6.4. Sources of atmospheric emission

6.4.1. Point source parameters

Point Source Code	Source Name	Latitude (decimal degrees) South	Longitude (decimal degrees) East	Height of Release Above Ground (m)	Height Above Nearby Building (m)	Diameter at Stack Tip / Vent Exit (m)	Actual Gas Exit Temperature (°C)	Actual Gas Volumetric Flow (m^3/hr)	Actual Gas Exit Velocity (m/s)	Emission Hours	Type of Emission (Continuous / Batch)
1	02F201 Stack	33.84516	18.52839	60.96	-	1.68	Approx 335	-	Approx 8	24 hours	Continuous
2	2F1 Combined Stack	33.84480	18.52853	60.96	-	2.68	Approx 404	-	Approx 10		
3	4F1 Combined Stack	33.84523	18.52904	59.13	-	3.35	Approx 230	-	Approx 2		
4	YIP Combined Stack	33.84342	18.52909	91.44	-	2.53	Approx 551	-	Approx 8		
5	No 1 FCCU	33.84380	18.52969	59.50	-	1.2	Approx 215	-	Approx 18		
6	56F201 Stack	33.84550	18.52980	53.35	-	0.91	Approx 398	-	Approx 6		
7	Major Combined Stack	33.84242	18.53102	91.44	-	3.05	Approx 263	-	Approx 17		
8	71F1 Stack	33.84403	18.52977	53.00	-	0.9	Approx 229	-	Approx 7		
9	Existing Flare	33.83834	18.52995	53.34	-	0.93 (1.1 to 1.83 depending on flame)	Approx 1000	-	Approx 20		
10	New Elevated Flare	33.83834	18.52995	100	-	1.2 (effective diameter)	TBE	-	TBE		

TBE = to be established (source has not been installed yet)

Note: 6.4.1.1 to 6.4.1.8 is contained in Appendix A to this AEL. The Appendix contains diagrams of the stacks located at the refinery and is considered to be confidential proprietary information and is not available to the general public.

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6.4.2. Area and/or line source parameters

Area Source Code	Source Name	Source Description	Latitude (decimal degrees) of SW corner	Longitude (decimal degrees) of SW corner	Height of Release Above Ground (m)	Length of Area (m)	Width of Area (m)	Emission Hours	Type of Emission (Continuous / Intermittent)
1	New MPGF	New Multipoint Ground Flare	33.84038	18.52853	2.5	62.02	53.34	24 hours	Continuous
2	TTLR	Loading Racks for loading Road Tankers with Petroleum Products	33.84490	18.52561	3.0	76.2	30.5		
3	TF	Tank Farm	33.84472	18.52401	-	-	-		
4	KTF	Killarney Tank Farm	33.83529	18.53001	-	-	-		

NOTES:

1. TF and KTF represent a number of tanks of various sizes used for the storage of various substances.
2. Tanks storage areas located east of Process Area as depicted in Figure 2 are not included in Table 6.4.2.1 due to the low volatility of substances stored in tanks located in these areas.
3. Product loading area located east of Process Area as depicted in Figure 2 are dedicated to LPG loading and is therefore not included in Table **6.4.2.1**.

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6.4.2.1 Tank storage information

Unique Area Source ID	Source Name	Source Description	Latitude (decimal degrees) of SW corner	Longitude (decimal degrees) of SW corner	Height of Release Above Ground (m)	Tank/Sphere Diameter (m)	Width of Area (m)	Angle of Rotation from True North (°)
TF001	TK-21	Floating Roof			9.8	10.7	-	-
TF002	TK-22	Floating Roof			9.8	10.7	-	-
TF003	TK-23	Fixed Roof			9.8	10.7	-	-
TF004	TK-24	Fixed Roof			9.8	10.7	-	-
TF005	TK-25	Fixed Roof			9.8	10.7	-	-
TF006	TK26	Floating Roof			9.8	10.7	-	-
TF007	TK-27	Floating Roof			14.6	10.7	-	-
TF008	TK-28	Floating Roof			14.6	10.7	-	-
TF009	TK-61	Fixed Roof			7.3	4.0	-	-
TF010	TK-62	Fixed Roof			7.3	4.0	-	-
TF011	TK-101	Floating Roof			16.5	53.0	-	-
TF012	TK-102	Floating Roof			16.5	53.0	-	-
TF014	TK-104	Fixed Roof			7.3	5.5	-	-
TF015	TK-200	Fixed Roof			16.0	36.0	-	-
TF016	TK-201	Fixed Roof			16.5	53.0	-	-
TF017	TK-202	Floating Roof			16.5	53.0	-	-
TF018	TK-203	Floating Roof			16.5	53.0	-	-
TF019	TK-204	Floating Roof			16.5	53.0	-	-
TF020	TK-205	Floating Roof			16.5	53.0	-	-
TF021	TK-206	Fixed Roof			16.7	46.7	-	-
TF022	TK-207	Fixed Roof			16.7	46.6	-	-
TF023	TK-301	Floating Roof			14.6	18.3	-	-
TF024	TK-302	Floating Roof			14.6	18.3	-	-
TF025	TK-303	Floating Roof			14.6	18.3	-	-
TF026	TK-304	Floating Roof			17.1	24.4	-	-
TF027	TK-305	Floating Roof			17.1	24.4	-	-
TF028	TK-306	Floating Roof			14.6	18.3	-	-
TF029	TK-307	Fixed Roof			9.8	10.7	-	-
TF030	TK-308	Fixed Roof			17.1	21.4	-	-
TF031	TK-401	Floating Roof			17.2	21.3	-	-
TF032	TK-402	Floating Roof			17.2	21.3	-	-
TF033	TK-403	Floating Roof			17.1	24.4	-	-
TF034	TK-404	Floating Roof			17.1	24.4	-	-
TF035	TK-405	Floating Roof			14.6	18.3	-	-

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Unique Area Source ID	Source Name	Source Description	Latitude (decimal degrees) of SW corner	Longitude (decimal degrees) of SW corner	Height of Release Above Ground (m)	Tank/Sphere Diameter (m)	Width of Area (m)	Angle of Rotation from True North (°)
TF036	TK-406	Fixed Roof			17.1	21.3	-	-
TF037	TK-407	Floating Roof			16.7	42.7	-	-
TF038	TK-408	Fixed Roof			16.7	21.0	-	-
TF039	TK-409	Floating Roof			16.7	42.6	-	-
TF040	TK-501	Fixed Roof			17.1	21.3	-	-
TF041	TK-502	Fixed Roof			17.1	24.4	-	-
TF042	TK-503	Fixed Roof			17.1	24.4	-	-
TF043	TK-504	Fixed Roof			17.1	24.4	-	-
TF044	TK-505	Floating Roof			12.8	17.3	-	-
TF045	TK-506	Fixed Roof			16.0	22.5	-	-
TF046	TK-507	Fixed Roof			17.1	36.6	-	-
TF047	TK-508	Floating Roof			16.7	42.7	-	-
TF048	TK-509	Fixed Roof			18.0	32.0	-	-
TF049	TK-601	Floating Roof			14.6	18.3	-	-
TF050	TK-602	Fixed Roof			17.1	13.7	-	-
TF051	TK-603	Fixed Roof			17.1	24.4	-	-
TF052	TK-901	Pressure Vessel-Sphere			-	15.2	-	-
TF053	TK-902	Pressure Vessel-Sphere			-	15.2	-	-
TF054	TK-903	Pressure Vessel-Sphere			-	12.6	-	
TF055	TK-904	Pressure Vessel-Bullet			3.2- Diameter	17.3-Length	-	-
KTF001	TK-C1	Floating Roof			14.6	54.9	-	-
KTF002	TK-C2	Floating Roof			14.6	54.9	-	-
KTF003	TK-C3	Floating Roof			14.6	54.9	-	-
KTF004	TK-C4	Floating Roof			14.6	54.9	-	-
KTF005	TK-C5	Floating Roof			14.6	54.9	-	-
KTF006	TK-C6	Floating Roof			14.6	54.8	-	-
KTF007	TK-C7	Floating Roof			14.6	54.8	-	-
KTF008	TK-C8	Floating Roof			14.6	54.8	-	-
KTF009	TK-C9	Floating Roof			14.6	54.9	-	-
KTF010	TK-C10	Floating Roof			14.6	54.8	-	-
KTF011	TK-C11	Floating Roof			14.6	54.9	-	-
KTF012	TK-C12	Floating Roof			14.6	54.9	-	-
KTF013	TK-C13	Floating Roof			14.6	54.8	-	-
KTF014	TK-C14	Floating Roof			14.6	54.8	-	-
KTF015	TK-C15	Floating Roof			14.6	54.9	-	-

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Unique Area Source ID	Source Name	Source Description	Latitude (decimal degrees) of SW corner	Longitude (decimal degrees) of SW corner	Height of Release Above Ground (m)	Tank/Sphere Diameter (m)	Width of Area (m)	Angle of Rotation from True North (°)
KTF016	TK-C16	Floating			14.6	54.9	-	-
KTF017	TK-C17	Floating			14.6	54.9	-	-
KTF018	TK-C18	Floating			14.6	54.9	-	-
KTF019	TK-C19	Floating			14.6	54.9	-	-
KTF020	TK-C20	Floating			14.6	54.9	-	-
Other 001	TK-54	Floating			17.1	17.7	-	-
other 002	TK-55	Fixed			6.1	60.1	-	-
Other 003	TK-57	Fixed			13.0	12.5	-	-
Other 004	TK-58	Fixed			13.0	12.5	-	-
Other 005	TK-803	Fixed			15.9	10.7	-	-
Other 006	TK-804	Fixed			9.8	8.2	-	-
Other 007	TK-805	Fixed			9.8	9.1	-	-
Other 008	TK-806	Fixed			14.6	15.2	-	-
Other 009	TK-807	Fixed			7.3	6.1	-	-
Other 010	TK-820	Fixed			5.5	6.1	-	-
Other 011	TK-821	Fixed			5.5	6.1	-	-
Other 012	TK-822	Fixed			5.5	6.1	-	-
Other 013	TK-69D1	Fixed			9.6	9.1	-	-
Other 014	TK-69D2	Fixed			9.6	9.1	-	-
Other 015	TK-69D6	Fixed			9.6	9.1	-	-

NOTES: Tanks grouped per area for ease of reference. The source description for these tanks indicates what type of substance would typically be stored in the tank. See table below for more detail. Tanks utilised for storage of water and process chemicals are not included.
Not all tanks are in use. The latitudes and longitudes have been removed for National security purposes.

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6.4.2.2 Tank substance storage information

Source Description	Substance Name	True Vapour Pressure [kPa]
Fixed Roof	Bunker Gas Oil (BGO)	< 14 kPa
Fixed Roof	Diesel Gas Oil (DGO)/ Seal Oil	< 14 kPa
Fixed Roof	Fuel Oil	< 14 kPa
Fixed Roof	Illuminating Kerosene/Jet	< 14 kPa
Fixed Roof	Asphalt	< 14 kPa
Fixed Roof	Heavy Vacuum Gas Oil (HVGO)	< 14 kPa
Floating Roof	Gasoline/Mogas	14 - 91 kPa
Floating Roof	Crude Oil	14 - 91 kPa
Floating Roof	Reformate	14 - 91 kPa
Floating Roof	Intermediate Product/Slop	14 - 91 kPa
Pressure Vessel	LPG	> 91 kPa
Pressure Vessel	Butane	> 91 kPa

7. APPLIANCES AND MEASURES TO PREVENT AIR POLLUTION

7.1. Appliances and control measures

Associated Source Code	Appliances			Abatement Equipment Control Technology							
	Appliance / Process Equipment Number	Appliance Serial Number	Appliance Type / Description	Abatement Equipment Technology Name and Model	Abatement Equipment Technology Manufacture Date	Commission Date	Date of Significant Modification / Upgrade	Technology Type	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilisation (%)
5	#1 FCCU ESP	-	Electrostatic Precipitator	Research Cottrell	-	-	-	ESP	45 000 Nm3/hour	80	90
7	#2 FCCU ESP	-	Electrostatic Precipitator	Research Cottrell	-	-	-	ESP	45 000 Nm3/hour	80	90
4	TGTU	-	Tailgas Treating Unit	Sandvik	-	-	-	SCOT	550 kg/hour	99	80
4	SRU 1	-	Sulphur Recovery Unit	2 Stage Claus	-	-	-	Catalytic Sulphur Recovery	45 ST/day sulphur in the feed. (Basis 88.9 mol% of H2S in acid gas.)	95	99 (linked to SRU feed rate)
4	SRU 2	-	Sulphur Recovery Unit	2 Stage Claus	-	-	-	Catalytic Sulphur Recovery	45 ST/day sulphur in the feed. (Basis 88.9 mol% of H2S in acid gas.)	95	99 (linked to SRU feed rate)
2 (Area Source)	VRU	-	Vapour Recovery Unit	Aker Kvaerner Cool Sorption A/S	-	-	-	Non thermal treatment	Nominal yearly capacity of 400 000 m3 for vapour with nominal HC concentration of 35 vol. %	Maximum HC concentration in outlet of 10 g/Nm3.	TBC

NOTE: The minimum control efficiency and minimum utilisation compliance conditions to be based on a monthly average.

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7.2. Point source – maximum emission rates (under normal working conditions)

7.2.1 Sub-category 1.2: Liquid fuels combustion installations: Liquid fuels combustion installations used primarily for steam raising or electricity generation - All installations with design capacity equal to or greater than 50 MW heat input per unit, based on the lower calorific value of the fuel used:

Listed activities:

	Equipment name and code	Stack Point source code
1	69F2 Steam Raising Boiler	Major combined Stack

Point Source Code	Pollutant Name	Maximum Release Rate			Duration of Emissions
		mg/Nm³ under normal conditions of 3 % O_2, 273 Kelvin and 101.3 kPa.	Date to be Achieved By	Average Period	
Major combined Stack	Particulate Matter	75	1 April 2015	Daily	Continuous
		50	1 April 2020		
	Sulphur dioxide	3500	1 April 2015		
		500	1 April 2020		
	Oxides of nitrogen-NO_x expressed as NO_2	1100	1 April 2015		
		250	1 April 2020		

NOTE: Periodic emissions in stack monitoring shall take place annually and monitoring is to be conducted in 69 F2 duct prior to discharge into the major combined stack.

7.2.2 Sub-category 1.4: Gas Combustion installations: Gas combustion (including gas turbines burning natural gas) used primarily for steam raising or electricity generation - All installations with design capacity equal to or greater than 50 MW heat input per unit, based on the lower calorific value of the fuel used

Listed activities:

	Equipment name and code	Stack Point source code
1	69F2 Steam Raising Boiler	Major Combined Stack

Point Source Code	Pollutant Name	Maximum Release Rate			Duration of Emissions
		mg/Nm³ under normal conditions of 3 % O_2, 273 Kelvin and 101.3 kPa.	Date to be Achieved By	Average Period	
Major Combined Stack	Particulate Matter	10	1 April 2015	Daily	Continuous
		10	1 April 2020		
	Sulphur dioxide	500	1 April 2015		
		400	1 April 2020		
	Oxides of nitrogen-NO_x expressed as NO_2	300	1 April 2015		
		50	1 April 2020		

NOTE: Periodic emissions in stack monitoring shall take place annually and monitoring is to be conducted in 69 F2 duct prior to discharge into the major combined stack

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7.2.3 **Sub-category 2.1: Combustion installations: Combustion installations not used primarily for steam raising or electricity generation (furnaces and heaters) - All refinery furnaces and heaters.**

Table A Listed activities:

	Equipment name and code	Stack Point source code	Monitoring Location
1	Process Heater 02F201	02F201 Stack	02F201 Stack
2	Process Heater 5F1	2F1 Stack	2F1 Stack
3	Process Heater 3F1		
4	Process Heater 3F2		
5	Process Heater 6F1		
6	Process Heater 2F1		
7	Process Heater 4F1	4F1 Stack	4F1 Stack
8	Process Heater 4F2		
9	Process Heater 4F3		
10	Process Heater 4F4		
11	Process Heater 52F201	YIP Stack	In the combined duct of 52 F201 and 52F202 prior to discharge into the YIP stack
12	Process Heater 52F202		
13	Process Heater 56F201	56F201 Stack	56F201 Stack
14	Process Heater 60F1	Major Combined Stack	In the combined duct for 60F1 and 61F1 prior to discharge into the major combined stack
15	Process Heater 61F1		
16	Process Heater 71F1	71F1 Stack	71F1 Stack

Point Source Code	Pollutant Name	Maximum Release Rate			Duration of Emissions
		mg/Nm³ under normal conditions of 10% O_2, 273 Kelvin and 101.3 kPa.	Date to be Achieved By	Average Period	
As per Table A above	Particulate Matter	120	1 April 2015	Daily	Continuous
		70	1 April 2020		
	Sulphur dioxide	1700	1 April 2015		
		1000	1 April 2020		
	Oxides of nitrogen-NO_x expressed as NO_2	1700	1 April 2015		
		400	1 April 2020		

NOTE: Periodic emissions in stack monitoring shall take place annually and monitoring is to be as per table A.

(a) The following special arrangements shall apply -

i) No continuous flaring of hydrogen sulphide-rich gases shall be allowed.

ii) A bubble cap of all Combustion Installations and Catalytic Cracking Units shall be at 1.2 Kg SO_2/ ton for existing plants-1 April 2015

iii) A bubble cap of all Combustion Installations and Catalytic Cracking Units shall be at 0.4 Kg SO_2/ ton for new plants-1 April 2020.

NOTE: Bubble cap compliance condition to be based on a daily average

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7.2.4 Sub-category 2.2: Catalytic Cracking Units: Refinery catalytic cracking units - All installations.

Table B Listed activities:

	Equipment name and code	Stack Point source code	Monitoring Location
1	No 1 FCCU (unit 53C2)	No 1 FCCU Stack	No 1 FCCU Stack
2	No 2 FCCU(unit 63C2)	Major Combined Stack	In No 2 FCCU ducting prior to discharge into the major combined stack.

Point Source Code	Pollutant Name	Maximum Release Rate			Duration of Emissions
		mg/Nm³ under normal conditions of 10% O_2, 273 Kelvin and 101.3 kPa.	Date to be Achieved By	Average Period	
As per Table B above	Particulate Matter	120	1 April 2015	Daily	Continuous
		100	1 April 2020		
	Sulphur dioxide	3000	1 April 2015		
		1500	1 April 2020		
	Oxides of nitrogen-NO_x expressed as NO_2	550	1 April 2015		
		400	1 April 2020		

NOTE: Periodic emissions in stack monitoring shall take place annually and monitoring as per Table B.

(a) The following special arrangements shall apply -

i) A bubble cap of all Combustion Installations and Catalytic Cracking Units shall be at 1.2 Kg SO_2/ ton of crude oil processed for existing plants – 1 April 2015

ii) A bubble cap of all Combustion Installations and Catalytic Cracking Units shall be at 0.4 Kg SO_2/ ton of crude oil processed for new plants – 1 April 2020

NOTE: Bubble cap compliance condition to be based on a daily average

7.2.5 Sub-category 2.3: Sulphur Recovery Unit: All installations

Listed activities:

	Equipment name and code	Stack Point source code
1	Process Burner 67F5	YIP Stack
2	Process Burner 67F10	

Point Source Code	Pollutant Name	Special Arrangement
YIP Stack	Hydrogen Sulphide	Sulphur recovery units shall achieve 95% recovery efficiency and availability of 99%.

NOTE: SRU availability is linked to SRU feed rate therefore the following formula applies:

$$SRU\ availability\ (\%) = \left(\frac{Total\ SRUfeedgas\ generated(m^3/hr) - Total\ SRUfeedgas\ routed\ to\ Flare\ (m^3/hr)}{Total\ SRUfeedgas\ generated\ (m^3/hr)} \right) * 100$$

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7.2.6 Sub-category 2.4: Storage and Handling of Petroleum Products: All permanent immobile liquid storage facilities at a single site with a combined storage capacity of greater than 1 000 cubic meters

Listed activities: All fuel storage tanks as listed in table 6.4.2.1 of this document.

(a) The following transitional arrangement shall apply for the storage and handling of raw materials, intermediate and final products with a vapour pressure greater than 14kPa at operating temperature: -
Leak detection and repair (LDAR) program approved by the licensing authority must be maintained and implemented at all times.
(b) The following special arrangements shall apply for control of TVOCs from storage of raw materials, intermediate and final products with a vapour pressure of up to 14kPa at operating temperature, except during loading and offloading. (Alternative control measures that can achieve the same or better results may be used) –
(i) Storage vessels for liquids shall be of the following type:

Application	All permanent immobile liquid Storage facilities at a single site with a combined storage capacity of greater than 1000 Cubic meters.
True vapour pressure of contents at product storage temperature	Type of tank or vessel
Type 1: Up to 14 kPa	Fixed-roof tank vented to atmosphere, or as per Type2 and 3
Type 2: Above 14 kPa and up to 91 kPa with a throughput of less than 50'000 m3 per annum	Fixed-roof tank with Pressure Vacuum Vents fitted as a minimum, to prevent "breathing" losses, or as per Type 3
Type 3: Above 14 kPa and up to 91 kPa with a throughput greater than 50 000 m3 per annum	a) External floating-roof tank with primary rim seal and secondary rim seal for tank with a diameter greater than 20m, or b) fixed-roof tank with internal floating deck / roof fitted with primary seal, or c) fixed-roof tank with vapour recovery system.
Type 4: Above 91 kPa	Pressure vessel

(ii) The roof legs, slotted pipes and/or dipping well on floating roof tanks (except for domed floating roof tanks or internal floating roof tanks) shall have sleeves fitted to minimise emissions.
(iii) Relief valves on pressurised storage should undergo periodic checks for internal leaks. This can be carried out using portable acoustic monitors or if venting to atmosphere with an accessible open end, tested with a hydrocarbon analyser as part of an LDAR programme.
(c) The following special arrangements shall apply for control of TVOCs from the loading and unloading (excluding ships) of raw materials, intermediate and final products with a vapour pressure of greater than 14kPa at handling temperature. Alternative control measures that can achieve the same or better results may be used:

(i) All installations with a throughput of greater than 50 000 m^3 per annum of products with a vapour pressure greater than 14 kPa, must be fitted with vapour recovery / destruction units. Emission limits are set out in the table below -

Description:	Vapour Recovery Units		
Application:	All loading/ offloading facilities with a throughput greater than 50 000 m^3		
Substance or mixture of substances		Plant status	mg/Nm^3 under normal conditions of 273 Kelvin and 101.3 kPa.
Common name	Chemical symbol		
Total volatile organic compounds from vapour recovery/ destruction units using thermal treatment.	N/A	New	150
		Existing	150
Total volatile organic compounds from vapour recovery/ destruction units using non thermal treatment.	N/A	New	40 000
		Existing	40 000

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(ii) For road tanker and rail car loading / offloading facilities where the throughput is less than 50 000 m^3 per annum, and where ambient air quality is, or is likely to be impacted, all liquid products shall be loaded using bottom loading, or equivalent, with the venting pipe connected to a vapour balancing system. Where vapour balancing and / or bottom loading is not possible, a recovery system utilizing adsorption, absorption, condensation or incineration of the remaining VOC's, with a collection efficiency of at least 95%, shall be fitted.

Conditions of authorisation:

7.3.1 The holder must develop a written start-up, shut down, maintenance and emergency plan that describes in detail procedures for operating and maintaining emission sources during periods of start-up, shut down, maintenance and emergency by **31 December 2014**; and a programme of corrective action for emergencies, air pollution control, and monitoring equipment used to comply with the relevant standards to ensure that at all times operates and maintains each affected source, including associated air pollution control and monitoring equipment in a manner which satisfies general duty of care enshrined in Section 28 of NEMA.

7.3.2 The National Ambient Air Quality Standards for SO_2 as detailed in table 7.3.2.1 below may not be exceeded at the following monitoring stations: Tableview, Bothasig and Plattekloof.

Chevron must review and evaluate the available SO_2 ambient air quality monitoring results of the surrounding ambient air quality monitoring stations (Bothasig, Tableview and Plattekloof). Any exceedences of the Sulphur Dioxide (SO_2) ambient air quality standard must be reported to the Licensing Authority. Events potentially caused by the Refinery to be investigated and remedied by the Refinery.

7.3.2.1 National ambient air quality standards for Sulphur Dioxide (SO_2)

Averaging period	Concentration-µg/m^3	Frequency of exceedences per annum	Compliance date
10 minute	500	526	Immediate
1 hour	350	88	
24 hours	125	4	
1 year	50	0	

7.3.3 **Condition of authorisation:** Under start-up, shut down and maintenance conditions the licence holder may not exceed a bubble cap of 22 tons of SO_2 over any 24 hour period for all process operations. The bubble cap shall be based on an engineering calculation which must be independently peer reviewed by an external competent third party and submitted to the Licencing Authority within 60 days of the event.

7.3.4 **Condition of authorisation:** The elevated flare and the ground flare must comply with all the conditions specified in the **Environmental Authorisation reference no: E12/2/3/1-A2/309-0468/08** dated 28 May 2009.

7.3.5 **Condition of authorisation:** Any event that results in the emission of more than 1.5 tons of SO2 per day from a flare must be reported to the Licensing Authority within 48 hours. A flare event report must be submitted to the Licensing Authority within 14 days of the event.

7.3.6 Condition of authorisation: Full compliance with the contingency plan detailed in the table below:

Unit Process	Description of Occurrence of Potential Releases	Pollutants and associated amount of emissions	Contingency Plan
Steam Boilers, Waste Heat Boilers and Process Heaters/Furnaces	Maintenance - Soot Blowing Soot Blowing is performed, as required, during day shift only. Maximum Frequency ~ 10 minutes continued soot blowing per unit in a 24 hour period. Soot Blowing on Waste Heat Boilers is critical to ensure ESP availability and efficiency.	Particulates emissions increase for short period of time. Increased plume visibility. Soot blowing on a Waste Heat Boilers increase the amount of particulates routed to the ESP, which in turn could reduce the ESP removal efficiency.	Soot blowing is performed regularly in order to minimise duration and impact.
Waste Heat Boilers	Maintenance – Tube and casing repairs can only be done while the waste heat boiler(s) is offline. Repair time estimated at 2 weeks. The waste heat boiler reduces FCCU flue gas temperature to the required ESP inlet temperature. Therefore the ESP cannot be online when the Waste Heat Boiler is offline	Particulate emission from FCCUs can increase for the duration of repair required on Waste Heat Boilers due to the ESP being offline. Increased plume visibility.	Where possible tube repairs are conducted during annual maintenance shut down periods.

Unit Process	Description of Occurrence of Potential Releases	Pollutants and associated amount of emissions	Contingency Plan
Waste Heat Boilers	Maintenance – Gauge Glass, PSV and valve replacements/repairs can only be done while the waste heat boiler(s) is offline. Repair time estimated at 2 days.	Particulate emission from FCCUs can increase for the duration of repair required on Waste Heat Boilers due to the ESP being offline. Increased plume visibility.	Where possible gauge glass replacement/repairs are conducted during annual maintenance shut down periods.
Waste Heat Boilers	Statutory Inspection – as required in terms of the Pressure Equipment Regulations Inspection duration is approximately 4 weeks and is scheduled every 4 years.	Particulate emission from FCCUs can increase for the duration of inspection required on Waste Heat Boilers due to the ESP being offline.	Where possible statutory inspections are conducted during annual maintenance shut down periods.
Process Heaters/Furnaces	Maintenance - De-coking (important maintenance activity required for optimal performance)	Increased plume visibility.	Where possible de-coking is conducted during annual maintenance shut down periods.
SCOT	Statutory Inspection – as required in terms of the Pressure Equipment Regulations Inspection duration is approximately 6 weeks and is scheduled every 8 years.	If inspection is required outside of annual maintenance window then the SO2 emissions will increase due to reduction in SRU conversion efficiency during the period that the SCOT is offline for inspection.	Where possible statutory inspections are conducted during annual maintenance shut down periods.

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Unit Process	Description of Occurrence of Potential Releases	Pollutants and associated amount of emissions	Contingency Plan
SCOT	Start-up process after SRU shut down - the SCOT unit requires steady feed conditions to perform optimally; therefore the SCOT plant cannot be started until Refinery operations are steady. Refinery start up activity takes approximately 2 weeks, depending on the complexity of the shut down.	SO2 emissions increase due to reduction in SRU conversion efficiency.	
SCOT	Maintenance cleaning required every quarter which takes approximately 2 weeks.	SO2 emissions increase due to reduction in SRU conversion efficiency.	
SRUs	Start-up and Shut-down of process units supplying gas feed to the SRUs – the SRUs, as designed, requires sufficient and steady gas feed to operate. If the gas feed is less than design the SRUs are shut down/not started up and gas is routed to the flare. This can be linked to planned maintenance activity, or can be due to unplanned events (such as an electrical power supply failure) resulting in shut down of process units supplying gas feed to the SRUs. The SRUs requires steady feed conditions to perform optimally; therefore the 95% conversion can only be achieved once steady Refinery operations have been achieved. Refinery start up activity takes approximately 2 weeks, depending on the complexity of the shut down.	SO2 from flare increase during period of refinery start up when gas feed rate is insufficient to start the SRU(s) and gas is routed to flare. Increased plume visibility (due to dispersion dynamics) from YIP stack during period if Plt 52 is offline. SO2 emissions increase due to reduction in SRU conversion efficiency.	

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Unit Process	Description of Occurrence of Potential Releases	Pollutants and associated amount of emissions	Contingency Plan
SRUs	Heat Soak required on a quarterly basis. It is difficult to maintain SRU conversion of 95% during heat soak activities. SRU exit gas cannot be routed to the SCOT during heat soak. Heat Soak activity takes approximately 1 week.	SO2 emissions increase due to reduction in SRU conversion efficiency.	
SRUs	Hot Strip is required before every planned shut down of the SRU. It is difficult to maintain SRU conversion of 95% during hot strip activities. SRU exit gas cannot be routed to the SCOT during hot strip. Hot Strip activity takes approximately 48 hours.	SO2 emissions increase due to reduction in SRU conversion efficiency.	
ESPs on FCCUs	Start-up process after FCCU(s) shut down – the potential for CO breakthrough during FCCU start up poses a safety risk when the ESP is online, therefore the ESP is only brought online once steady FCCU operation has been achieved. FCCU start up activity takes approximately 1	PM emissions increase due to ESP offline. Increased plume visibility.	

Unit Process	Description of Occurrence of Potential Releases	Pollutants and associated amount of emissions	Contingency Plan
	week, depending on the complexity of the shut down.		
ESPs on FCCUs	Maintenance that can be performed while ESP remain online – including, but not limited to, repair of rotorary valves and seal air fan – could potentially affect ESP removal efficiency.	PM emissions increase due to reduction in ESP removal efficiency. Increased plume visibility.	
ESPs on FCCUs	Maintenance requiring ESP to be offline – including, but not limited to: 1. Rodding of hoppers 2. Transformer repairs 3. Casing repairs 4. Internal/mechanical repairs The ESP takes approximately 24 hours to cool down before any repairs can be undertaken. Repair duration depends on complexity and location of maintenance required.	PM emissions increase due to ESP offline. Increased plume visibility.	Where possible ESP repairs are conducted during annual maintenance shut down periods.
VRU	Maintenance that can be performed online – to be confirmed	VOC emissions increase due to reduction in VRU removal efficiency.	
VRU	Maintenance requiring VRU to be offline – to be confirmed	VOC emissions increase due to VRU offline.	

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7.4. Point source – emission monitoring and reporting requirements

Point Source Code	Emission Sampling / Monitoring Method	Sampling Frequency	Sampling Duration	Parameters to be Measured	Parameters to be Reported	Reporting Frequency
1 to 8	Opacity analysers on all process heaters and boilers	Continuous [95% availability]	Continuous	% Opacity		Annually
9	Monitoring by camera	Continuous	Continuous	Flare appearance		
1 to 9	SO2 – standard engineering calculations using process and laboratory data (as communicated to the City on 01 March 2012 in letter Ref. A Borman/ivf2068)	1 to 9	SO2 – standard engineering calculations using process and laboratory data (as communicated to the City on 01 March 2012 in letter Ref. A Borman/ivf2068)	1 to 9		
FCCUs (5 & 7)	PM – standard engineering mass balance calculations using process and laboratory data (as communicated to the DEA on 13 October 2009 in letter Ref. KJM/ivf1906)	FCCUs (5 & 7)	PM – standard engineering mass balance calculations using process and laboratory data (as communicated to the DEA on 13 October 2009 in letter Ref. KJM/ivf1906)	FCCUs (5 & 7)		

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7.4.1. Conditions of authorisation: No continuous emission or flaring of hydrogen sulphide-rich gasses (normally routed to the SRU under normal operating conditions) shall be allowed.

7.5. Area and/or line source – management and mitigation measures

Area and/or Line Source Code	Area and/or Line Source Description	Description of Specific Measures	Timeframe for Achieving Required Control Efficiency	Method of Monitoring Measures Effectiveness	Contingency Measures
2	Tanker loading bay	Vapour Recovery Unit (VRU) linked to loading road tankers with diesel and gasoline.	Already in place	Monthly fence line passive sampling for BTEX and approved LDAR programme	Repair and maintenance programme
3 and 4	Liquid fuel storage tanks	Product with vapour pressure above 14 kPa and below 91 kPa stored in floating roof tanks			
3	Gaseous fuel storage tanks	LPG and Butane are stored in Pressure Vessels			
	Odour emissions from refinery operations	1. Where odour episodes occur, appropriate mitigation measures must be deployed. 2. An odour management plan must be submitted to the Licensing Authority by 31 December 2014.	31 December 2014	As per odour management plan.	

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8. GENERAL CONDITIONS OF AUTHORISATION FOR LICENCE HOLDER

8.1 Ambient air quality monitoring:

8.1.1 The licence holder is required to continue with the funding of the continuous ambient air quality monitoring and meteorological equipment at one station i.e Tableview. Other ambient data will be gathered by the Bothasig and Plattekloof stations. These stations are operated and maintained by the City of Cape Town.

8.1.2 The licence holder is required to continue with the passive ambient air quality monitoring programme at the seven stations currently reported to the Licencing Authority. Any deviations from this monitoring regime must be approved in writing by the Licensing Authority.

8.1.3 The licence holder must enter into a service level agreement with the City of Cape Town for the continuous ambient air quality monitoring of SO_2, NOx, PM_{10} and H_2S at the Tableview monitoring station by 1 February 2015.

8.2 Non Compliance with Minimum Emission Standards

In the event of non-compliance of the conditions and requirements indicated in the licence, a report in the following format must be submitted to the Licensing Authority within 60 days of the event:

1. Source code / name;
2. Root cause analysis (where applicable/ upon request of Licensing Authority)
3. Calculation of impacts / emissions associated with the non-compliance incident and dispersion modeling of pollutants, where applicable/ upon request of Licensing Authority;
4. Measures implemented or to be implemented to prevent recurrence and date by which measure will be implemented.

8.3 Emergency Preparedness and Abnormal Operating Conditions

1. Section 30 of the National Environmental Management Act 107 of 1998, as amended defines an emergency incident as 'an unexpected sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property'. The relevant authority includes the municipality with jurisdiction over the area in which the incident occurs.

2. In the event of an emergency incident, the contact details for the reporting of the incident to the City of Cape Town Emergency Call Centre are as follows: (Toll free: 0809114357; 0801124357; e-mail: gd-disasteroperations.centre@capetown.gov.za; Fax: 0865761776).

3. The Licence Holder shall formulate and maintain an internal emergency preparedness plan for acute pollution. All risks identified in the plan must be systematically managed using one of the approaches: Environmental Management procedures; and/or a contingency plan to reduce the probability of an incident or minimise the impact of the incident through an efficient and effective emergency response.

   This should include as a minimum a description of responsible personnel, their expertise, contact numbers, response procedures, staff training programmes and personal protective equipment. A list of material and equipment used in the event of acute pollution for containment, clean up, response or prevention must be available for inspection. The Contingency plan should include media specific response, i.e. storm-water and groundwater, discharges to sewer, waste, air pollution etc.
   Such emergency preparedness procedures shall be documented in a Contingency Plan which is to be kept up to date and be readily available to the Licence Authority on request.

In the event of any incident which has the potential to impact on the surrounding communities, the Licence Holder is required to present/report its findings in relation to the incident, such feedback must include:

(a) A written submission,
(b) Calculation of impacts/emissions associated with the incident and dispersion modelling of pollutants, where applicable,
(c) Interpretation of modelled ground level concentrations in relation to health impacts,
(d) Root cause analysis,
(e) Mitigatory measures to be implemented to prevent recurrence.

8.4 Incident Investigation

Should any significant adverse health or environmental impacts arise from any abnormal operating conditions, the Licence Holder must immediately undertake the appropriate mitigation to reduce the impact to within acceptable limits or abate the said nuisance and report thereon this may include the following:

(a) Determine what monitoring needs to be conducted and commence monitoring in the community
(b) External sampling results e.g. Hand held meter reading, canister samples
(c) Complaints received
(d) Calculated emission values or emissions during that period.

9. ROUTINE REPORTING AND RECORD-KEEPING

9.1 Condition of authorisation: Complaints register

The licence holder must maintain a complaints register at its premises, and such register must be made available for inspections. The complaints register must include the following information on the complainant, namely, the name, physical address, telephone number, date and the time when the complaint was registered. The register should also provide space for noise, dust and offensive odours complaints.
Furthermore, the licence holder is to investigate and, monthly, report to the licencing authority in a summarised format on the total number of complaints logged. The complaints must be reported in the following format with each component indicated as may be necessary:

(a) Source code / name;
(b) Root cause analysis;
(c) Calculation of impacts / emissions associated with incidents and dispersion modelling of pollutants, where applicable;
(d) Measures implemented or to be implemented to prevent recurrence; and
(e) Date by which measure will be implemented.

The licensing authority must also be provided with a copy of the complaints register on an annual basis. The record of a complaint must be kept for at least 5 (five) years after the complaint was made.

9.2 Condition of authorisation: Annual reporting

The licence holder must complete and submit to the licensing authority an annual report. The report must include information for the year under review (i.e. annual year end of the company). The report must be submitted to the licensing authority not later than 1 May after each reporting period. The annual report must include, amongst others, the following items:

(a) Pollutant emissions trend;
(b) Compliance audit report(s);
(c) Major upgrades projects (i.e. abatement equipment or process equipment); and
(d) Greenhouse gas emissions – total for the refinery.
(e)The results of the LDAR programme must be submitted to the Licensing Authority and must be updated to include all new equipment.

The holder of the licence must keep a copy of the annual report for a period of at least 5 (five) years.

NOTE: In this regard, the annual report and stack emissions report is due by 1 May 2015 and annually thereafter.

9.3 Condition of authorisation: Quarterly reporting

The licence holder must submit a quarterly report to the licensing authority as well as the provincial and national authorities on the performance of the refinery against the licence conditions.

NOTE: The format of the report currently reported to the Authorities quarterly meeting must be amended to include any new conditions of authorisation contained in this licence. **A draft format of this report must be submitted to the Licensing Authority by 30 November 2014** for approval.

9.4 Condition of authorisation: In January 2014, the National Air Quality Officer established an internet-based National Atmospheric Emissions Inventory System. Once the system is fully operational, the reports contemplated above must be made in the format required for the internet-based National Atmospheric Emissions Inventory System.

9.5 Condition of authorisation: Existing elevated, new elevated and ground flare:

1. Continuous ground and elevated flare monitoring cameras must be installed in such a manner so as to record flare activity and any dark smoke emissions.
2. A flare DVD must be provided to the Licensing Authority on a monthly basis.
3. The images recorded must allow the licensing Authority to observe not only the flame but also any dark smoke emissions.

10. INVESTIGATION

The following investigations are required:

Investigation	Purpose	Completion Date
The licence holder must embark on discussions with Eskom regarding security of electricity supply during periods of load shedding and report back to the Licensing Authority on outcomes.	To ensure that the refinery has a secure electricity supply at all times and that unplanned power outages do not result in excessive and uncontrolled emissions	30 November 2014.

11. DISPOSAL OF WASTE AND EFFLUENT ARISING FROM ABATEMENT EQUIPMENT CONTROL TECHNOLOGY

The disposal of any waste and effluent arising from the abatement equipment control technology must comply with the relevant legislation and requirements of the relevant authorities.

12. PENALTIES FOR NON-COMPLIANCE WITH LICENCE AND STATUTORY CONDITIONS OR REQUIREMENTS

Failure to comply with any of the licence and relevant statutory conditions and/or requirements is an offence, and licence holder, if convicted, will be subjected to those penalties as set out in section 52 of the AQA.

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