الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

KINGDOM OF SAUDI ARABIA

الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

ROYAL COMMISSION ENVIRONMENTAL REGULATIONS

2025

Volume I

Regulations and Standards

FOREWARD

The Royal Commission (RC) for Jubail and Yanbu enters its sixth decade with great success, international recognition, and major achievements in the industrial and infrastructure development of cities namely Jubail, Yanbu, Ras Al Khair, and Jazan. Jubail and Yanbu were developed in 1975 as hydrocarbon-based industrial cities while Ras Al Khair has been added under RC jurisdiction in the year of 2009, as a mineral-based industrial city. Recently, the Jazan City for Primary and Downstream Industries, the fourth city, has been given under RC jurisdiction in 2015.

The Royal Commission is committed to excellence and strives continually to improve and increase its capacity in achieving superior results that surpass all expectations.

The Royal Commission always supports the development of the community under a healthy and clean environment; and the wise stewardship to maximize the benefit of natural resources of the Kingdom in conjunction with the sustainable development directives.

The Royal Commission for Jubail and Yanbu has always been recognized as a leader in environmental performance management and has encouraged industrial growth in the industrial cities of Jubail and Yanbu while maintaining a fine-tuned balance and harmony between environmental protection and heavy industrialization. The RC continues to refine its environmental management system to better support decision-making and enhance the ability to protect the environment and public health.

The Royal Commission issues the fifth revision of the environmental regulations, titled “Royal Commission Environmental Regulations-2025” (RCER-2025) which supersedes the last version RCER-2015. All the regulations and standards in the RCER-2025 have been revised and updated to cover all the environmental aspects of the industrial cities and thus, shall be followed by all industries in Jubail, Yanbu, Ras Al-Khair, Jazan, and other industrial cities to be given under the RC jurisdiction in future.

It is to be noted that the industries and environment Royal Commission cities have always co-existed in an integrated fashion through transparency and accountability with increasing use of cleaner and energy-efficient technologies, reducing potential environmental impacts, influencing positively on the local community and upholding the highest ethical standards.

It is indeed a great pleasure to see that industries in Jubail, Yanbu, Ras Al-Khair, and Jazan have been showing much commitment to the environment and have always cooperated closely with Royal Commission. It is expected that such cooperation between industries and Royal Commission will continue in future.

Engineer Khalid Mohammed Al-Salem

President of Royal Commission for Jubail and Yanbu

TABLE OF CONTENTS

LIST of Tables

APPENDICES:

LIST OF UNITS AND ABBREVIATIONS

APHA	-	American Public Health Association
AWWA	-	American Water Works Association
COD	-	Chemical Oxygen Demand
BOD	-	Biochemical Oxygen Demand
BTU	-	British thermal unit
C	-	degrees Centigrade
d	-	day
dBA	-	A-weight sound pressure level in decibels
DRE	-	Destruction and Removal Efficiency
dscm	-	dry standard cubic meter
ECRA	-	Electricity & Co-generation Regulatory Authority
EIA	-	Environmental Impact Assessment
EPC	-	Environmental Permit to Construct
EPO	-	Environmental Permit to Operate
ESQ	-	Environmental Screening Questionnaire
EERP	-	Environmental Emergency Response Plan
h	-	hour
H_t	-	Net heating value of a gas combusted in a flare
J	-	joule (equivalent to 0.239 calories)
kg	-	kilogram
kJ	-	kilojoules (equivalent to 1000 joules)
kPa	-	kilo Pascal
l	-	liter
L_{10}	-	noise level in decibels exceeded 10% of the time
lb	-	pound
lb/MBTU	-	pound per million British Thermal Units
min	-	minute
ml	-	milliliter
mm	-	millimeter
MPN	-	Most Probable Number
MEWA	-	Ministry of Environment, Water and Agriculture
MW	-	Megawatt (equivalent to 10^6 watts of electricity)
MWAN	-	National Center for Waste Management
NCEC	-	National Centre for Environmental Compliance
NMHC	-	Non- methane hydrocarbon
NMOC	-	Non-methane organic carbon
NTU	-	Nephelometric Turbidity Unit
Pa	-	Pascal, a unit of pressure expressed as Nm^{-2}
pH	-	$-\log_{10}$ (hydrogen ion concentration moles/l)
PAP	-	Permit Application Package
PCB	-	Polychlorinated Biphenyl
POHC	-	Principal Organic Hazardous Constituent
POM	-	Polycyclic Organic Matter
ppm	-	parts per million (mass)
ppmv	-	parts per million volume
ppt	-	parts per thousand
psi	-	pounds per square inch (gauge)
psia	-	pounds per square inch (absolute)
RCC	-	RC City
s	-	second
SAR	-	Sodium Adsorption ratio unit
scm	-	standard cubic meter
SOCMI	-	Synthetic Organic Chemical Manufacturing Industries
t	-	tonne (equivalent to 1000 kilograms)
TCLP	-	Toxicity Characteristic Leaching Procedure

TDS	-	Total Dissolved Solids
TKN	-	Total Kjeldahl Nitrogen
TOC	-	Total Organic Carbon
TPH	-	Total Petroleum Hydrocarbons
TSS	-	Total Suspended Solids
UST	-	Underground Storage Tank
Watt	-	Unit of power (equivalent to one joule per second)
WEF	-	Water Environment Federation
WMF	-	Waste Management Facility
WRF	-	Waste Recycling Facility

GLOSSARY

Abatement	Reduction or lessening (of pollution) or doing away with (a nuisance) by legislative or technical means, or both.
Acid gas flare	A flare used exclusively for the incineration of hydrogen sulphide and other acidic gases derived from natural gas sweetening processes.
Affected facility	Any stationary source that is affected by a standard regulation.
Ambient air	Air outside a facility boundary.
Appurtenance	An adjunct or appendage which is an integral part of a tank, unit or apparatus.
BAT	Best Available Techniques (BAT) is the application at facilities of the most effective and advanced production processes, methods/ technologies or operational practices to prevent and, where that is not practicable, to reduce emissions or discharges and other impacts to the environment as a whole. BAT must as a minimum achieve emission or discharge standards in these regulations taking into account energy, environmental and economic impacts and other costs to the facility.
BIF	Boiler or Industrial Furnace that burns liquid or solid hazardous materials other than fossil fuels.
By-Product	A substance or object generated as an integral part of the production process, the primary objective of which is not the production of that item. Use of the substance shall be certain i. Without any further processing. ii. To be used as raw material to produce new product iii. Material stored for more than 180 days shall be considered as waste unless authorized by RC.
CAS Number	CAS (Chemical Abstracts Service) Registry Number.
Central Wastewater Treatment Facility	The Industrial Wastewater Treatment Plant (IWTP) or the city Sanitary Wastewater Treatment Plant (SWTP) which receives wastewater from different facilities/sources for final treatment.
Chlorine Residual Combined (Available)	The residual consisting of chlorine that is combined with ammonia, nitrogen, or nitrogenous compounds (Chloramines).
Chlorine Residual Free (Available)	The residual consisting of hypochlorites ions (ocl-), hypochlorous acid (hocl) or a combination of the two. These are the most effective in killing bacteria.
Chlorine Residual Total	The total amount of chlorine present in a sample. This is the sum of the free chlorine residual and the combined available chlorine residual.
Colored Emissions	Colored emissions referring to the visibility resulting from homogenized gaseous pollutant(s). Opacity standard is not applicable for colored emissions.
Component (VOC service)	Pumps, valves, compressors and pressure relief valves which are in contact with streams containing >10 wt.% VOC.
Component (organic HAP service)	Flanges, connectors, pumps, valves, compressors and pressure relief valves which are in contact with streams containing >5 wt.% organic HAP.
Connector	Flanged, screwed, welded, or other joined fittings used to connect two pipe lines or a pipe line and a piece of equipment.
Contaminated Sites	Any site within RCCs that exceeds the soil quality standards provided in these regulations Table 6 or the RC approved baseline data is considered a contaminated site. Baseline Data Collection Criteria: Baseline study as agreed with the regulator shall include parameters listed in Table 6 and any other chemicals not listed in Table 6 and are being used in the facility in liquid or solid state shall be included in establishing baseline data.

GLOSSARY (Continued)

Day	Refers to working day.
Dredged Material	Material excavated from the marine waters, including rock, gravel, sand, silt/clay, and mud.
Dredging	All underwater activities pertaining to disturbing the sediments/earth moving and the process of removing sediments beneath the surface waters by mechanical or hydraulic means.
DRE	Standard which verifies that a combustion unit is destroying the organic components found in hazardous waste.
Duct burner	A device that combusts fuel and that is placed in the exhaust duct from another source, such as a stationary gas turbine, internal combustion engine, kiln, etc., to allow the firing of additional fuel to heat the exhaust gases before the exhaust gases enter a heat recovery steam generating unit.
EIA 3rd Party	Class A: Approved by RC to conduct EIA studies for First, Second & Third Category facilities. Class B: Approved by RC to conduct EIA studies for First and Second category facilities. Class C: Approved by RC to conduct EIA studies for First category facilities only.
Emission	The process of discharging into the atmosphere or the material being discharged.
Emission inventory	The systematic compilation, either by measurement or estimation, of detailed information on pollutant emissions in a given area or facility.
Emission standard	The amount of pollutant permitted to be discharged from a pollutant source.
Existing facility	Any facility which has received environmental approval from the Royal Commission before the effective date of these Regulations or a facility that is contracted for prior to the effective date of these Regulations provided that RC is informed.
Facility	Any apparatus, installation, equipment or grouping thereof which is subject to an applicable standard or regulation; facility, facility operator and operator are synonyms. Entities receiving/exporting materials/chemicals are also considered as facility.
Facility Closure	Facility closure/decommissioning is defined as the closure of land lease agreement or surrender of EPO.
Flare	The flame produced by the disposal, in an arrangement of piping and a burner, of surplus or residual combustible gases.
Fossil fuel	Coal, petroleum, natural gas and any form of solid, liquid or gaseous fuel derived from such materials for the purpose of creating useful heat.
Fugitive emission	Any gaseous or particulate contaminant entering the atmosphere which could not reasonably pass through a stack, chimney vent, or other functionally equivalent opening designed to direct or control its flow.
Generator	Any operator of a facility whose process produces hazardous waste as defined in these Regulations or whose act first causes the hazardous waste to become subject to regulation.
Guideline	Guideline values are for information, reference and study purposes
Habitat	An area occupied by an organism, population, or community that includes living and non-living elements with specific characteristics including the basic needs for shelter and food.
HAP	Hazardous air pollutant (as specified in Table 2C).
Inhalable particulate	Any substance dispersed in the atmosphere in the form of individual solid or liquid particles each of which is less than 10 microns in diameter.

Impervious Barrier	Wherever liner requirement is mentioned for secondary containment in these regulations, it refers to an impervious barrier of HDPE liner of 2.0 mm thickness for new installations and 1.5 mm for existing facilities. An alternative to HDPE liner may be approved by RC provided that it fulfils following requirements: (a) Synthetic material or another material that has a permeability rate to the regulated substance stored of 1×10-7 cm/sec or less, or (b) For concrete structures with synthetic coatings, a material that: i. Meets the design and construction standards of Design Considerations for Environmental Engineering Concrete Structures, ACI 350.4R-04, 2004 Edition, and Control of Cracking in Concrete Structures, ACI 224R-01, (Reapproved 2008), and ii. Is applied to the concrete in accordance with Design, Installation, and Maintenance of Coating Systems for Concrete Used in Secondary Containment, SSPC-TU 2/NACE 6G197, Publication No. 97-04/Item No. 24193, February 1997.
Land Farming	Land farming, also known as land treatment or land application, is an above-ground remediation technology for sludge material generated from petroleum industries which will degrade the hydrocarbon content by bio-remediation process. This process involves spreading the oily sludge in a thin layer on the loose soil of the ground and also application of the required nutrients and moisture and providing oxygen by ploughing the soil regularly.
Leachate	Any liquid, including any suspended components in the liquid that has percolated through or drained from solid waste.
Major upset	An unscheduled occurrence or excursion of a process or operation that results in an emission that contravenes the regulations or standards and is beyond immediate control, or a release that is initiated to protect life in immediate or adjacent areas.
Modification	Any physical change to, or change in the method of, an existing facility which increases the unit capacity or contribution to pollution emitted into the atmosphere OR results in an impact to the environment not previously occurring.
Modified facility	Any facility which is subject to modification as follows: a. Production increases greater than 10% b. 10% increase in emissions or discharges from a facility c. New pollutants are emitted or discharged.
New facility	Any new facility/ project or plant
Normal Conditions	25˚C and 760 mmHg (for ambient standards), 20˚C and 760 mmHg (for source standards)
NOx	Oxides of nitrogen, representing nitric oxide and nitrogen dioxide.
Nuisance	An act which causes material inconvenience, discomfort or harm and is persistent and likely to re-occur.
Opacity	The degree to which an emission of air contaminants obstructs the transmission of light expressed as a percent of light obstructed as per EPA Method 21.
Operator	Any entity who operates or controls a facility at a given location to whom decisive economic power over the technical functioning of the facility has been delegated.
Point source	An individual air emission / pollutant source originating from a specific location.
POHC	Selected “Principal Organic Hazardous Constituent” (POHC) which are high in concentration and difficult to burn, that are monitored to ensure its destruction and removal efficiency in a hazardous waste combustion unit.
POM	Polycyclic organic matter is a broad class of compounds that includes the Polycyclic Aromatic Hydrocarbon Compounds (PAHs), of which are formed primarily from combustion and are present in the atmosphere in particulate form.
Potable Water System	All facilities, including the desalination plants, groundwater abstraction systems and blending plants, producing water for the potable water network and the potable water storage and distribution systems connecting to these facilities to the end users.

GLOSSARY (Continued)

Process Commissioning	Commissioning refers to the startup of the plant or unit after it has been designed and installed as per EPC conditions. A commissioning process may be applied not only to new projects but also to existing units and systems subject to expansion, renovation or revamping.
Process construction	Construction in process areas. It excludes geo technical surveys, installation of fencing or construction of non-process facilities.
RATA	Relative Accuracy Test Audit is a test used to determine the CEMS Analyzers' relative accuracy of sulfur dioxide (SO_2), nitrogen oxides (NO_X), and carbon dioxide (CO_2) or oxygen (O_2) concentration measurements, and volumetric flow measurements of the flue gas (known as stack gas flow).
RC City (RCC)	Industrial city under RC Jurisdiction
RCER	Royal commission environmental regulations.
Reconstructed facility	Any facility that is dismantled damaged or destroyed and is intentionally reconstructed following the original design in the same or different location.
Sanitary wastewater	Sanitary wastewater is the water produced from urban use and defined as the effluent that arises from the usage of potable water for the normal domestic purposes of washing, cooking, cleaning, personal hygiene, sanitation, and the preparation of food.
Severe Damage	Damage(s) that has/have significant impacts on the environment of the RC industrial City.
Soil contamination	All the activities/incidences that cause soil to exceed Table 6 or RC approved baseline data.
Soil contamination investigation	Soil Contamination Investigation is the study carried out to identify the activities, services, products, causes, sources etc. leading to soil contamination.
Soil contaminations delineation	The term "soil contaminations delineation" in this regulation means assessment of the horizontal and vertical extent of the contamination.
Soil reclamation/ rehabilitation	The term 'soil reclamation/rehabilitation" in this regulation means "bringing back the soil to its original condition or improving the condition to an acceptable state as per clause 1.5.4 on a case-by-case basis in agreement with RC.
Source	The point of emission or discharge of an air pollutant or effluent.
TEQ	Releases of dioxins and furans are reported in units of toxic equivalence (TEQ) relative to the most toxic type of dioxin, 2,3,7,8-tetrachlorodibenzo-p-dioxin.
Thermal Oxidizer	Thermal oxidizers are employed to destruct gaseous waste streams containing volatile organic compounds (VOCs) and/or organic hazardous air pollutants (HAP). Incinerator is generally used for the combustion of solid and liquid wastes, such as hazardous, medical, municipal, or sewage waste. Any Thermal Oxidizer burning liquid waste shall be considered as incinerators.
Third Party	The "Third Party" contractor is the one who shall be selected on the basis of ability and absence of any conflict of interest.

GLOSSARY (Continued)

First Category Facility	A facility that has negligible or no impact on public health or the environment during construction or operation. First Category facility is typically support industries and commercial establishments.
Second Category Facility	A facility that has potential for moderate impacts to public health or the environment during construction or operation. Second Category facility typically includes secondary industries and some larger support industries.
Third Category Facility	A facility that has significant potential for environmental harm including permanent or irreversible damage to public health or the environment during construction or operation. Third Category facility typically includes primary industries and some larger secondary industries.
True vapour pressure	The vapor pressure of a volatile substance under actual conditions of storage or transfer.
Used oil	Any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities
Variance stream	A non-cooling water discharge to the seawater cooling system. Any water other than once through cooling water discharge to the seawater cooling system
VOC	Volatile Organic Compound - any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. The following have been determined to have negligible photochemical reactivity, and are not VOCs: • methane; ethane; acetone; cyclic, branched or completely methylated siloxanes; methylene chloride (dichloromethane); perchloroethylene (tetrachloroethylene); 1,1,1-trichloroethane (methyl chloroform); 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113); trichlorotrifluormethane (CFC-11); dichlorodifluoromethane (CFC-12); chlorodifluoromethane (HCHC-22); trifluoromethane (HFC-23); 1,2-dichloro 1,1,2,2-tetrafluorothane (CFC-114); Chloropentafluoroethane (CFC-115); 1,1,1-trifluoro 2,2-dichloroethane (HCFC-123); 1,1,1,2-tetrafluoroethane (HFC-134a);2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124); 1,1,2,2-tetrafluoroethane (HFC-134); 1,1,1 trifluoroethane (HCFC-143a); 1,1-difluoroethane (HFC-152a); parachlorobenzotrifluoride (PCBTF); 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca); 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb); 1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC 43-10mee); and perfluorocarbon compounds which fall into these classes: • cyclic, branched or linear completely fluorinated • alkanes • cyclic, branched or linear completely fluorinated ethers with no unsaturation • cyclic, branched or linear completely fluorinated tertiary amines with no unsaturation • sulphur containing perfluorocarbons with no unsaturation and with sulphur bonds only to carbon and fluorine.
WMF	Waste Management Facility which stores, treats, disposes of wastes using physical, chemical, thermal, landfilling and other techniques
WRF	Waste Recycling Facility which recovers all recoverable and resalable materials out of wastes before disposing the residual wastes

INTRODUCTION

The Royal Commission (RC) is the sole governmental and an independent body, established by Royal decrees in 1975, with an authority within the boundaries of industrial cities, Jubail and Yanbu having a wide array of responsibilities including developing of infrastructure, regulating environment, community, industrial, commercial, and other related services. In the year 1430 AH, the Council of Ministers issued a decision allowing the Royal Commission for Jubail and Yanbu to manage Ras Al-Khair City for Mining Industries, and to provide services to the mining and other industries in the same manner as for the industrial cities of Jubail and Yanbu. In the year 1436 AH, the Royal Order was issued “assigning the Royal Commission for Jubail and Yanbu to manage and operate Jazan City for Basic and Transformative Industries.” All industrial cities subject to the supervision of the Royal Commission are hereafter referred to as Royal Commission Cities (RCC).

The RC is also an environmental regulating body, responsible for controlling pollution associated with the development and operation of the industrial city. The Royal Commission has, thus, developed and adopted regulations, standards, and guidelines to control all types of substances emitted, discharged, or deposited, and noise generated within the RCC.

The RC issues the Royal Commission Environmental Regulations 2025 (RCER-2025) providing regulations, standards, and guidelines specific to the RCC. These are intended to clearly state the environmental protection regulations and to formally define the requirements for adherence to them.

The RCER-2025, Volume I include all regulations, standards, and guidelines required to protect the environment of the RCC from adverse impacts. The Volume II of the RCER-2025 presents the Environmental Permit Program which covers procedures and forms for applying for an “Environmental Permit to Construct” (EPC) and "Environmental Permit to Operate" (EPO). The Volume III describes a Penalty System and Service Charges Framework, which has been designed to ensure compliance with regulations to further assist in accomplishing the goals of the Royal Commission by deterring violations and encouraging voluntary compliance with the Environmental Regulations.

This document (Volume I) is divided into nine sections:

- Section 1 – Environmental Regulatory System
- Section 2 – Air Environment
- Section 3 – Water Environment
- Section 4 – Hazardous Materials Management
- Section 5 – Waste Management
- Section 6 – Soil Quality
- Section 7 – Dredging
- Section 8 – Noise
- Section 9 – Reporting and Record Keeping

SECTION - 1

1. Environmental Regulatory System

This section covers all the general regulations stating the policies to control the environment of industrial city from potential adverse impacts from industrial activities.

1.1 General Regulations

1.1.1 All the facilities in RCCs shall comply with all the Royal Commission Environmental Regulations. In case, a specific standard/regulation is not available in these regulations, clause 1.6.4 of these regulations shall be applicable.

1.1.2 These regulations for all new, modified, reconstructed and existing facilities shall be effective after six months from the date of official notification to facilities unless otherwise stated in specific sections of these regulations or an exemption has been granted in accordance with clause 1.1.6.

1.1.3 The Royal Commission requires all operators of industrial facilities located in RCC to operate their facilities in accordance with the environmental regulations of the Royal Commission.

1.1.4 The operator of a facility shall take all reasonable steps to minimize releases to the environment and shall carry out such measures as are reasonable to prevent adverse impacts to public health and the environment.

1.1.5 The operators of all facilities are obligated to be knowledgeable of the environmental regulations applicable to their facilities.

1.1.6 The operator of a facility may apply to the Royal Commission for an exemption to any specific regulation or standard for which their current facilities or operations are non-compliant. In this case, the following procedures shall apply:

a) The operator shall submit all claims for exemption in writing to the Royal Commission. The operator shall provide a separate justification for each regulation or standard subject to a claim. To be considered by the Royal Commission, the operator must demonstrate that, based on conditions unique and peculiar to the facility's situation, compliance will impose a substantial financial, technological, or safety burden on the facility.

b) The operator shall provide the Royal Commission with a compliance plan, which shows how and when compliance with the subject regulation or standard will be achieved in the future.

c) The Royal Commission shall assess the application and the compliance plan. The Royal Commission shall issue its decision to accept or reject each exemption claim following consultation with the operator. The decision shall stipulate the period during which an accepted exemption is valid.

d) Based on the request evaluation, Royal Commission has the right to exempt the affected facility from the regulations and standards covered by the application for the period between the date of receipt of the exemption application and the date of the Royal Commission's decision regarding the application.

1.1.7 All facilities shall submit the Environmental Screening Questionnaire (ESQ) / Permit Application Package (PAP) to obtain Environmental Permits (EPC and EPO) as per the procedure described in RCER-2025, Volume II.

1.1.8 In addition to submitting the completed PAP forms, Second and Third Category facilities shall prepare and submit an Environmental Impact Assessment (EIA) as per RC requirements to obtain an EPC.

1.1.9 Any EIA shall be conducted by the RC approved "Third Party" as per criteria provided in RCER-2025, Volume II, Appendix C.

A "Third Party" is a consultant who does not have any known conflict of interest and has a team of experts who has performed several similar EIA projects. If the proposed development is significant in nature (e.g., petrochemical complexes, refineries, minerals manufacturing, others), the consultant shall have significant experience conducting such studies for that type of facility. Due to the multifaceted nature of a full comprehensive EIA, the consultant may enter into a joint venture with other consultants.

1.1.10 All facilities shall prepare and submit a general operational Environmental Emergency Response Plan (EERP) covering issues as per Section 4.3 particularly clause 4.3.19, and guidelines provided in the currently enforced RCER, Volume II, Appendix D.

1.1.11 The operator of a facility shall utilize Best Available Techniques (BAT) for environmental control. The Royal Commission applies the concept of BAT as follows:

Best Available Techniques (BAT) is the application at facilities of the most effective and advanced production processes, methods/ technologies, or operational practices to prevent and, where that is not practicable, to reduce emissions or discharges and other impacts to the environment as a whole. BAT must as a minimum achieve emission or discharge standards in these Regulations taking into account energy, environmental and economic impacts and other costs to the facility. The criteria to perform BAT analysis shall be as follows (refer to Volume II, Appendix B for details):

a. For any source which does not meet the source emission or discharge standards.
b. Any source emitting greater than 100 t/y before control of any of the parameters listed in Table 2A.
c. Any source emitting greater than 10 t/y before control of any hazardous air pollutants identified in Table 2C.
d. Any pre-treatment required to comply with Section 3.

1.1.12 BAT assessment shall be conducted for new, reconstructed and modified facilities as per the procedures given in Volume II (Appendix B) of these regulations.

1.1.13 At the request of the Royal Commission (if the Operator is not in compliance with RCER), the operator of a facility shall provide an assessment of BAT to address environmental issues that are identified by the Royal Commission as posing a direct detrimental environmental or public health impact. The BAT assessment should follow the procedure given in Volume II.

1.1.14 The operator of a facility shall operate, inspect and maintain all facilities, systems, equipment and related appurtenances for measurement and control that are installed or used to achieve compliance with these Regulations.

1.1.15 The operator of a facility shall have established procedures that outline the management practices within the facility as they relate directly to environmental control and environmental compliance.

1.1.16 The operator of a facility shall apply or utilize methods and procedures for compliance monitoring, sampling and analyses in accordance with internationally accepted standards for the specific procedure in question such as those of the American Standard Test Methods (ASTM), U.S. Environmental Protection Agency (USEPA), or Standard Methods for the Analysis of Water and Wastewater (APHA, AWWA, WEF, Latest Edition).

1.1.17 The Royal Commission has the right to enter and access the facility, upon reasonable prior notice of at least 24 hours, for the purpose of regular surveillance, monitoring, sampling and inspection to verify compliance with these regulations and permit conditions.

1.1.18 The Royal Commission has the right to enter the facility without prior notice for inspection and collecting samples in the case of any complaint or abnormal situation relating to environmental issues.

1.1.19 The operator of the facility shall facilitate the Royal Commission, upon reasonable request, to review all environmental related records, methods and procedures to verify compliance with these regulations.

1.1.20 The operator shall submit a compliance plan for any non-compliance issues as per Section 9.

1.1.21 The operator in violation of RCER shall be subject to penalty according to the Royal Commission Penalty System.

1.1.22 The operator shall furnish to the Royal Commission, within RC requested timeframe, any relevant information that the Royal Commission may request with proper quality assurance and accuracy.

1.1.23 Special conservation areas have been designated within the industrial city. Information on such areas is available in the Royal Commission Master Plan. These areas are protected, and hence any activity leading to ecological degradation shall be restricted and penalized.

1.1.24 Terms used in these regulations have the meanings as defined in the Glossary.

1.1.25 In case of abnormal situation, the RC has the right to conduct any testing of any source or any other area inside the facility boundaries with the prior coordination of the operator.

1.1.26
a) All existing facilities shall comply with the energy efficiency standards and requirements as per Saudi Energy Efficiency Center (SEEC).
b) All new facilities including facilities to be reconstructed, modified or expanded are required to comply with the SEEC's standards and requirements at the time of applying to obtain Environmental Permit to Construct (EPC).

1.1.27
a) All the environmental studies and field tests shall be conducted by RC approved independent "Third Party" agency. The studies and tests shall include, but not necessarily be limited to the following:
   i. Environmental Impact Assessment (EIA) Study
   ii. Stack Emission & Cooling Tower Drift Losses Test
   iii. Fugitive Emission Monitoring Test
   iv. Sampling and laboratory analysis for soil and groundwater remediation (if any), dewatering activities and all baseline studies requested by RC e.g., for air, water, wastewater, soil, noise, marine environment and groundwater etc.
b) Third Party shall be responsible for providing all the services in compliance with RCER and its approval conditions.
c) The third party permitted by MEWA shall submit application for approval as per Appendix-K of Volume II and shall pay the fee as mentioned in the Volume III of currently enforced RCER to obtain license. A third party licensed by any of the RCCs for any of the above-mentioned/additional environmental services is authorized to provide such services in all the RCCs.

1.1.28 The facilities shall be responsible for all of their contractor's chemical handling or contaminated equipment handling activities either in or outside of their premises related to their contract.

1.1.29 In case of any facility operation causing severe damage to environment, RC has the right to stop or suspend the facility operations until the facility submits and implements an action plan to take appropriate action to contain the damage and ensure that such violations will not be repeated in future.

1.1.30 In case of any facility operation causing severe damage to environment repeatedly, RC has the right to refer the case to the relevant competent authorities.

1.1.31 All plans submitted as per RCER requirements shall be implemented accordingly.

1.2 Environmental Permit to Construct Regulations

This section applies to new, reconstructed and modified facilities requiring construction only. The application procedures for obtaining an Environmental Permit to Construct (EPC) are presented in Volume II of these regulations "Environmental Permit Program".

1.2.1 The operator shall obtain an EPC before starting any construction activity related to process of a new facility (refer APPENDIX A of Volume I).

1.2.2 The operator of an existing facility shall obtain an EPC in the form of EPC authorization letter or EPC certificate on a case by case basis for the reconstruction, modification or expansion in the existing facility.

1.2.3 EPC is issued for an individual facility, or group of inter-related facilities which, under normal operating conditions, result in the production or manufacture of a common product and provided they are owned and operated by the same owner(s).

1.2.4 The operator shall start the preparation of PAP/ESQ (and EIA if required) immediately after signing the Conditional Site Allocation (CSA). However, the PAP (including compliance with Clause 1.1.26 b) shall be submitted for getting EPC at least six months before starting any construction activity related to process of a new, reconstructed and modified facility.

1.2.5 The EPC shall, by reference, authorize construction of only those facilities as described in the Permit Application Package/ESQ submitted under Clause 1.2.4.

1.2.6 The operator shall notify the Royal Commission when process construction of the facility is approaching 30 days to final completion. In the event of non-compliance with the specified period, the appropriate fine will be imposed on the operator in accordance with the penalties stipulated in Volume III of these regulations.

1.2.7 In event of change of ownership / operator, sublease or closure of all or any part of a facility under construction, the operator shall notify the Royal Commission to obtain appropriate amendment to or cancellation of the EPC. In case of surrender of EPC, the application to RC shall accompany a site report describing all the environmental related changes resulting during the construction and all the steps that have been adopted to avoid any pollution risk resulting from the construction of the facility.

1.2.8 The facility which fails to comply with the conditions of an EPC shall be subject to penalty as per the Royal Commission Penalty System including the revocation of the permit and / or any other legal actions deemed necessary by the Royal Commission. However, any change in EPC conditions shall be mutually prior agreed with the facility.

1.3 Environmental Permit to Operate Regulations

This section applies to all facilities. The application procedures for obtaining an Environmental Permit to Operate (EPO) are presented in Volume II of these Regulations "Environmental Permit Program".

1.3.1 The operator of a facility shall not operate it or carry out process commissioning without a valid EPO (refer APPENDIX B of Volume I). Once the EPO is received, the facility shall submit monthly update.

regarding facility startup and shall submit formal notification within 07 days of startup. For new facilities, an EPO will be issued only if all EPC conditions are complied.

1.3.2 The operator of a modified or reconstructed facility shall not operate it without obtaining an amendment to the existing EPO or a new EPO if needed.

1.3.3 EPO is issued for an individual facility, or group of inter-related facilities which, under normal operating conditions, result in the production or manufacture of a common product and provided they are owned and operated by the same owner(s).

1.3.4 An EPO shall, by reference, authorize the operation of only those processes and facilities as described in the permit application package. All information submitted in the permit application package shall, unless otherwise specified by the Royal Commission, be considered as a condition of the EPO.

1.3.5 EPO is issued to the operator of a new facility or amendment to existing EPO (or a new EPO) for reconstructed or modified facility provided that the process construction is in conformance with the EPC and that the operator has complied with all requirements of the EPC.

1.3.6 An EPO is valid for a period of five (5) years from the date of issue. The Operator shall apply for the renewal of the permit by submitting EPO Renewal Form 6 months before EPO expiry and PAP/other related documents (if requested). In the event of non-compliance with the specified period, the appropriate fine will be imposed on the operator in accordance with the penalties stipulated in Volume III of these regulations. All the RC comments shall be resolved by the facility before the EPO expiry date.

1.3.7 The operator of modified facility shall apply for a new or amended EPO using the procedures specified in Volume II of these Regulations for any of the following modifications:

a) Production increases above the previously approved value by 10% or more
b) Emissions or discharges from a facility increase by 10% or more
c) New pollutants are emitted or discharged.

1.3.8 Renewal of EPO shall be granted following review, evaluation and approval of the following information:

a) Renewal form as per Volume II
b) permit conditions
c) facility compliance status / exemptions / Audit Study
d) updated permit application package/forms, if deemed necessary
e) air emission inventory (refer to Clause 2.11.1)

1.3.9 The operator of a facility shall operate in accordance with the terms and conditions of the EPO/authorizations. These terms and conditions shall include:

a) Operation in accordance with the design basis and procedures described in the EPO/authorization application
b) Facility upgrade requirements
c) Industry monitoring, record keeping and reporting schedules.
d) Approved variances or exemptions to regulations
e) Corrective action

1.3.10 All conditions, exemptions or limitations contained in the Environmental Permit to Operate can be amended, based on reliable data, following consultation with the operator of a facility, if such amendments are required to assure:

a) Compliance with applicable environmental regulations
b) Protection of public health and safety
c) Prevention of direct detrimental impact to the environment
d) Ensuring the proper functioning of infrastructure facilities.

1.3.11 The facility which fails to comply with the conditions of an EPO/authorization shall be subject to penalty as per the Royal Commission Penalty System including the revocation of the permit and / or any other legal actions deemed necessary by the Royal Commission.

1.3.12 In event of change of ownership / operator, sublease or closure of all or any part of the facility, the operator shall notify the Royal Commission to obtain appropriate amendment to or cancellation of the EPO. In case of surrender of EPO, the application to RC must accompany a site report describing all the environmental related changes resulting during the operation and all the steps that have been adopted to avoid any pollution risk resulting from the operation of the facility.

1.3.13 All information submitted to the Royal Commission by the facility shall be treated as confidential and shall not be released to any other party without prior consent from the Operator.

1.4 Facility Closure and Decommissioning Regulations

This sub-section covers all the regulations related to the closure and post closure of all the facilities in operation in the RCC, except waste management and waste recycling facilities (WMF and WRF) which are covered in Section 5 of this Volume.

1.4.1 After following the procedure for closure of a facility as described in the lease contract with the Royal Commission, the operator of the facility shall submit to the RC in writing a detailed decommissioning plan of the facility within 60 days in advance of beginning of facility closure activities.

1.4.2 The decommissioning plan shall include closure start/completion dates, a detailed description of decommissioning and decontaminating methods for each process plant, equipment, hazardous/non-hazardous materials storage facilities (including underground storage tanks and services), and hazardous/non-hazardous waste storage areas of the facility in such a manner that they will not pose a future threat to human health or the environment in general including soil and groundwater. Further, it includes removal and disposal methods for demolished buildings and any other infrastructure wastes as well as procedures for decontaminating soil, water and air (if applicable).

1.4.3 The facility shall conduct an environmental site impact assessment by RC approved “Third Party” and submit a report to RC. The facility shall implement all the required remediation and reclamation work recommended in the report in order to eliminate all potential hazards to soil, water and air and to restore the leased premises to its original condition as per lease contract. A guideline for site impact assessment is provided in Appendix L of RCER-2025, Volume II.

1.5 Corrective Action

1.5.1 The operator of a facility shall be responsible for corrective action required by the Royal Commission following:

a) Non-compliance with these Regulations
b) Non-compliance with any conditions of the Environmental Permit to Construct
c) Non-compliance with any conditions of the Environmental Permit to Operate
d) Any pollution which is harmful to the public, property, infrastructure, or environment.

1.5.2 Corrective action is defined as all activities, both inside and outside the facility boundary, which are necessary to:

a) Comply with these Regulations
b) Comply with any conditions of the Environmental Permit to Construct
c) Comply with any conditions of the Environmental Permit to Operate
d) Isolate and control the source of any harmful release from the facility
e) Prevent future occurrence of the harmful release
f) Investigate the extent of any potentially harmful release

g) Mitigate and render harmless the impacts of any harmful release
h) Monitor the effectiveness of any mitigation measures

1.5.3 Corrective action falling under categories clauses 1.5.2f, 1.5.2g and 1.5.2h shall be subject to Royal Commission review and approval.

1.5.4 The Royal Commission, in agreement with the operator of the facility responsible for a harmful release, shall establish the point at which the agreed mitigation measures have rendered harmless the impact of any harmful release.

1.5.5 If the operator of a facility responsible for a harmful release fails to take the necessary corrective action, the Royal Commission will, following prior notification to the affected facility, initiate corrective action and recover associated costs from the operator of the responsible facility.

1.6 Rulemaking Process

1.6.1 Prior to amendment, revision, deletion or other change to these Regulations, the Royal Commission shall transmit the proposed change(s) in the RCER to industries for their review and comments. Any comment from industries shall be sent to RC within a period of no more than sixty (60) days. After this period ,the Royal Commission will implement the proposed changes. The RC reserves the right to reject any comment from industries, and the official version of the proposed changes will be transmitted officially to all industries for compliance.

1.6.2 The Royal Commission shall provide a written response to received comments within sixty (60) days from the closing date of the industry comment period. This response shall include any final revision of the change(s) to the Regulations or its effective date.

1.6.3 Unless otherwise stated by the Royal Commission in any final revision, the proposed change(s) to the regulations made under clause 1.6.1 shall become part of the Royal Commission Environmental Regulations (see APPENDIX F of Volume I).

1.6.4 In the event that these Regulations, or their amended version, do not specify a standard for a specific emission source, discharge or environmental management practice, then the Royal Commission shall use for reference other recognized regulations as a basis for technical justification or establishment of a change (as per clause 1.6.1) such as :

a) MEWA/Other Saudi National Standards
b) U.S. Environmental Protection Agency (US EPA)
c) U.S. State environmental protection rules and guidelines
d) European Union member's environmental rules and guidelines
e) Other internationally recognized and accepted regulatory bodies

1.6.5 All facilities shall comply with treaties, protocols and agreements signed by the Government of Saudi Arabia related to the Environment.

1.6.6 The Royal Commission reserves the right to modify emission and discharge standards, based on the evaluation of reliable data, following the procedures in Section 1.6 to prevent significant deterioration of ambient air quality.

SECTION - 2

Air Environment

Ambient air quality standards are set at levels, which are determined by the threshold of observable health effects on humans. Air pollution source standards are designed to prevent, control, or abate air pollution and to attain and maintain ambient air quality within standards.

2.1 Ambient Air Quality Standards

2.1.1 Ambient air is defined as any air on the external side of a pollution source's boundary fence to which the public have access. This includes industrial areas neighboring a pollution source. No facility is authorized to install air quality stations/analyzer outside the facility boundary to monitor ambient air without RC approval.

2.1.2 Table 2A lists the ambient air quality standards for the industrial city areas. The standards for each pollutant consist of one or more concentration limits, each with an associated averaging period. These standards do not apply to individual facilities or sources, but are considered an objective, which should be met in order to protect the health and well-being of the general public. Ambient air quality standards present desirable concentration of contaminants in air, based on protection against adverse effects on health or the environment. The effects considered may be health, odor, vegetation, soiling, visibility, corrosion or others. These ambient air quality standards data shall be followed, particularly, in the air dispersion study conducted during EIA as per clause 1.1.8.

2.1.3 Facilities which emit VOCs or odorous compounds (including WMF/WRF and sanitary and industrial wastewater treatment plants and their related systems) shall install a minimum of four fixed ambient air analysers around the fence line to monitor any affected pollutant & odorous chemicals specific to an individual facility. All First Category facilities are exempted from installing fenceline analyzers unless specified by RC based on the facility activity to be evaluated on case-by-case basis. The results shall be submitted to RC on a monthly basis. Facilities which have difficulties in getting suitable fixed analysers can be considered for an alternate system on a case by case basis.

2.2 Source Emission Standards

2.2.1 Table 2B lists the source emission standards that shall be complied with by all the individual facilities for emission sources. However, the operational limit shall be subject to the most stringent limit achievable through BAT.

2.2.2 The source emission standards are applicable to all facilities in the industrial city from the effective date of regulations unless otherwise specified in Table 2B. All the facilities constructed, modified or expanded before the effective date of RCER 2025, shall comply with all the source standards of Table 2B within a timeframe to be mutually agreed upon between RC EPCD and the facility.

2.2.3 If a pollutant is not mentioned in Table 2B, the most stringent shall be applied either from MEWA, US Federal and States regulation, EU, UK, Australia, EFMA and other internationally recognized and accepted regulatory bodies.

2.3 General Air Quality Regulations

The following air quality regulations apply to facilities that emit air pollutants:

2.3.1 The operator of a facility shall not emit at any time air contaminants in such concentration and of such duration as to be injurious to, adversely affect, or cause nuisance to public health or welfare, animal life, vegetation, or property.

2.3.2 The operator shall use BAT, as defined in Clause 1.1.11, to control emissions to the atmosphere.

2.3.3 The operator of a facility shall not conceal or appear to minimize the effects of an emission to achieve compliance with the regulations. This includes introduction of dilution air or incorrect operation of monitoring equipment.

2.3.4 The operator of a facility shall phase out chlorofluorocarbons (CFC) and halons or any other substances defined in the Montreal Protocol (and subsequent amendments) which are capable of depleting stratospheric ozone. The total phase out of ozone depleting substances shall be completed in accordance with the schedule and deadline stated within the protocol**.** Venting of CFC's and other ozone depleting substances to the atmosphere is prohibited except in the case of firefighting.

2.3.5 Use of all types of Asbestos Containing Materials (ACM) is prohibited in the industrial city. The existing facilities shall make a phase out plan to remove asbestos as per RC approved guidelines and methodology (refer RCER, Volume II, Appendix I).

2.3.6 Metal grits shall be used for surface cleaning instead of sand blasting, unless the abrasive material used for sand blasting contains less than 5% silica.

2.3.7 Any facility, having potential of dust emissions from loading/unloading activity or during storing raw materials, shall take necessary measures such as: closed hanger, shield spraying system etc. to avoid dust emissions from the sources with RC prior approval. All such facilities shall submit a dust mitigation plan as per Appendix M of Volume II of RCER-2025.

2.3.8 All quarries, crushers, ready-mix concrete plants, landfills and other similar facilities shall install appropriate dust control devices as per RC prior approval.

2.3.9 All facilities (including landfills) shall follow appropriate dust control measures during construction/site preparation phase to control dust emission to less than Ambient Air Quality Standard (Table 2A) for particulate matters.

2.3.10 All the facilities (including pretreatment plants, sanitary and industrial wastewater treatment plants, pumping stations, waste management plants / systems) shall employ appropriate environmental practices and measures (based on best available techniques) to control the emissions of odors from their operating units.

2.4 Point Source Regulations

2.4.1 The operator of a facility shall not emit from any source air contaminants in excess of the Source Emission Standards described in Section 2.2.

a. Exceeding the source emission standards during major upsets, emergencies, startups, or shutdowns shall be notified immediately and will be evaluated on a case-by-case basis for exemption from source emission standards for a maximum period of 6 hours.

b. For any exceedance beyond the exempted period, a separate notification with justification shall be submitted to RC for evaluation, prior to the expiry of the exempted period. The evaluation will be based on several factors, such as: duration and frequency of emissions, quantities and characteristics of pollutants emitted, actions taken during the incident, designs of equipment, preventive and maintenance plans and other relevant parameters.

2.4.2 The operator of a facility shall not emit from any source quantities of air pollutants that result in ground level concentrations exceeding the ambient air quality standards in Table 2A.

2.4.3 The operator of an affected facility shall provide performance testing facilities, including:

a) Sampling ports adequate for test methods applicable to the facility as per USEPA methods.
b) Safe sampling platform(s).

c) Safe access to the sampling platform(s).
d) Provision of utilities for sampling and testing equipment.

2.4.4 Flares shall be operated with a flame present at all times which is to be monitored by a thermocouple or an equivalent device to detect the presence of a flame. In addition, the continuous imaging (digital recording) of all new flares (the existing flares, if possible) with date and time shall be maintained. All facilities, having flares, shall install flare flow monitoring device (like Ultrasonic Flow Meter) on the vapor line after liquid knock-out drum. All Facilities shall submit a monthly report to RC for the quantity and estimated composition of the gases flared.

2.4.5 Elevated flare heights (for new facilities) shall be established based on the American Petroleum Institute recommended Practice 521.

2.4.6 All the regulated new facilities shall design their stacks using the USEPA Good Engineering Practice (GEP) guidelines and Air Dispersion Modeling (ADM) results starting with a minimum stack height 30 meters and using the formula as given below:

$$Hs = H + 1.5\,L$$

Where Hs = Stack height measured from the ground-level elevation at the base of the stack
H = Height of nearby structure(s) measured from the ground-level elevation at the base of the stack
L = Lesser dimension, height, or projected width of nearby structure(s)- Nearby means that the distance up to five times the lesser of the height or the width dimension of a closest structure but not greater than 0.8 Km

In case, GEP is less than 30 meters, the stack height must be 30 meters. However, if GEP height is above 30 meters, ADM shall be conducted at proposed height to verify compliance with ambient standards. Any process vents or small combustion sources which may not comply with stack height requirement of 30 meters shall be evaluated on a case-by-case basis with the final decision of the regulator.

2.4.7 An operator of an industrial facility shall not install any new ground flare without RC approval. The facility shall install only elevated flares. Burn pits (e.g. horizontal ground flares) are not permitted.

2.5 Air Emission Testing Regulations - Point Sources

2.5.1 The operator of a facility shall undertake annual stack emission testing of the following point sources:

a) Affected sources that, before the use of abatement equipment, have the potential to emit more than 100 t/y of any air pollutant listed in Table 2A, or
b) Affected sources that, before the use of abatement equipment, have the potential to emit more than 10 t/y of any hazardous air pollutant listed in Table 2C.
c) Affected sources combusting hazardous materials (see Section 2.7).

2.5.2 The operator of a facility subject to clause 2.5.1 shall, at a minimum, measure for the applicable parameters that are regulated in Table 2B for the affected sources at the facility. Testing of sources subject to clause 2.5.1b) shall include individual measurement of each applicable hazardous air pollutant.

2.5.3 The operator of an affected facility with several identical process streams each with similar point source emissions which are subject to clause 2.5.1 may restrict the annual emission testing to the following number of sources provided that all sources are tested at least once every 4 years:

No. of Identical Sources	No. Tested Annually
1-3	1
4-8	2
>8	3

2.5.4 The operator of new facilities subject to clause 2.5.1 shall undertake initial performance testing of all point sources & associated CEMS within 60 days of the facility achieving the normal production rate or within 180 days of initial start up, whichever is earlier. The parameters to be determined shall be as specified in clause 2.5.2 and any other parameters specified in conditions of the Environmental Permit to Operate.

2.5.5 All emission testing shall be conducted by the RC approved "Third Party" and reported in accordance with methods and procedures that are approved by the U.S. EPA or equivalent RC approved international standard.

2.5.6 All Performance Guarantee tests including other stack testing shall be conducted as per technical supplier specifications under conditions of maximum designated use (max. design capacity) of the affected source. Operations during periods of shutdowns, startups, and malfunctions shall not constitute representative conditions for the purpose of the emission tests. Performance guarantee tests shall be conducted at maximum designated capacity, however, for the periodic compliance measurements, a capacity greater than 90% of its maximum design capacity is required. If the required capacity is not achieved, RC will assess such scenarios on case by case basis.

2.5.7 The operator of an affected facility shall provide the Royal Commission at least fourteen (14) days prior notice of any emission testing required by Clause 2.5.1 along with the Stack/RATA test plan as per Appendix N of RCER – 2025 Volume II. The Royal Commission may elect to witness all or part of the required emission test. The electronic raw data (or hard copy) shall be initialled by all parties at the end of each run.

2.5.8 The operator of a facility shall, within 60 days of conducting any required emission testing, submit a written report in electronic format (report in PDF/Word and all data & calculation in excel format) to the Royal Commission. The report shall contain all applicable information as given below:

a) Analytical data - pollutants, moisture content, oxygen content.
b) Physical data - flow rate, stack emission velocity, temperature, pressure, stack dimensions, isokinetic flow conditions (if applicable).
c) Process operating conditions at the time of testing.
d) One example calculation for each method.
e) Emission results, raw data with final emission data in same unit as the relevant emission standard in Table 2B and mass emission data.
f) Calibration records.

2.5.9 The operator of an affected facility shall undertake additional emission tests deemed necessary by the Royal Commission to demonstrate the facility's current compliance status.

2.5.10 The Royal Commission may waive or reduce the frequency of the emission testing requirements if the operator of the affected facility can demonstrate to the satisfaction of the Royal Commission that the source is consistently in compliance with the applicable standard.

2.6 Continuous Air Emission Monitoring Regulations - Point Source(s)

2.6.1 Operators of all point sources listed in Table 2D shall install appropriate continuous emission monitoring systems (CEMS). The Royal Commission may specify other pollution sources to be continuously monitored for specific pollutants or performance parameters. CEMS shall be initially assessed (as per clause 2.5.4) and then validated annually through the RATA test along with the annual stack emission testing. Additional details for CEMS are provided in RCER Volume-II Appendix-G Guidelines.

2.6.2 Each applicable facility shall submit CEMS report as per clause 2.6.7.

2.6.3 All continuous monitoring systems shall be installed and operational prior to conducting the emission testing required in Section 2.5. The use of continuous monitoring systems does not waive the emission testing requirements under Section 2.5.

2.6.4 All continuous emission monitoring systems (CEMS) shall be in continuous operation except for system breakdowns, repairs, calibration checks, and zero and span adjustments.

2.6.5 The operator of continuous monitoring systems shall maintain the following records on site for a minimum period of three years. These records shall be available for inspection by the Royal Commission or its designee at any time, and shall include as a minimum:

a) All measurements
b) All performance evaluations
c) Verification of calibration and maintenance checks
d) Manufacturers' recommended maintenance and calibrations frequencies.
e) Occurrences and duration of any startups, shutdowns, or malfunctions in the operation of the affected source or emission control device
f) Periods when the continuous monitoring system is inoperative
g) Type of fuel used along with specification and consumption (upon request)
h) Vendor manual with calibration details and technical specification of equipment used
i) Quality Assurance Plan

2.6.6 All new facilities shall install Continuous Opacity Monitoring System (COMS) as per requirement given in Table 2D or EPO conditions. However the existing facilities, having frequent opacity exceedance problems, shall install COMS as required by RC on a case by case basis. Additional requirements for COMS are provided in RCER Volume-II Appendix-G Guidelines for CEMS.

2.6.7 All applicable facilities shall submit a report (a soft copy with electronic signature) electronically to the Royal Commission every month summarizing the continuous emission monitoring data for affected sources at their facility. The report shall include, as a minimum, the following information:

a) Monitoring period.
b) Actual Monitoring data (as per Table 2B requirements or hourly time weighted average where time weighted average is not defined) along with results of the Statistical analysis including average, minimum, maximum, and standard deviation.
c) The number of times that the specific pollutants being monitored exceeded the source emission standards established in Table 2B or specified in conditions of EPO.
d) An explanation for the occasions when the source emission standards were exceeded, and the corrective action taken to prevent recurrence.
e) Occurrences and duration of any startups, shutdowns, or malfunctions in the operation of the affected source or emission control device.
f) Periods when the continuous monitoring system was inoperative.

2.7 Combustion of Hazardous Materials

This section applies to boilers and industrial furnaces (BIF) and incinerators that burn hazardous materials other than fossil fuels. The hazardous materials, as defined in Section 4.1, maybe but are not limited to waste, by-products of a process or used oil.

2.7.1 The operator of an incinerator shall only burn hazardous materials specified in the facility's Environmental Permit to Operate.

2.7.2 The operator of a BIF shall only burn hazardous materials generated at their facility and specified in the facility's Environmental Permit to Operate.

2.7.3 The operator of a BIF or incinerator shall operate such a unit with a system that automatically cuts off hazardous material feed when operating conditions deviate from those established in the Environmental Permit to Operate for the specific unit.

2.7.4 The operator of a BIF may be exempted from the requirements to determine destruction and removal efficiency (DRE) and particulate emissions under clause 2.5.4 provided that all of the following low-risk waste exemption conditions apply:

a) > 50% of the heat input to the BIF is derived from primary fossil fuel.
b) Primary fuels and co-incinerated hazardous materials both have heat inputs >8,000 Btu/lb.
c) Hazardous materials are introduced directly into the primary fuel flame zone of the combustion chamber.
d) Compliance with the CO emission standard in Table 2B is demonstrated by the provision of a continuous emission monitor as specified in Table 2D.
e) If the above items are not in compliance, the operator shall demonstrate that the burning will not result in unacceptable adverse health effects

2.7.5 The operator of a BIF or incinerator shall keep records of the composition and quantity of all hazardous materials burnt in these facilities. Information on process vent gases will also be provided, if possible.

2.8 Fugitive Emission Regulations

This section is applicable to all components in VOC service or hazardous air pollutant (HAP) service (see Table 2C), unless stated otherwise.

2.8.1 All affected components in VOC or HAP service shall be individually identified by a specific number, service and location (e.g. metal tags, bar code, P&ID's). An updated master list containing all of the affected components shall be kept on-site at all times.

2.8.2 Open-ended valves shall be equipped with a cap, blind flange, plug, or a second valve. The second valve shall always be closed except during sampling.

2.8.3 Pressure relief valves equipped with rupture disks shall be equipped with a sensor between the valve and the disk to detect leaks.

2.8.4 The operator of a facility shall monitor all affected components in VOC service or in HAP service, except as stated in Table 2E, on a minimum of *semi-annual* basis, starting within 180 days of initial startup of operations. Following two (2) consecutive *semi-annual* leak detection periods when the number of leaking components is found to be less than 2% of the total, the operator revert to *annual* leak detection monitoring. If the total number of leaking components ever exceeds 2%, then the facility shall revert to *semi-annual* monitoring. The RC has the right to witness any fugitive monitoring testing, if required, on prior advance notice as per mutually agreed schedule. The operator shall provide RC at least 14 days prior notice of the required testing.

2.8.5 Less frequent monitoring of difficult or unsafe to monitor components shall be permitted as determined by the operator, subject to verification and approval by the Royal Commission.

2.8.6 All components in VOC service or organic HAP service that register more than 10,000 ppmv VOC and valves, flanges or connectors in organic HAP service which register more than 500 ppmv VOC shall be defined as leaking components.

2.8.7 All leaking components shall be tagged immediately and replaced or repaired within 15 calendar days or, if a unit or plant shutdown is required, at the next scheduled shutdown.

2.8.8 All leaks from pressure relief valves shall be stopped within 24 hours of detection.

2.8.9 All leaking or returned to service components shall be monitored after maintenance is performed.

2.8.10 The operator of a facility shall prepare an annual report (soft copy with electronic signature) for submittal to the Royal Commission summarizing the facility fugitive emissions. This report shall include the following information:

a) Total number of each type of component monitored
b) Number of leaking components of each type
c) Number of components of each type awaiting repair
d) Number of components of each type repaired and returned to service

e) Quantity of emissions

2.8.11 The operator of a facility shall maintain semi-annual records of fugitive emissions monitoring and maintenance activities. The records shall be maintained on site for a minimum period of three years.

2.9 Storage of Volatile Organic Compounds Regulations

2.9.1 The operator of a facility shall not place, store, or hold in any stationary tank, reservoir, or any other container any volatile organic compound (VOC) unless such container is equipped with a control device as specified in Table 2F.

2.9.2 The operator of a facility storing VOC compounds in tanks or containers which fall under following categories are exempt from this section of the Regulations and the requirements of Table 2F:

a) All vessels at gasoline service stations.
b) All vessels that are permanently mobile.
c) All vessels which maintain a pressure of at least 204.9 kPa.
d) All vessels with capacities less than 75 m^3.

2.9.3 The operator of the facility installing or operating a fixed roof storage tank with an internal floating roof, with the exception of Nitrogen blanketed tanks provided that emissions are routed through a close vent system with a control device, shall:

a) Visually inspect the internal floating roof primary seals prior to the initial filling of the tank. The primary seal shall be inspected each time the tank is taken out of service and at a minimum of once every ten (10) years.
b) Visually inspect the secondary seal from the nearest manway after the tank is placed in service and on an annual basis thereafter.
c) Repair any major defect discovered during an inspection within 45 days of the date of inspection or remove the tank from service. If the operator cannot complete the repair within the specified time frame, then a written justification explaining the delay and expected completion date shall be provided to the Royal Commission.

2.9.4 The operator of a facility with storage equipment equipped with external floating roofs shall:

a) Determine that the total gap width and areas for each of the primary and secondary seals are consistent with manufacturers' design and installation specifications. This determination shall be verified annually for secondary seals. For primary seals, this shall be verified each time the tank is removed from service and at a minimum of once every ten (10) years.
b) Measure during hydrostatic testing or within sixty (60) days of initial fill the gaps between the tank wall and the primary seal (seal gaps) and the gaps between the tank wall and the secondary seal.
c) Repair any major defect discovered during an inspection within 45 days of the date of inspection or remove the tank from service. If the operator cannot complete the repair within the specified timeframe, then a written justification explaining the delay and expected completion date shall be provided to the Royal Commission.

2.9.5 The operator shall notify the RC (14 working days in advance) of their schedule of routine seal inspection as described in clause 2.9.3 and clause 2.9.4.

2.9.6 All results of the visual inspections of storage tank primary and secondary seals shall be documented and records shall be kept in accordance with Section 9.3 of these regulations.

2.9.7 The operator of any facility using VOC storage vessels shall retain on site the following records:

a) Chemical name of VOC stored.
b) VOC storage tank capacity.
c) Details of periods when any required control device is not functional.
d) True vapor pressure of the material stored.

2.10 Loading and Unloading of Organic Compounds Regulations

Unless otherwise specified, this section of the regulations applies to both land and marine based loading and unloading operations.

2.10.1 The operator of a facility which is loading or unloading VOCs or organic HAP compound with a true vapor pressure greater than or equal to 1.5 psia, in quantities greater than 75 m^3 per day averaged over any consecutive 30 day period, shall not permit any such material loading or unloading unless the vapors generated from such an operation are processed by a vapor control system.

2.10.2 The operator of a facility performing land-based loading and unloading subject to clause 2.10.1 shall perform the operations such that:

a) All liquid and vapor lines shall be equipped with fittings which make vapor-tight connections, and which close automatically when disconnected.
b) All liquid and vapor lines shall be equipped to allow residual VOC or organic HAP in the loading line after loading is complete to discharge to the control system.
c) All loading effected through the hatches of a transport vessel shall provide appropriate pneumatic, hydraulic, or other mechanical means to force a vapor tight seal between the loading arm and the vessel hatch.
d) Transfer operations shall cease if a vapor leak is detected greater than 20% of the lower explosive limit of the material being transferred.
e) If a leak is detected during the transfer operations of more than 10,000 ppm VOC or 500 ppm organic HAP, then repairs to the transfer system shall be made before continuing the loading operation. The stringent of Clause 2.10.2(d) or 2.10.2(e) shall be complied with.

2.10.3 The operator of a VOC loading or unloading vapor control system shall operate the system such that:

a) Control efficiency of at least 95% is maintained for VOCs during loading when using a vapor recovery device.
b) Control efficiency of at least 98% during loading is maintained when using a combustion device for HAPs as identified in Table 2C. However, in case of carcinogenic or acutely hazardous compounds, higher control efficiency may be applicable.

2.10.4 The operator of a facility that is affecting the loading and unloading of VOC or organic HAP shall establish an inspection scheme to be implemented during each transfer operation. The operations inspection shall include inspection for visible liquid leaks, visible fumes, vapor leaks or significant odors resulting from the transfer operations.

2.10.5 The operator of a facility shall cease transfer operations if a liquid leak is detected and cannot be repaired immediately.

2.10.6 The operator of a facility which is affecting the loading and unloading of VOC or organic HAP shall maintain records and report emissions in accordance with the relevant point source and fugitive emission regulations as specified in Sections 2.5 and 2.8.

2.10.7 The operator of a facility involving Marine Tank vessel loading operations of crude oil with a throughput of 200 Million barrels or more on a 24-month annual average basis or gasoline with a throughput of 10 Million barrels or more on a month annual average basis shall comply with the following:

a) Equip each terminal with a Vapor Collection System (VCS) designed to collect VOC vapors displaced from marine tank vessels during loading and to prevent VOC vapors from passing through another loading berth or to the atmosphere.

b) Limit marine tank vessel loading operations to those vessels that are equipped with Vapor Collection Equipment (VCE) compatible with the terminal's VCS.
c) Limit marine tank vessel loading operations to those levels that are vapor tight and connected to the VCS
d) Reduce emissions of captured VOC from marine tank vessel loading operations by 98 wt. % when using a combustion device or by 95 wt. % when using a recovery device.
e) Requirement of above paragraph (d) may be met by reducing gasoline-loading emissions to, at most, 1000-ppmv outlet VOC concentration.

Note: The standards given in item (d) and (e) as above, do not apply to marine tank vessel loading operations where emissions are reduced by using a Vapor Balancing System.

2.10.8 All the loading racks at a bulk gasoline terminal with throughput of greater than 75 m^3 per day which deliver liquid product in to gasoline tank trucks shall comply with the following standards:

a) Each affected facility shall be equipped with vapor collection system designed to collect the total organic compounds vapors displaced from tank trucks during loading.
b) The emissions to the atmosphere from the vapor collection system due to the loading of the gasoline into gasoline tank trucks are not to exceed 35 milligrams of total organic compounds per liter of gasoline loaded except as noted in item (c) of this section.
c) For each affected facility equipped with an existing vapor processing system, the emissions to the atmosphere from the vapor collection system due to the loading of gasoline into gasoline tank trucks are not to exceed 80 milligrams of total organic compound per liter of gasoline loaded.

2.11 Air Emissions Inventory Regulations

2.11.1 Operators of facilities shall submit an air emissions inventory report annually. The inventory report shall contain the following information:

a) Identification of all emission sources by facility
b) Emission loads obtained from measured pollutant emissions for all point sources subject to clause 2.5.1 or clause 2.5.2.
c) Estimated emission loads obtained from calculations or engineering design information for all other point sources.
d) Fugitive emissions estimates based on calculations utilizing procedures, methodologies and appropriate air quality emission factors as provided in USEPA AP-42: Protocol for Equipment Leak Estimates (latest edition - http://www.epa.gov/ttn/chief/ap42/).
e) An estimate of emissions from storage tanks and transfer operations.
f) An estimate of emissions from wastewater treatment operations.
g) All emissions data should be expressed in kg/h and t/y
h) If the emissions data are calculated it shall be necessary to cite and include the calculations in support of such data.
i) The inventory of VOC emissions may be combined as one pollutant (total VOCs) with the exception of emissions of any HAP as listed in Table 2C.
j) Estimated inventory of greenhouse gases (GHG)--carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), Nitrogen Trifluoride (NF_3) from all point sources, following IPCC updated guidelines and methodology, submitted annually on/before 15th March to RC.

Table 2-A: Ambient Air Quality Standards (1)

S/N	Pollutant	Averaging Period	Maximum Concentrations	
			µg/m^3	ppm
1.	Carbon Monoxide (CO)	Hourly (2)	40000	35
		8 Hours (3)	10000	9
2.	Nitrogen Dioxide (NO_2)	Hourly (4)	660	0.35
		Annual	100	0.05
3.	Sulfur Dioxide (SO_2)	Hourly (5)	655	0.25

S/N	Pollutant	Averaging Period	Maximum Concentrations	
			µg/m³	ppm
		24 Hours [6]	217	0.083
		Annual	65	0.02
4.	Ozone (O_3)	Hourly	235	0.12
		8 Hours [7]	157	0.08
5.	Inhalable Particulates (PM10) [8]	24 Hours	340	-
		Annual	50	-
6.	Inhalable Particulates (PM2.5) [9]	24 Hours	35	-
		Annual	15	-
7.	Lead	Hourly [10]	1.5	-
		24 Hours	0.5	-
		Monthly	0.2	-
8.	Acetaldehyde [10]	Hourly	90	0.05
9.	Acetic Acid [10]	Hourly	250	0.102
10.	Acetone [10]	Hourly	5900	2.4
11.	Acrylic Acid [10]	Hourly	60	0.02
		Annual	6	0.002
12.	Acrylonitrile [10]	Hourly	43	0.02
		Annual	2	0.0009
13.	Ammonia (NH_3)	Hourly	1400	2.01
		Annual	92	0.13
14.	Arsenic [10]	Hourly	0.1	-
		Annual	0.01	-
15.	Benzene (C_6H_6) [10]	Hourly	30	0.009
		Annual	3	0.0009
16.	PAH as Benzo[a] Pyrene [11]	Annual	0.001	-
17.	Bromine	Hourly	7	0.00214
		Annual	0.7	0.00021
18.	Bromoform	Hourly	50	0.00484
		Annual	5	0.00048
19.	Butadiene 1,3 [12]	24 Hour	10	0.00452
		Annual	2	0.0009
20.	Cadmium	Hourly	5.4	-
		24 Hours [12]	0.025	-
		Annual	0.0033	-
21.	Carbon Disulfide [10]	Hourly	30	0.01
22.	Carbon Tetrachloride [12]	24 Hours	2.4	0.0004
23.	Chlorine (Cl_2)	Hourly	43	0.01483
		Annual	2.6	0.0009
24.	Chloroform	Hourly	100	0.02048
		Annual	10	0.00205
25.	Cumene [10]	Hourly	500	0.1
26.	Ethylbenzene	Hourly	26000	6.0
		24 Hours	1000	0.23
27.	Ethylene [12]	24 Hours	40	0.035
28.	Ethylene Dibromide	Hourly	150	0.01952
		24 Hours	3	0.0004
		Annual	0.22	0.00003
29.	Ethylene Dichloride	Hourly	150	0.03706
		24 Hours	3	0.00074
		Annual	0.4	0.0001

Table 2-A: Ambient Air Quality Standards

S/N	Pollutant	Averaging Period	Maximum Concentrations	
			µg/m³	ppm
30.	Ethylene Oxide	Hourly	20	0.0111
		Annual	2	0.00111
31.	Formaldehyde	Hourly (10)	65	0.053
		Annual	3.3	0.00269
32.	Fluorides	24 Hours	16	0.016
		Monthly	1.0	0.001
33.	Hydrogen Chloride (10)	Hourly	75	0.05
34.	Hydrogen Cyanide (12)	24 Hours	8	0.0072
35.	Hydrogen Fluoride	Hourly (13)	250	0.30
		24 Hours (13)	30	0.036
		Annual (14)	14	-
36.	Hydrogen Iodide (15)	Hourly	10	0.00191
		Annual	1	0.00019
37.	Hydrogen Sulfide (H_2S) (10)	Hourly	200	0.14
		24 Hours	40	0.03
38.	Manganese (10)	Hourly	2	-
		Annual	0.2	-
39.	Methanol (10)	Hourly	2600	2
40.	Methylene Bisphenyl diisocyanate (MDI) (12)	Hourly	0.7	0.00005
41.	Naphthalene (12)	24 Hours	22.5	0.0043
42.	Nickel (12)	Hourly	0.1	-
		Annual	0.02	-
43.	Phenol	Hourly (10)	100	0.026
		24 Hours (12)	30	0.0078
44.	Phosgene (10)	Hourly	4	0.001
45.	Polymeric Methylene diphenyl diisocyanate (PMDI) (12)	24 Hours	0.7	0.0006
46.	Propylene (12)	24 Hours	4000	2.324
47.	Propylene Oxide (10)	Hourly	480	0.2
48.	Pyridine	Hourly	30	0.00927
		Annual	3	0.00093
49.	Sulphate	24 Hours	25	-
50.	Styrene (10)	Hourly	215	0.052
51.	Tetrachloroethylene	24 Hours	250	-
52.	Toluene	Hourly	1800	0.48
		24 Hours (10)	400	0.106
53.	Toluene Diisocyanate (TDI) (12)	24 Hours	0.2	0.00003
54.	Vanadium (12)	24 Hours	2	-
55.	Vinyl Chloride	Hourly (10)	130	0.051
		Annual (12)	0.2	0.00008
56.	Xylene (10)	Hourly	2300	0.53
		24 Hours	700	0.161
57.	Non-Methane Hydrocarbon (NMHC) (16)	3 hours	160	0.24

Notes:

µg/m³ is the applicable standard. ppm values are for reference only.

1) Reference conditions are 25 °C and 760 mm Hg.
2) Shall not exceed more than 01 time per year
3) Shall not exceed more than 2 times per month
4) Shall not exceed more than 24 times per year
5) Shall not exceed more than 24 times per year
6) Shall not exceed more than 03 times per year
7) Shall not exceed 25 days per year averaged over 3 years

8) Inhalable particulates: < 10 microns equivalent aerodynamic diameter: 24-hour standard shall not exceed more than 12 times annually. Exceedance of the 24-hour or annual standard as a result of abnormal natural background concentrations shall not be considered a violation of the standard.
9) Inhalable particulates: < 2.5 microns equivalent aerodynamic diameter. 24-hour standard shall not exceed more than 12 times annually. Exceedance of the 24-hour or annual standard as a result of abnormal natural background concentrations shall not be considered a violation of the standard.
10) Alberta Ambient Air Quality Objectives and Guidelines issued in January 2019.
11) Air Quality Standards European Commission.
12) Human toxicology and air standards section technical assessment and standards development branch Ontario Ministry of the Environment, Conservation and Parks. Ambient Air Quality Criteria May 1, 2020.
13) Acceptable Ambient Levels (AAL) of North Carolina, USA), USA. Hourly and 24 Hours values are only for Ras Al-khair area, whereas only 24 Hours value is for other RCCs. These values of hourly and 24 hours must not exceed at or beyond a facility property boundary. Moreover, these values are not applicable for the RC City which is surrounded by farmlands having all kinds of crops, forage, and other vegetation. RC has the right to decrease these values whenever it is required based on human health impacts.
14) State of Vermont, Agency Of Natural Resources, Air Pollution Control Regulations - 2022
15) Expert Panel on Air Quality Standards – Addendum to Guidelines for Halogens and Hydrogen Halides in Ambient Air, Dept. for Environment, Food and Rural Affairs, Scottish Executive, National Assembly of Wales, Dept. of Environment in Northern Ireland, 2009.
16) This level is a goal to aid in the control of ambient ozone concentrations.

Table 2B: Air Pollution Source Standards [1]

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
1	**General [3] All facilities**	1.1. All sources	Particulate	20% Opacity above background except for 6 minutes for any continuous 60 minutes period
			Asbestos	No emissions allowed
			Visible Emissions	No colored emissions except for water vapor.
		1.2. Stockpiles	Particulate	10% Opacity above background
		1.3. Cooling Towers	Particulate	< 0.0005% Drift Losses of Total Circulated Water
		1.4. End of Pipe NOx Control (e.g., SCR)	Ammonia	≤5.0 ppm
		1.5. Fuel gas combustion (except for BIF)	H_2S contents of fuel gas	<230 mg/dscm
		1.6. Sources emitting >100g/h organic HAP [19] [4]	VOC (Total)	20 mg/m^3 [5]
		1.7. Sources emitting >2kg/h or 5t/y non-HAP VOC [4]	VOC (Total)	80 mg/m^3 [5]
		1.8. For components in VOC service	Fugitive VOC	10,000 ppmv
		1.9. For valves, connectors and flanges in organic HAP[19] service (see Table 2C)	Fugitive organic HAP	500 ppmv
		1.10. Acid gas flares	Visible emissions	No more than 20% opacity for 6 min. within any one-hour period
		1.11. Process flares	Visible emissions	No more than 5 minutes of visible emission within any two-hour period except for water vapor.
		1.12. Flares: steam assisted [6]	VOC & Visible Emissions	Permitted if $H_t \geq 11.2$ MJ/scm Permitted V_{max} as below: $\log_{10}(V_{max}) \leq (H_t + 28.8)/31.7$ if 11.2 MJ/scm < H_t < 37.3 MJ/scm then $V_{max} \leq 122$ m/s if H_t > 37.3 MJ/scm
		1.13. Flares: air assisted [6]	VOC & Visible Emissions	$H_t >= 11.2$ MJ/scm & $V_{max} =< 8.706 + 0.7084(H_t)$

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
1 Cont.		1.14. Flares: non-assisted [6]	VOC & Visible Emissions	Permitted if $H_t \geq 7.45$ MJ/scm Permitted V_{max} as below: $\log_{10}(V_{max}) \leq (H_t + 28.8)/31.7$ if 7.45 MJ/scm < Ht < 37.3 MJ/scm then $V_{max} \leq 122$ m/s if $H_t > 37.3$ MJ/scm
		1.15. Manufacturing, storage and handling of Ethylene Oxide [27]	Ethylene Oxide	0.2 mg/m3(New facilities)
		1.16. Manufacturing, storage and handling of Toluene[27]	Toluene	5 mg/m3(New facilities)
		1.17. Manufacturing, storage and handling of Methanol[27]	Methanol	20 mg/m3 (Existing facilities) 5 mg/m3 (New facilities)
		1.18. Manufacturing, storage and handling of Acetic Acid[27]	Acetic Acid	20 mg/m3 (Existing facilities) 5 mg/m3 (New facilities)
2	**Primary Aluminum Reduction Plants**	2.1 Potlines	Total fluorides	0.6 kg/t of aluminum produced
			Opacity	10 percent
			PM[28]	2.45 Kg/t of aluminum produced
			Carbonyl Sulfide [28]	1.95 kg/ t of aluminum produced
			SO_2	380 mg/m^3 without control (Existing facilities) 40 mg/m_3 [29] with control (New facilities)

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD (2)
2 Cont.		2.2 Potlines at soderberg plants	POM(18)	0.32kg/t of aluminum produced
		2.3 Paste production plants (continuous)	POM (30)	0.175 kg/t of paste produced
		2.4 Paste production plants (batch)	POM (30)	0.38 kg/t of paste (Existing facilities)
		2.5 Paste production plants(All)	PM(31)	0.041 kg/t of green anode
		2.6 Anode bake plants	Total Fluorides	0.01 kg/t of green anode produced
			POM(18)	0.025 kg/t of green anode produced
			PM(31)	0.035 kg/t of green anode produced
			Mercury(31)	1.7 µg/dscm
			SO_2	0.6 kg/t of aluminum produced (Existing facilities) 250 mg/m^3 (29) (New facilities)
			NOx	0.4 kg/t of aluminum produced (Existing facilities) 150 mg/m^3 (29) (New facilities)
		2.7 Bauxite grinding	Particulates	0.06 kg/t
		2.8 Calcining of aluminum hydroxide	Particulates	2.00 kg/t
			Opacity	20 percent
		2.9 Pitch Storage Tanks(21)	POM18)	Reduce inlet emissions by 95% or more
3	**Secondary Aluminum Production**	3.1 Aluminum scrap shredder(32)	PM	0.023 g/dscm
			Visible Emissions	10% Opacity above background
			HF	2 mg/m^3(29)
			CO	50 mg/m^3
		3.2 Chrome electroplating	Total Chromium(33)	0.011 mg/dscm
		3.3 Melting Furnaces (Excluding Dross), Mills & Non-Melting Furnaces (Annealing Furnace and Coating Section)	SOx (65)	100 mg/m^3
			NOx(65)	100 mg/m^3
			PM	Same as S.N. 41 (50 mg/m^3)
			CO	235 grams/ton of feed(66) (shall not exceed 150 mg/m^3)
			VOC (4) (applicable to all furnaces except melting furnaces)	80 mg/m^3

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
	Secondary Aluminum Production	3.4 Delacquering Furnace	SO_x[65]	100 mg/m^3
			NO_x[65]	100 mg/m^3
			PM	Same as S.N. 41 (50 mg/m^3)
			CO	235 grams/ton of feed[66] (shall not exceed 150 mg/m^3)
			HCl	10 mg/m^3[29]
			VOCs	10 mg/m^3 [29]
			Dioxin & Furans[32]	0.250 µg TEQ/ton of feed/charge
		3.5 Dross Furnace	HCl	10 mg/m^3[29]
			SO_x [65]	100 mg/m^3
			NO_x[65]	100 mg/m^3
			PM	Same as S.N. 41 (50 mg/m^3)
			CO	235 grams/ton of feed[66] (shall not exceed 150 mg/m^3)
			VOC [4]	80 mg/m^3
4	**Ammonia Fertilizers** (including urea)	4.1 Granulators and others	Particulates[7]	0.25 kg/ t of product (New Facilities) 0.35 kg/ t of product (Existing Facilities)
			Ammonia	50 mg/Nm^3 [7] (New Facilities) 150 mg/Nm^3 [7] (Existing Facilities)
		4.2 Prilling towers	Particulates[7]	0.5 kg/ t of product (New Facilities) 1.25 kg/ t of product (Existing Facilities)
			Ammonia	50 mg/Nm^3 [7] (New Facilities) 85 mg/Nm^3 [7] (Existing Facilities)
5	**Ammonium Sulphate manufacturing**	Ammonium Sulphate dryer	Particulate	0.15 kg/t of ammonium sulphate produced
			Opacity	15 percent
			Ammonia	50 mg/Nm^3
6	**Asphalt/ Roofing/ Concrete Plants**	6.1 All emission points	Particulates	90 mg/dscm
		6.2 Fuel gas combustion	Opacity	20 percent
		6.3 All source	VOCs[34]	20 ppm

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD (2)
7	**Beverage Can Surface Coating Industry**	Coating operations	VOC	0.29 kg/l of coating solids from each two-piece can exterior base coating
			VOC	0.46 kg/l of coating solids from each two-piece can clear base coating operation AND from each over-varnish coating operation
			VOC	0.89 kg/l of coating solids from each two-piece can inside spray coating operation
8	**Boilers and Industrial Furnaces (BIF) Burning Hazardous Materials**	Stack gases	Organic Emissions	99.99% Destruction and removal efficiency
			CO	Not to exceed 100 ppmv on an hourly rolling average basis, corrected to 7% oxygen, dry gas basis
			NO_x	As Combustion Device standards.
			SO_2	As Combustion Device standards.
			Particulate	180 mg/dscm after correction to 7% oxygen stack gas concentration
			Chlorinated Organics	99.9999% Destruction and removal efficiency
			Metals	Sb - 1500 g/h; Pb - 430 g/h Ag - $1.5x10^4$ g./h; Ba - $2.5x10^5$ g/h Hg - 1500 g/h; Tl - 1500 g/h As -11 g/h; Cd - 28 g/h Cr - 4.2 g/h; Be - 21 g/h
9	**Thermal Oxidizers (excluding incinerators**	9.1 Stack gases (Excluding Mining Industry)	Organic Emissions	99.99% Destruction and removal efficiency / 20 mg/m^3
			CO	50 mg/m^3
			NO_x	150 mg/m^3 (Existing) 100 mg/m^3 (New)
			SO_2	50 mg/m^3
			Chlorinated Organics	99.9999% Destruction and removal efficiency
		9.2 Stack gases (Mining Industry only)	Organic Emissions(67)	95.00% Destruction and removal efficiency for mining industry
			CO	50 mg/m^3 (Same as S.N. 19 for CO Existing)
			NO_x (67)	150 mg/m^3
			SO_2(67)	50 mg/dscm

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
10	**Brick, Clay, Gypsum Boards & Related Products**	10.1 Raw material - grinders	Particulates	38 kg/t of product[17]
		10.2 Raw material - dryers	Particulates	35 kg/t of product[17]
		10.3 Raw material - Storage	Particulates	20% Opacity above background
11	**Chlorine Manufacturing**	Exit gases	Chlorine gas [8]	30 mg/m^3 (Existing facilities) 20[35] mg/m^3 (New facilities)
12	**Combustion Facilities (Stream generating units, furnaces, reformers, heaters etc.)**	12.1 Fossil-fuel fired combustion facilities with a heat input capacity more than 250 MBTU/h (73MW)	Particulates	43 ng/J (0.1 lb/MBTU)
			SO_2	340 ng/J (0.8 lb/MBTU)
			NO_x	43 ng/J (0.1 lb/MBTU) gas fired (Existing facilities) 30 ng/J (New facilities) 69 ng/J (0.16 lb/MBTU) oil fired (Existing facilities) 43 ng/J oil fired (New facilities)
			Hydrogen Chloride	0.05 ng / J[36]
			Hydrogen Fluoride	0.05 ng / J[36]
		(Note: HF, HCl and Heavy metals are not applicable for facilities using gaseous fuel.)	Heavy Metals Antimony Arsenic Beryllium Cadmium Chromium Cobalt Lead Manganese Nickel Selenium Mercury	Heavy Oil Combustion Source[36] 0.001512 ng / J 0.000378 ng / J 0.000063 ng / J 0.000025 ng / J 0.002520 ng / J 0.003780 ng / J 0.001008 ng / J 0.002520 ng / J 0.011340 ng / J 0.002520 ng / J 0.000013 ng / J
		12.2 Electric utility steam generating units operated on fossil fuel with more than 250 MBTU/h (73 MW) electrical output	Particulates	13 ng/J (0.03 lb/MBTU) (Existing facilities) 4 ng/J[37] (0.01 lb/MBTU) (New facilities)
			SO_2	340 ng/J (0.8 lb/MBTU) (Existing facilities) 47 ng/J[38] (0.11 lb/MBTU) (New facilities)
			NO_x [11]	43 ng/J (0.1 lb/MBTU) gas fired (Existing facilities) 30 ng/J (New facilities) 69 ng/J (0.16 lb/MBTU) oil fired (Existing facilities) 43 ng/J oil fired (New facilities)
		12.3 Industrial/commercial/institutional combustion facilities with a heat capacity more than 100 MBTU/h	Particulates	43 ng/J (0.1 lb/MBTU)

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
12 Cont.	**Combustion Facilities** (Continue)	more than 100 MBTU/h (29MW)	SO_2	215 ng/J (0.5 lb/MBTU) when <30% heat input derived from oil (Existing facilities)
				340 ng/J (0.8 lb/MBTU) when >30% heat input derived from oil (Existing facilities) 87 ng/J[39] (0.02 lb/MBTU) (New facilities)
			NO_x [10,11]	43 ng/J (0.1 lb/MBTU) gas fired (Existing facilities) 30 ng/J (New facilities) (BAT) 69 ng/J (0.16 lb/MBTU) oil fired (Existing facilities) 43 ng/J oil fired (New facilities)
		12.4 Small industrial/commercial/institutional combustion facilities with a heat capacity 100 MBTU/h (29MW) or less but greater than or equal to 10 MBTU/h (2.9MW)	SO_2	215 ng/J (0.5 lb/MBTU)
			Particulates	13 ng/J (0.01 lb/MBTU)[40]
			NO_x	Same as 12.3
		12.5 Stationery gas turbines with heat input > 100 MW	NO_x [10]	9 ppmv @ 15 % O_2 dry basis
			SO_2	26 ng/J[41]
		12.6 Stationery gas turbines with heat input> 10 MW and <100MW	NO_x [10]	25 ppmv @ 15 % O_2 dry basis
			SO_2	26 ng/J[41]
		12.7 Stationery gas turbines with heat input< 10 MW	NO_x [10]	42 ppmv @ 15 % O_2
			SO_2	26 ng/J[41]
		12.8 Duct burner	NOx	86 ng/J (0.2 lb/MBTU gas fired 130 ng/J (0.3 lb/MBTU) oil fired
		12.9 Combined Cycle Gas Turbine[68] (GT+Heater+Catofine Reactor+Waste Heat Boiler) or any combination of all/any of these units.)	NO_2	10 ppm
13	**Ferroalloy Production Facilities (Electric Arc Furnaces)**	13.1 Silicon metal, ferrosilicon, calcium Silicone or silico-manganese zirconium	Particulates	0.45 kg/MW-hr.
		13.2 High carbon ferrochrome, charge chrome, standard ferro-manganese, silicomanganese, calcium carbide or silvery iron	Particulates	0.23 kg/MW-hr.
		13.3 Ferrochrome silicon, or ferromanganese silicon	Opacity	15 percent
			CO	20 percent by volume

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD (2)
14	**Formaldehyde**	14.1 Storage of formaldehyde solutions with vapor pressure =< 570 mm Hg	Formaldehyde	A floating roof is allowable if it can be shown that the emissions from all vents of the storage tank do not exceed 0.1 kg/hour of gas/vapor OR if the emissions through the tank vents exceed 0.1 kg/hour, a floating roof may be permitted if the concentration of formaldehyde in the vent gas does not exceed 20 mg/m^3 (STP), OR a sealed storage tank with vapor recovery is required.
		14.2 Storage of formaldehyde solutions with vapor pressure => 570 mm Hg	Formaldehyde	A sealed storage tank with a vapor recovery system
		14.3 Waste Gases (24)	Formaldehyde	60 mg/m^3 (Existing facilities)
		14.4 Waste Gases	Formaldehyde(42)	5 mg/m^3 (New facilities)
		14.5 Waste Gases	Total VOCs(42)	20 mg/m^3
15	**Wool Fiberglass Insulation Manufacturing Plants**	15.1 Exit gases from rotary spin wool fiberglass insulation manufacturing	Particulates	5.5 kg/t of glass pulled
			Formaldehyde(43)	0.36 kg/t of glass pulled
			Methanol(43)	0.30 kg/t of glass pulled
16	**Glass Manufacturing Plants**	16.1 Pressed and blown gas with soda-lime and lead recipes(44) melting furnace	Particulates	0.5 g/kg of glass produced (Existing facilities) 0.10 g/kg of glass produced (New facilities)
		16.2 Pressed and blown gas with borosilicate recipe melting furnace	Particulates	1.0 g/kg of glass produced (Existing facilities) 0.50 g/kg of glass produced or 50 mg/Nm3 whichever is stringent (New facilities)
		16.3 Glass for Wool fiberglass(44)	Particulates	0.25 g/kg of glass produced (New facilities)
		16.4 Float Glass(44)	Particulates	0.225 g/kg of glass produced
		16.5 Melting Furnace	NOx(20)	1000 mg/Nm3 (24 hour (daily) average period)
			SO_2(45)	700 mg/Nm^3 (gas fired) 1500 mg/Nm^3 (oil fired)

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD (2)
17	**Grain Elevators**	All sources except grain dryer	Particulates Opacity	0.023 g/dscm Zero percent
18	**Graphic Arts Industry - Publication Rotogravure Printing and Flexographic Printing**	Fugitive emissions	VOC	16 percent of the total mass of VOC solvent and water contained in water borne Inks, used at a facility during one calendar month
19	**Hazardous and Medical Waste incineration (12)**	19.1 Incinerator stack	Particulate	34 mg/dscm corrected to 7% oxygen (Existing facilities) 18.0 mg/dscm(46) corrected to 7% oxygen (New facilities)
			Visible emissions	10% opacity except for no more than 6 minutes in any hour
			NOx (23)	400 mg/m^3 capacity < 6 tph corrected to 7% oxygen 200 mg/m^3 capacity ≥ 6 tph corrected to 7% oxygen
			Sulphur dioxide	50 mg/dscm corrected to 7% oxygen
			CO	50 mg/dscm corrected to 7% oxygen
			Chlorinated organics & other toxic compounds	>99.9999% destruction and removal efficiency (DRE) for POHC[18]
			Organics	>99.99% destruction and removal efficiency (DRE) for POHC[18]
			Total Dioxins & Furans	0.1 ng TEQ/dscm corrected to 7% oxygen
			PCB	1 mg/kg PCB feed for a maximum one-hour average concentration or >99.9999% destruction and removal efficiency (DRE)
			HCl	10 mg/dscm corrected to 7% oxygen
			Hydrogen fluoride	1 mg/dscm corrected to 7% oxygen
			Tl + Cd	0.05 mg/dscm corrected to 7% oxygen
			Sb + Pb + Co + As + Cr + Cu + Mn + Ni + V	0.5 mg/dscm corrected to 7% oxygen
			Hg	0.05 mg/dscm corrected to 7% oxygen

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
19	**Hazardous and Medical Waste incineration [12]**	19.2 Incineration chamber	Minimum post combustion Temperature and Minimum Residence Time	850°C for 2 second OR 1100°C for 2 seconds where incineration of >1% halogenated organic substances (expressed as chlorine) takes place
20	**Hydrochloric Acid Plants**	20.1 Process vent[47]	HCl	>99.4% control or =<12 ppm
			Cl_2	>99.8% control or =<20 ppm
		20.2 Storage tank[47]	HCl	>99.9% control or =<12 ppm
		20.3 Transfer operation[47]	HCl	>99% control or =<120 ppm
21	**Industrial Surface Coating - Large Metal Appliances & Furniture**	Coating	VOC	0.9 kg of VOC per litre of applied coating solids
22	**Lead Acid Battery Manufacturing Plants**	22.1 Lead reclamation facility	Lead	4.5 mg/dscm
			Opacity	5%
		22.2 Grid casting facility	Lead	0.4 mg/dscm
		22.3 Paste mixing facility	Lead	1.0 mg/dscm
		22.4 Other general operations	Lead	1.0 mg/dscm
		22.5 Lead oxide manufacturing	Lead	5 mg/kg of lead feed
		22.6 Any facility except lead reclamation	Opacity	0%
23	**Lime Manufacturing Plants**	Rotary lime-kiln emissions	Particulates	0.3 kg/t of stone feed
			Opacity	15 percent

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD (2)
24	**Medical Waste Autoclave(13) (New)** For regulated medical wastes	24.1 Gravity Flow Autoclave 24.2 Vacuum Autoclave (subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air) 24.3 Steam Sterilizer (subjected at 100% steam conditions and all air evacuated)		Temp.≥121 C, Pres.=15 psig, R. T=>60mins Or Temp. ≥135 C, Pres.=31 psig, R.T =>45 mins Or Temp. ≥149 C, Pres.=52 psig, R.T =>30 mins Temp.≥149 C, Pres.=15 psig, R. T=>45mins Or Temp. ≥135 C, Pres.=31 psig, R.T =>30 mins Temp. ≥121 C, Pres.=15 psig, R. T=>90mins Or Temp. ≥133 C, Pres.=27 psig, R.T =>45 mins Or Temp. ≥160 C, Pres.=80 psig, R.T =>16 mins
25	**Metal Coil Surface Coating Paints**	Fugitive emissions	VOC	0.28 kg/l of coating solids with no control 0.14 kg/l of coating solids with control
26	**Mineral Processing Plants (Metallic)**	26.1 Exit gases	Particulates	0.05 g/dscm
		26.2 Emissions from any source except wet scrubbing control device	Opacity	7 percent
27	**Mineral Processing Plants (Non-Metallic)**	Belt conveyors or other affected facility	Particulates Opacity	0.05 g/dscm 10 percent (Existing facilities)
28	**Nitric Acid Plants**	Exit gases	NO_x	1.5 kg/t of acid produced (expressed as 100 percent nitric acid) (Existing facilities) 0.23 kg/t of acid produced (expressed as 100 percent nitric acid)(50) (New facilities)
			Opacity	10%

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
29	**Petroleum Refineries**	29.1 Fluid catalytic cracking unit catalyst Regenerator	Particulates	1.0 kg/t of coke burn-off (Existing facilities) 0.5 kg/t of coke burn-off[51] (New facilities)
			Opacity	30 percent
			CO	500 ppm
			SO_2 [14]	50 ppm with an add-on control device OR 9.8 kg/t of coke burn-off without an add-on control device
			NOx	80 ppm[51]
		29.2 Claus sulfur recovery plants	SO2 Reduced Sulphur and H2S	250 ppm at zero percent oxygen on dry basis if emissions are controlled by an oxidation/reduction control system followed by incineration OR 300 ppm of reduced Sulphur compounds and 10 ppm H2S calculated as SO2 at 0% oxygen on a dry basis if emissions are controlled by reduction control system not followed by incineration
		29.3 Process Vent	Organic HAP[19]	Reduce emissions of TOC by 98% by wt. OR to a concentration of 20 ppmv on a dry basis corrected to 3% oxygen OR combust the emissions in a flare
30	**Pharmaceutical Plants**	Process vents	Organic HAP[19]	Reduce emissions of TOC by 98% by wt. OR to a concentration of 20 ppmv on a dry basis corrected to 3% oxygen OR combust the emissions in a flare/other device
			Hydrogen halides and halogens	20 ppmv

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
31	**Phosphate Fertilizer**	31.1 Exit gases from any source	Total fluorides	10 g/t of equivalent P_2O_5 feed
		31.2 Exit gases from any point or area source	Visible emissions	No visible colored emissions except for water vapor.
		31.3 Exit gases - phosphoric acid plant	Total fluorides	10.0 g/t of equivalent P_2O_5 feed
		31.4 Exit gases - super phosphoric acid plant	Total fluorides	5 g/t of equivalent P_2O_5 feed
		31.5 Exit gases - diammonium & mono-ammonium phosphate plants	Total fluorides	30 g/t of equivalent P_2O_5 feed
		31.6 Exit gases - NPK plants	Total fluorides	0.02 Kg/t of NPK[54]
		31.7 Exit gases - NPK plants[54]	Chlorides	20 mg/m^3
		31.8 Exit gases - NPK plants[54]	Dust	0.2 Kg/t of NPK
		31.9 Exit gases- triple super phosphate plants	Total fluorides	100 g/t of equivalent
		31.10 Exit gases - granular superphosphate storage facilities	Total fluorides	0.25 g/hr/t of equivalent P_2O_5 stored
32	**Phosphate Rock Plants**	32.1 Phosphorous plant	Polonium[25]	4.5 curies per year (Total emissions from plant)
		32.2 Phosphate rock dryer	Particulates	0.03 kg/t of rock feed
			Opacity	10 percent
		32.3 Phosphate rock calciner	Particulates	0.12 kg/t of rock feed
			Opacity	10 percent
			Polonium[25]	2 curies per year (same with nodulizing kiln)
		32.4 Phosphate rock grinder	Particulates	0.006 kg/t of rock feed
			Opacity	zero percent
33	**Polymeric Coating (supporting Substrate Facilities)**	Coating operation and coating mix operation	VOC	Install, operate and maintain a total enclosure around the coating operation and vent the captured VOC emissions from the total enclosure to a control device that is at least 95% efficient.
34	**Polymer Manufacturing (Polypropylene; Polyethylene; Polystyrene)**	All facilities with process vents	TOC[15]	Reduce emissions of TOC by 98% by wt. OR concentration of 20 ppmv on a dry basis corrected to 3% oxygen OR combust emissions in a flare or equivalent combustion device.

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
35	**Portland Cement Plants**	Kiln gases	Particulates	32.0 g/t of clinker[56]
			Dioxins & Furans	0.2 ng/dscm @7% O_2[56]
			Mercury	9.5 Kg/ MM ton of clinker[56]
			THC	24 ppmvd @7% O_2[56]
			HCl	3 ppmvd @7% O_2[56]
			CO	500 mg/m^3[57]
			HF	2 mg/m^3[57]
			NOx	680 g/t of clinker[57] (30-operating day rolling average)
			SO_2	180 g/t of clinker[57] (30-operating day rolling average)
			Opacity	20 percent
		All other sources	Opacity	10 percent
36	**Cement Kilns Burning Hazardous Waste[58]**	Kiln gases	Dioxins & Furans	0.20 ng/dscm @7% O_2
			Mercury	120 µg/dscm @7% O_2
			Lead & Cadmium	180 µg/dscm @7% O_2
			Arsenic, beryllium & chromium	54 µg/dscm @7% O_2
			Hydrocarbons	20 ppmv @7% O_2
			HCl & Cl_2 (Combined)	86 ppmv @7% O_2
			Particulates	0.15 kg/t of dry feed
			POHC	99.99% DRE 99.9999% DRE (dioxin-listed hazardous wastes)
37	**Primary Copper Smelters**	37.1 Dryer gases	Particulates	50 mg/dscm
		37.2 Roaster, smelting furnace or copper converter	SO2	500 mg/m^3[59]
			NOx	300 mg/m^3[59]
		37.3 All sources	Opacity	20 percent

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
38	**Primary Zinc Smelters**	38.1 Sintering machine gases	Particulates	50 mg/dscm
		38.2 Roaster gases	SO2	650 ppm (Existing facilities) 500 mg/m$^{3(59)}$ (New facilities)
			NOx	300 mg/m$^{3(59)}$
		38.3 All units	Opacity	20 percent
39	**Primary Lead Smelters**	39.1 Blast furnace, dross reverberatory furnace, or sintering machine discharge end gases	Particulates	50 mg/dscm$^{(60)}$
		39.2 Sintering machine, electric smelting furnace, or converter gases	SO_2	650 ppm (Existing facilities) 500 mg/m3 (New facilities)
			NOx	300 mg/m$^{3(59)}$
		39.3 All Units	Opacity	20 percent$^{(60)}$
40	**Secondary Brass and Bronze Production**	40.1 Exit gases from reverberatory furnace	Particulates	50 mg/dscm
			Opacity	20 percent
		40.2 All units	Opacity	20 percent
41	**Steel Plants Electric Arc Furnace (EAF)**	41.1 Electric arc furnace	Particulates	12 mg/dscm
		41.2 Exit gases from control device	Opacity	3 percent
		41.3 Exit gases from shop due to EAF	Opacity	6 percent during melting 20 percent during charging 40 percent during tapping
		41.4 Exit gases from dust handling system	Opacity	10 percent
42	**Steel Plants - Basic Oxygen Furnaces for Making Molten Steel from Scrap**	42.1 Furnace with a control device	Particulates	23 mg/dscm
			Opacity	10 percent
43	**Steel Pickling Plants**	43.1 Pickling lines (Batch)	HCl	18 ppmv or 97% control
		43.2 Pickling lines (continuous)$^{(61)}$	HCl	6 ppmv or 99% control
		43.3 Acid regeneration line$^{(61)}$	HCl	12 ppmv
			Cl_2	6 ppmv

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD (2)
44	**Sulphuric Acid Plants**	44.1 Exit gases	Acid mist including SO_3 and H_2SO_4 Vapors	75 g/t of acid produced (expressed as 100 percent Sulphuric acid)
			Opacity	10%
			SO_2	2 kg/t of acid produced (expressed as 100 percent Sulphuric acid)
45	**Synthetic Fibre Production Facilities**	45.1 All facilities that produce acrylic and non-acrylic fibres	VOC	10 kg VOC/t of solvent (6 month rolling average)
			Carbon fibers(60)	50 mg/m^3 or 0.2 kg/ton of product, whichever is stringent
			HCN (62)	2 mg/m^3
		45.2 Facilities that produce only non-acrylic fibres	VOC	17 kg of VOC/t of solvent
46	**Synthetic Organic Chemical Manufacturing Industry (SOCMI Processes):**	46.1 Any air oxidation unit producing any of the chemicals listed in Table 2B- 1 as a product or by -product 46.2 Any distillation operation producing any of the chemicals listed in Table 2B- 2 as a product or by-product 46.3 Any reactor process (16) producing any of the chemicals listed in Table 2B- 3 as a product or by-product	TOC (15)	Reduce emissions of TOC by 98% by wt. OR to a concentration of 20 ppmv on a dry basis corrected to 3% oxygen OR combust the emissions in a flare
47	**Titanium Dioxide Plant**	47.1 Chlorinator, chlorine storage, chlorine scrubber	Chlorine (17)	30 mg/m^3 (Existing facilities) 20 mg/m^3(35) (New facilities)
		47.2 Material storage, material handling and bagging	Particulates	0.05 g/dscm
			Opacity	7% except for wet scrubbing system
48	**Vinyl Chloride**	48.1 Vents from equipment used in VCM formation; purification; and loading / unloading	Vinyl chloride	10 ppm (3 hourly average)
		48.2 Oxychlorination reactor	Vinyl chloride	0.2 g/kg of the 100% ethylene dichloride product from the Oxychlorination process
49	**Polyvinylchloride & Ethylene Dichloride Manufacturers**	49.1 Polyvinyl chloride reactor; stripper; mixing, weighing and holding containers; and monomer recovery system	Vinyl chloride	10 ppm (3 hourly average)
		49.2 Ethylene dichloride unit	Vinyl chloride	10 ppm (3 hourly average)
		49.3 Oxychlorination reactor	Vinyl chloride	0.2 g/kg (3 hourly average) of the 100% ethylene dichloride product from the Oxychlorination process

Table 2B: Air Pollution Source Standards

S.N	INDUSTRY	SOURCE	POLLUTANT	EMISSION STANDARD [2]
50	**Soda Ash (Sodium Carbonate) & Sodium Chloride Plants[63]**	50.1 Coke combustion & limestone decomposition	CO	12.0 Kg/t of Soda Ash produced
		50.2 Bicarbonate precipitation & filtration	NH_3	50 mg/m^3
		50.3 Fluidized Bed Dryer & Calciner /Flaker ($CaCl_2$ Plant)	Particulates	40 mg/m^3
		50.4 Kiln gas	Particulates	50 mg/m^3
			NOx	200 mg/m^3
			SOx	Same as combustion unit
		50.5 Tower gas washers	H_2S	5.0 mg/m^3
51	**Carbon Black Manufacturing[64]**	51.1 Furnace black plants (All emission limits are at 10% O_2)	Particulate matter	10 mg/m^3
			Sulphur dioxide (as SO_2)	400 mg/m^3
			Nitrogen oxides (as NO_2)	400 mg/m^3
			Carbon monoxide	120 mg/m^3
			VOCs	50 mg/m^3
			Benzene	5 mg/m^3
52	**Rare Earth Manufacturing Industry**	52. All Sources	HCl	12 ppm (adapted from acid regeneration line)
			SO_2	500 $mg/m^{3(59)}$
			NOx	300 $mg/m^{3(59)}$
			PM	50 $mg/m^{3(60)}$ (zero emissions of radioactive materials)
			Cl_2[35]	20 mg/m^3
			Visible Emissions	No visible colored emissions except for water vapor
			VOCs[42]	20 mg/m^3

Notes:

1. The primary source of the standards is the United States Environmental Protection Agency (USEPA): Code of Federal Regulations (CFR) Title 40, Parts 60 – 63.
2. Compliance with the standards will be determined by comparison with hourly average data, unless otherwise specified, that are corrected to standard temperature and pressure, moisture and oxygen content as specified by USEPA Methods.
3. General standards apply to all emissions sources unless individual facility standards are specified.
4. Standard derived from Benchmark Release Levels quoted in the IPC Guidance Note S2 4.04 Inorganic Chemicals, Environment Agency, UK September 1999.
5. Applies to facilities exempted by RC from conducting fugitive emission monitoring.
6. The maximum exit velocity of a flare (V_{max}) is calculated by dividing the maximum volumetric flow rate at STP by the cross-sectional area of the flare tip and (H_t) is the Net Heating Value of the gas being combusted.
7. Standard derived from European Fertilizer Manufacturers Association (EFMA).
8. Established from Federal Republic of Germany Environmental Law title Purity Regulations, Copyright 1978 by the Bureau of National Affairs.
9. The value of F for Stationary Gas Turbines NO_x estimation shall be obtained using the following:

   Y = manufacturer rated heat rate at manufacturer's rated peak load (kJ/Wh) OR actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kJ/Wh
   F = NO_x emission allowance for fuel bound nitrogen, defined below
   N = fuel bound nitrogen

Fuel Bound Nitrogen (Percent by weight)	F (NOx by weight)
N =< 0.015	0
0.015 <= N< 0.1	0.04(N)
0.1 < N=< 0.25	0.004 + 0.0067(N - 0.1)
N > 0.25	0.005

10. Based on Best Available Control Technology 1991, TNRCC, Texas.
11. For mixed fuel the standard is prorated according to the % heat input from derived from each fuel:

$$\text{NOx standard (ng/J)} = \frac{(\%\text{ heat input gas} \times \text{NOx standard gas}) + (\%\text{ heat input oil} \times \text{NOx standard oil})}{(\%\text{ heat input gas} + \%\text{ heat input oil})}$$

12. Additional guidelines for hazardous waste incineration are retained in the documents entitled "Emission Guidelines for Hazardous Waste Incineration Facilities" by PME.
13. New York State, Department of Environmental Conservation Regulations, Regulated Medical Waste Treatment Facilities, Subpart, Chapter IV, 360-17.5, 1999, 2000.
14. The SO_2 limit shall be considered a seven-day rolling average.
15. TOC = total organic compounds, less methane and ethane.
16. Exemptions from the source standards for SOCMI reactor processes are as follows:
    a) Any reactor process that is designed and operated as a batch operation
    b) A process unit with a total design capacity for all chemicals produced within that unit of less than 1,000 tons per year
    c) If the vent stream from an affected facility is routed to a distillation unit subject to the SOCMI standards and has no other releases to the atmosphere except for a PRV the facility is exempt
17. Based on EPA, compilation of Air Pollution Emission Factors, AP-42, 5th edition, Section 11.3, January 1995.
18. POM = Polycyclic organic matter, POHC=Principal Organic Hazardous Constituent.
19. Measured as individual organic Hazardous Air Pollutant (HAP) or as TOC [15].
20. Study on Controlling NOx Emission from Float Glass Factory, RC-Yanbu ECD Study, May 31, 2007.

21. USAEPA-Summary of Current MACT Emission Limits for New Sources Under 1997 NESHAP and Amendments 2005-Table 4.
22. Best Available Techniques for Pollution Prevention and Control in European Fertilizer Industry Booklet No. 1 of 8: Production of Ammonia.
23. USEPA-40 CFR 63.623-Table 1 to Subpart BB of Part 63-Emission Limits for New or Reconstructed Standards for New Sources.
24. Germany's Federal Emission Control Act (Technical Instruction on Air Quality Control-TA Luft).
25. USEPA- 40 CFR 61.123, Subpart K, 54 FR 51699-National Emission Standards for Radionuclide.
26. Best available techniques for pollution prevention and control in the European Fertilizer Industry, European Fertilizer Manufacturers' Association (EFMA) - 2000.
27. Definition of Best Available Techniques (BAT) in Europe: BAT for Air Emission Reduction in the Chemical Industry Sector in Germany – 2017.
28. 40 CFR Part 63.844 (a) - Emission limits for new or reconstructed sources.
29. Best Available Techniques (BAT) Reference Document for the Non-Ferrous Metals Industries Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and control (Page 449, 458, 465, 466, 467, 513) – 2017.
30. 40 CFR Part 63.843 - Emission limits for existing sources.
31. 40 CFR Part 63.844(b) - Emission limits for new or reconstructed sources.
32. 40 CFR Appendix Table 1 to Subpart RRR of Part 63 - Emission Standards for New and Existing Affected Sources.
33. Subpart N. National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks (40 CFR Part 63.342 – Standards).
34. 40 CFR Appendix Table 1 to Subpart LLLLL of Part 63 - Emission Limitations.
35. Best Available Techniques (BAT) Reference Document for the Production of Chlor-alkali Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and control (Page 111) – 2014.
36. 40 CFR Appendix Table 1 to Subpart UUUUU of Part 63 - Emission Limits for New or Reconstructed EGUs.
37. CFR Part 60.42Da - Standards for particulate matter (PM).
38. 40 CFR Part 60.43Da - Standards for sulfur dioxide (SO2).
39. Subpart Db. Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. Section 60.42b. Standard for sulfur dioxide (SO2).
40. 40 CFR Part 60.43c - Standard for particulate matter (PM).
41. Subpart KKKK. Standards of Performance for Stationary Combustion Turbines Subjgrp 281. Emission Limits Section 60.4330. What emission limits must I meet for sulfur dioxide (SO2).
42. COMMISSION IMPLEMENTING DECISION (EU) 2017/2117 of 21 November 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the production of large volume organic chemicals (Table 5.1).
43. 40 CFR Appendix Table 2 to Subpart NNN of Part 63 - Emissions Limits and Compliance Dates.
44. 40 CFR Part 60.292 - Standards for particulate matter.
45. IFC, World Bank: Environmental, Health, and Safety Guidelines Glass Manufacturing (2007).
46. 40 CFR Appendix Table 1B to Subpart Ec of Part 60 - Emissions Limits for Small, Medium, and Large HMIWI at Affected Facilities as Defined in Part 60.50c(a)(3) and (4).
47. 40 CFR Appendix Table 1 to Subpart NNNNN of Part 63 - Emission Limits and Work Practice Standards.
48. 40 CFR Appendix Table 1 to Subpart AAAAA of Part 63 - Emission Limits.
49. 40 CFR § 60.672 - Standard for particulate matter (PM).
50. Subpart Ga. Standards of Performance for Nitric Acid Plants for Which Construction, Reconstruction, or Modification Commenced After October 14, 2011. Section 60.72a. Standards. 40 CFR § 60.72a – Standards.
51. 40 CFR Part 60.102a - Emissions limitations.
52. 40 CFR Appendix Table 2 to Subpart AA of Part 63 - New Source Emission Limits ab.
53. 40 CFR Appendix Table 2 to Subpart BB of Part 63 - New Source Emission Limits ab.
54. Environmental, Health and Safety Guidelines for Phosphate Fertilizer Manufacturing – IFC, 2007.
55. Integrated Pollution Prevention and Control Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals - Ammonia, Acids and Fertilizers (August 2007).
56. 40 CFR Part 63.1343 - What standards apply to my kilns, clinker coolers, raw material dryers, and open clinker storage piles?

57. 1st International Conference on Advances in Mineral Resources Management and Environmental Geotechnology by Z Agioutantis and K Komnitsas (2004 Edition).
58. 40 CFR Part 63.1220 - What are the replacement standards for hazardous waste burning cement kilns.
59. Best Available Techniques (BAT) Reference Document for the Non-Ferrous Metals Industries Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and control (Page 384, 388) – 2017.
60. 40 CFR Subpart R - Standards of Performance for Primary Lead Smelters.
61. 40 CFR § 63.1158 - Emission standards for new or reconstructed sources.
62. Government Gazette Staarskoerant, republic of South Africa (2010).
63. Integrated Pollution Prevention and Control Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals - Solids and Others Industry (Page 101---) – 2007.
64. Integrated Pollution Prevention and Control Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals - Solids and Others Industry (Page 266) – 2007.
65. Best Available Techniques (BAT) Reference Document for the Non-Ferrous Metals Industries Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and control (Page 415) – 2017.
66. https://cfpub.epa.gov/rblc/index.cfm?action=PermitDetail.ProcessInfo&facility_id=28094&PROCESS_ID=110612
67. Best Available Techniques (BAT) Reference Document for Common Waste Gas Management and Treatment Systems in the Chemical Sector – 2019 (Page 208, 266).
68. Visible Plume Investigation on a Combined Cycle Power Plant – ASME.

Table 2B- 1: SOCMI Oxidation Processes Subject to Point Source Emission Standards

CHEMICAL PRODUCT/BYPRODUCT	CHEMICAL PRODUCT/BY-PRODUCT
Acetaldehyde	Dimethyl terephthalate
Acetic Acid	Ethylene dichloride
Acetone	Ethylene oxide
Acetonitrile	Formaldehyde
Acetophenone	Formic acid
Acrolein	Glyoxal
Acrylic Acid	Hydrogen cyanide
Acrylonitrile	Isobutyric acid
Anthraquinone	Isophthalic acid
Benzaldehyde	Maleic anhydride
Benzoic acid; tech.	Methyl ethyl ketone
1.3-Butadiene	a-Methyl Styrene
1-Butyl benzoic acid	Phenol
N-Butyric acid	Phthalic anhydride
Crotonic acid	Propionic acid
Cumene hydroperoxide	Propylene oxide
Cyclohexanol	Styrene
Cyclohexanone	Terephthalic acid

Table 2B- 2: SOCMI Distillation Processes Subject to Point Source Emission Standards

CHEMICAL PRODUCT/BY-PRODUCT	CHEMICAL PRODUCT/BY-PRODUCT
Acetaldehyde	Butylbenzyl phthalate
Acetaldol	Butylene glycol
Acetic Acid	tert-Butyl hydroperoxide
Acetic Anhydride	2-Butene-1,4-diol
Acetone	Butyraldehyde
Acetone cyanohydrin	Butyric anhydride
Acetylene	Caprolactam
Acrylic Acid	Carbon disulphide
Acrylonitrile	Carbon tetrabromide
Adipic Acid	Carbon tetrachloride
Adiponitrile	Chlorobenzene
Alchohols, C-11 or lower, mixtures	2-Chloro-4-(ethylamino)-6-(isopropylamino)-s-triazine
Alchohols, C-12 or higher, mixtures	Chloroform
Allyl chloride	p-Chloronitrobenzene
Amylene	Chloroprene
Amylenes, mixed	Citric acid
Aniline	Crotonaldehyde
Benzene	Crotonic acid
Benzenesulphonic acid	Cumene
Benzenesulphonic acid alkyl derivatives	Cumene hydroperoxide
Benzoic acid, tech.	Cyanuric chloride
Benzyl chloride	Cyclohexane
Biphenyl	Cyclohexane, oxidized
Bisphenol A	Cyclohexanol
Brometone	Cyclohexanone
1,3-Butadiene	Cyclohexanone oxime
Butadiene and butene fractions	Cyclohexene
n-Butane	1,3-Cyclopentadiene
1,4-Butanediol	Cyclopropane
Butanes, mixed	Diacetone alcohol
1-Butene	Dibutanized aromatic concentrate
2-Butene	1,4-Dichlorobutene
Butenes, mixed	3,4-Dichloro-1-butene
n-Butyl acetate	Dichlorodifluoromethane
Butyl acrylate	Dichlorodimethylsilane
n-Butyl alchohol	Dichlorohydrin
sec-Butyl alchohol	Diethanolamine
tert-Butyl alchohol	Diethylbenzene

TABLE 2B-2: (cont.)
SOCMI Distillation Processes Subject to Point Source Emission Standards

CHEMICAL PRODUCT/BY-PRODUCT	CHEMICAL PRODUCT/BY-PRODUCT
Diethylene glycol	Formaldehyde
Di-n-heptyl-n-nonyl undecyl phthalate	Glycerol
Di-isodecyl phthalate	n-Heptane
Diisononyl phthalate	Heptenes (mixed)
Dimethylamine	Hexadecyl chloride
Dimethyl terephthalate	Hexamethylene diamine
2,4 Dinitrotoluene	Hexamethylene diamine adipate
2,6 Dinitrotoluene	Hexamethylene tetramine
Dioctyl phthalate	Hexane
Dodecene	2-Hexenedinitrile
Dodecylbenzene, non-linear	3-Hexenedinitrile
Dodecylbenzenesulphonic acid	Hydrogen cyanide
Dodecylbenzenesulphonic acid, sodium salt	Isobutane
Epichlorohydrin	Isobutanol
Ethanol	Isobutylene
Ethanolamine	Isobutyraldehyde
Ethyl acetate	Isodecyl alchohol
Ethyl acrylate	Isooctyl alchohol
Ethyl benzene	Isopentane
Ethyl chloride	Isophthalic acid
Ethyl cyanide	Isoprene
Ethylene	Isopropanol
Ethylene dibromide	Ketene
Ethylene dichloride	Linear alcohols, ethoxylated, mixed
Ethylene glycol	Linear alcohols, ethoxylated, sulphated, sodium salt, mixed
Ethylene glycol monobutyl	Linear alkylbenzene
Ethylene glycol monoethyl ether	Magnesium acetate
Ethylene glycol monoethyl ether acetate	Maleic anhydride
Ethylene glycol monomethyl ether	Melamine
Ethylene oxide	Mesityl oxide
2-Ethylhexanol	Methacrylonitrile
2-Ethylhexyl alchohol	Methanol
2-Ethylhexyl amine	Methylamine
Ethylmethyl benzene	Methylbenzene diamine
6-ethyl-1,2,3,4-tetrahydro-9,10-anthracenedrone	Methyl chloride

TABLE 2B-2: (cont.)
SOCMI Distillation Processes Subject to Point Source Emission Standards

CHEMICAL PRODUCT/BY-PRODUCT	CHEMICAL PRODUCT/BY-PRODUCT
Methylene chloride	Propylene glycol
Methyl ethyl ketone	Propylene oxide
Methyl iodide	Sodium cyanide
Methyl isobutyl ketone	Sorbitol
Methyl methacrylate	Styrene
2-Methylpentane	Terephthalic acid
1-Methyl-1-2-pyrrolidone	1,1,2,2-Tetrachloroethane
Methyl tert-butyl ether	Tetraethyl lead
Naphthalene	Tetramethyl lead
Nitrobenzene	Tetra (methyl-ethyl) lead
1-Nonene	Tetrahydrofuran
Nonyl alchohol	Toluene
Nonyl phenol	Toluene 2,4-diamine
Nonylphenol, ethoxylated	Toluene 2,4-(and 2,6)-diisocyanate (80/20 mixture)
Octene	Tribromomethane
Oil soluble petroleum sulphonate, calcium salt	1,1,1-Trichloroethane
Oil soluble petroleum sulphonate, sodium salt	1,1,2-Trichloroethane
Pentaerythritol	Trichloroethylene
n-Pentane	Trichlorofluoromethane
3-Pentene nitrile	1,1,2-Trichloro-1,2,2-trifluoroethane
Pentenes mixed	Triethanolamine
Perchloroethylene	Triethylene glycol
Phenol	Vinyl acetate
1-Phenylethyl hydroperoxide	Vinyl chloride
Phenyl propane	Vinylidene chloride
Phosgene	m-Xylene
Phthalic anhydride	o-Xylene
Propane	p-Xylene
Propionaldehyde	Xylenes, mixed
Prionic acid	m-Xylenol
Propyl alchohol	
Propylene	
Propylene chlorohydrin	

Table 2B- 3: SOCMI Reactor Processes Subject to Point Source Emission Standards

CHEMICAL PRODUCT/BY-PRODUCT	CHEMICAL PRODUCT/BY-PRODUCT
Acetaldehyde	Butyraldehyde
Acetic Acid	Butyric anhydride
Acetic Anhydride	Caprolactam
Acetone	Carbon disulphide
Acetone cyanohydrin	Carbon tetrachloride
Acetylene	Chlorobenzene
Acrylic Acid	Chloroform
Acrylonitrile	p-Chloronitrobenzene
Adipic Acid	Citric acid
Adiponitrile	Cumene
Alchohols, C-11 or lower, mixtures	Cumene hydroperoxide
Alchohols, C-12 or higher, mixtures	Cyanuric chloride
Allyl chloride	Cyclohexane
Amylene	Cyclohexane, oxidized
Amylenes, mixed	Cyclohexanol
Aniline	Cyclohexanone
Benzene	Cyclohexanone oxime
Benzenesulphonic acid	Cyclohexene
Benzenesulphonic acid alkyl derivatives	Cyclopropane
Benzyl chloride	Diacetone alchohol
Bisphenol A	1,4-Dichlorobutene
Brometone	3,4-Dichloro-1-butene
1,3-Butadiene	Dichlorodifluoromethane
Butadiene and butene fractions	Dichlorodimethylsilane
n-Butane	Diethanolamine
1,4-Butanediol	Diethylbenzene
Butanes, mixed	Diethylene glycol
1-Butene	Di-isodecyl phthalate
2-Butene	Dimethyl terephthalate
Butenes, mixed	2,4 Dinitrotoluene
n-Butyl acetate	2,6 Dinitrotoluene
Butyl acrylate	Dioctyl phthalate
n-Butyl alchohol	Dodecene
sec-Butyl alchohol	Dodecylbenzene, non-linear
tert-Butyl alchohol	Dodecylbenzenesulphonic acid
Butylbenzyl phthalate	Dodecylbenzenesulphonic acid, sodium salt
tert-Butyl hydroperoxide	Epichlorohydrin
2-Butene-1,4-diol	Ethanol

TABLE 2B-3: (cont.)
SOCMI Reactor Processes Subject to Point Source Emission Standards

CHEMICAL PRODUCT/BY-PRODUCT	CHEMICAL PRODUCT/BY-PRODUCT
Ethanolamine	Isopropanol
Ethyl acetate	Ketene
Ethyl acrylate	Linear Alcohols, ethoxylated, mixed
Ethyl benzene	Linear Alcohols, ethoxylated, sulphated, sodium salt, mixed
Ethyl chloride	Linear alkylbenzene
Ethylene	Magnesium acetate
Ethylene dibromide	Maleic anhydride
Ethylene dichloride	Mesityl oxide
Ethylene glycol	Methanol
Ethylene glycol monobutyl	Methylamine
Ethylene glycol monoethyl ether	Methylbenzene diamine
Ethylene glycol monoethyl ether acetate	Methyl chloride
Ethylene glycol monomethyl ether	Methylene chloride
Ethylene oxide	Methyl ethyl ketone
2-Ethylhexanol	Methyl isobutyl ketone
2-Ethylhexyl amine	Methyl methacrylate
6-ethyl-1,2,3,4-tetrahydro-9,10-anthracenedrone	1-Methyl-1-2-pyrrolidone
Formaldehyde	Methyl tert-butyl ether
Glycerol	Naphthalene
n-Heptane	Nitrobenzene
Heptenes (mixed)	1-Nonene
Hexadecyl chloride	Nonyl alchohol
Hexamethylene diamine	Nonyl phenol
Hexamethylene diamine adipate	Nonylphenol, ethoxylated
Hexamethylene tetramine	Octene
Hexane	Oil soluble petroleum sulphonate, calcium salt
2-Hexenedinitrile	Pentaerythritol
3-Hexenedinitrile	3-Pentene nitrile
Hydrogen cyanide	Pentenes mixed
Isobutane	Perchloroethylene
Isobutanol	Phenol
Isobutylene	1-Phenylethyl hydroperoxide
Isobutyraldehyde	Phenyl propane
Isopentane	Phosgene
Isoprene	Phthalic anhydride

TABLE 2B-3: (cont.)
SOCMI Reactor Processes Subject to Point Source Emission Standards

CHEMICAL PRODUCT/BY-PRODUCT	CHEMICAL PRODUCT/BY-PRODUCT
Propane	Tribromomethane
Propionaldehyde	1,1,1-Trichloroethane
Propyl alchohol	1,1,2-Trichloroethane
Propylene	Trichloroethylene
Propylene glycol	Trichlorofluoromethane
Propylene oxide	1,1,2-Trichloro-1,2,2-trifluoroethane
Sorbitol	Triethanolamine
Styrene	Triethylene glycol
Terephthalic acid	Vinyl acetate
Tetraethyl lead	Vinyl chloride
Tetramethyl lead	Vinylidene chloride
Tetra (methyl-ethyl) lead	m-Xylene
Tetrahydrofuran	o-Xylene
Toluene	p-Xylene
Toluene 2,4-diamine	Xylenes, mixed
Toluene 2,4-(and 2,6)-diisocyanate (80/20 mixture)	

Table 2C: Hazardous Air Pollutants (HAPs)

ORGANIC HAPs	ORGANIC HAPs
Acetaldehyde	p-Cresol
Acetamide	o-Cresol
Acetonitrile	Cumene
Acetophenone	2,4-D (salts & esters)
2-Acetylaminofluorene	DDE
Acrolein	Diazomethane
Acrylamide	Dibenzofurans
Acrylic Acid	1,2-Dibromo 3-chloropropane
Acrylonitrile	Dibutylphthalate
Allyl chloride	1,4-Dichlorobenzene
4-Aminodiphenyl	3,3-Dichlorobenzidine
Aniline	Dichloroethyl ether
o-Anisidine	1,3-Dichloropropane
Benzene	Dichlorvos
Benzidine	Diethanoloamine
Benzotrichloride	N,N-Diethylaniline
Benzyl chloride	N,N-Dimethylaniline
Biphenyl	Diethyl sulphate
Bis (2-ethylhexyl) phthalate (DEHP)	3,3-Dimethoxybenzidine
Bis(chloromethyl) ether	Dimethyl aminoazobenzene
Bromoform	3,3-Dimethyl benzidine
1,3-Butadiene	Dimethyl carbomyl chloride
Calcium cyanamide	Dimethyl formamide
Captan	1,1-Dimethyl hydrazine
Caprolactam	Dimethyl phthalate
Carbaryl	Dimethyl sulphate
Carbon disulphide	4,6-Dinitro-o-cresol; and salts
Carbon tetrachloride	2,4-Dinitrophenol
Carbonyl sulphide	2,4-Dinitrotoluene
Catechol	1,4-Dioxane (1,4-Diethylene oxide)
Chloramben	1,2-Diphenyl hydrazine
Chlordane	Epichlorohydrin
Chloroacetic acid	1,2-Epoxybutane
2-Chloroacetophenone	Ethyl acrylate
Chlorobenzene	Ethyl benzene
Chlorobenzylate	Ethyl carbomate (urethane)
Chloroform	Ethyl chloride
Chloromethyl methyl ether	Ethylene dibromide
Chloroprene	Ethylene dichloride
Cresols/Cresylic Acid	Ethylene glycol
m-Cresol	Ethyleneimine (Aziridine)

TABLE 2C (cont.):
Hazardous Air Pollutants (HAPs)

ORGANIC HAPs	ORGANIC HAPs
Ethylene oxide	N-Nitrosodimethylamine
Ethylene thio-urea	N-Nitrosomorpholine
Ethylene chloride	N-Nitroso N-methyl urea
Formaldehyde	Parathion
Glycol ethers[1]	Pentachloronitrobenzene
Heptachlor	Pentachlorophenol
Hexachlorobenzene	Phenol
Hexachlorobutadiene	p-Phenylenediamine
Hexachlorocyclopentadiene	Phosgene
Hexachloroethane	Phosphorus
Hexamethylene 1,6-diisocyanate	Phthalic anhydride
Hexamethylphosphoramide	Polychlorinated biphenyls
Hexane	Polycyclic Organic Matter[2]
Hydrazine	1,3-Propane sulphone
Hydroquinone	Beta-propiolactone
Isophorone	Propionaldehyde
Lindane (all isomers)	Propoxur
Maleic anhydride	Propylene dichloride
Methanol	Propylene oxide
Methoxychlor	1,2-Propyleneimine
Methyl bromide (bromomethane)	Quinoline
Methyl chloride (chloromethane)	Quinone
Methyl chloroform	Styrene
Methyl ethyl ketone (2-Butanone)	Styrene oxide
Methyl hydrazine	2,3,7,8-tetrachlorodibenzo-p-dioxin
Methyl iodide	1,1,2,2-Tetrachloroethane
Methyl isobutyl ketone	Tetrachloroethylene
Methyl isocyanate	Titanium tetrachloride
Methyl methacrylate	Toluene
Methyl-tert-butyl ether	2,4-Toluene diamine
4,4-Methylene bis (2-chloroaniline)	2,4-Toluene diisocyanate
Methylene chloride (dichloromethane)	o-Toluidine
Methylene diphenyl diisocyanate	Toxaphene (chlorinated camphene)
4,4-Methylenedianiline	1,2,4-Trichlorobenzene
Napthalene	1,1,2-Trichloroethane
Nitrobenzene	Trichloroethylene
4-Nitrobiphenyl	2,4,5-Trichlorophenol
4-Nitrophenol	2,4,6-Trichlorophenol
2-Nitropropane	Triethylamine

TABLE 2C (cont.):
Hazardous Air Pollutants (HAPs)

ORGANIC HAPs	NON-ORGANIC HAPs
Trifluralin	Antimony Compounds
2,2,4-Trimethyl pentane	Arsenic Compounds
Vinyl acetate	Asbestos
Vinyl bromide	Beryllium Compounds
Vinyl chloride	Cadmium Compounds
Vinylidene chloride	Chlorine
Xylenes (isomers and mixtures)	Chromium Compounds
o-Xylenes	Cobalt Compounds
m-Xylenes	Coke oven emissions
p-Xylenes	Cyanide Compounds[3]
	Fine Mineral Fibres[4]
	Hydrogen chloride (Hydrochloric acid)
	Hydrogen fluoride (Hydrofluoric acid)
	Lead Compounds
	Manganese Compounds
	Mercury Compounds
	Nickel Compounds
	Phosphine
	Selenium Compounds
	Radionuclides (including radon)

Notes:

1. Includes mono- and di-ethers of ethylene, diethylene and triethylene glycol.
2. Includes organic compounds with more than one benzene ring and which have a boiling point greater than 100 degree C
3. Any cyanide (CN) compound where formal dissociation may occur.
4. Includes mineral fibre emissions from facilities manufacturing or processing glass, rock, slag or other mineral derived fibres of average diameter of one (1) micron or less.

Table 2D: Air Emission Sources Subject to Continuous Emission Monitoring

Sr. No.	SOURCE (DESIGN BASIS)	PARAMETERS (1)
1	Gas Turbines >50MW heat input capacity	NO_x
2	Combustion Devices >73 MW heat input capacity	Opacity (2), SO_2(2) and NO_x (3)
3	BIFs operating > 1000 hours per year	CO or Hydrocarbons
4	Hazardous waste incinerators / Thermal Oxidizers	CO downstream of combustion zone Combustion temperature, Waste feed rate, SO_2, HCl, PM & O_2
5	Nitric Acid Plants	NO_x
6	Petroleum Refineries:	
	A. Fluid Catalytic Cracking Unit Catalyst Regenerators (with incinerator or waste heat boiler)	Opacity CO
7	B. Fuel Gas Combustion Devices(4)	SO_2(5) & O_2
8	C. Claus Sulfur plants > 20 t/d with oxidation or reduction control system followed by Incinerator	SO_2 and O_2
9	D. Claus Sulfur plants > 20 t/d with reduction control system not followed by incinerator	Reduced Sulphur Compounds and O_2
10	Steel & Ferroalloy Production Plants (electric arc furnaces)	Opacity/PM
11	Sulfuric Acid Plants	SO_2
12	Coal Cleaning Plants (with thermal dryer)	Opacity
13	Aluminum Reduction Plants	PM
14	Lead Smelting	Lead
15	Portland Cement	NOx, SO_2, PM
16	Metal Coil Surface Coating Paints	THC
17	Lead, Cu & Zinc Smelters	SO_2, NOx & Opacity
18	Glass Manufacturing Plants	NOx
19	HCl & Chlorine Emission Plants	HCl & Chlorine
20	Phosphoric Acid Manufacturing	Hydrogen Fluoride
21	Urea Manufacturing	PM/Opacity
22	Mineral Processing Plants	Opacity
23	SOCMI Processes	Total Organic Compounds

Notes:

1. Pertains to exhaust gases except where noted
2. Combustion sources that burn natural gas or hydrogen ONLY shall be exempt from the continuous emission monitoring requirements for opacity and SO_2.
3. If the operator of the facility demonstrates during a performance test and subsequent point source monitoring tests that the emissions of NO_x are consistently less than 70% of the applicable standard for facilities constructed after 1st September 2005, then the source is exempt from the requirement for continuous emission monitoring of NO_x. Demonstration of consistent compliance will require one of the following number consecutive spot sampling tests:
   - 2 results < 50% standard, 3 results < 60% standard, 4 results < 70% standard, 30 days <70% standard using portable continuous emission monitor. All spot sampling tests shall be separated by at least 3 months and completed within 2 years.
4. Fuel gas combustion devices having a common source of fuel gas may be monitored at only one representative location.
5. In lieu of monitoring SO_2 in combustion gases, H_2S in fuel gas may be monitored

Table 2E: Fugitive Emissions Monitoring Requirements

VAPOR PRESSURE @ 20 °C (psia)	MONITORING METHOD
> = 0.147	USEPA CFR 40 Part 60 App A Method 21
< 0.147	Physical / Visual Inspection
< 0.04	No inspection required

EXEMPTIONS FROM FUGITIVE EMISSIONS MONITORING REQUIREMENTS

COMPONENT	EXEMPTION
General	• Aggregate partial pressure or vapor pressure of <0.04 psia at 20 ºC
	• Operation assumes >0.725 psi below ambient pressure
Pressure Relief Valves	• Connected to a control device or equipped with a rupture disc
Pumps	• Canned Pump
	• Magnetic Drive Pumps
	• Diaphragm Pumps
	• Double mechanical seals venting the barrier fluid seal port to a control device • Double mechanical seals operating at a higher pressure than the process • Double seal with dry run back-up/gas barrier with emission released to a control device
Valve	• Bellows valves welded to both the bonnet and stem
	• Diaphragm type valve
	• < 2 inch size valve in all service other than organic HAP service • < 0.5 inch valve in organic HAP service
Flanges and connectors	• Non-HAP service • < 0.75 inch size in organic HAP service • Welded around circumference and connection
Compressors	• Crankcase vents to control device • Compressors with emission from the packing case and valves released through a control device

Table 2F: Required Control Devices for Storage Tanks for VOCs

Tank Capacity (C) (m^3)	True Vapor Pressure (kPa)	Control Devices Necessary for Storage(1)
C < 75	any	None
C => 75	5.2 =< Tvp < 76.6	Fixed roof with internal floating roof OR External floating roof with double seals OR Closed vent system with control device
C => 75	Tvp => 76.6	Closed vent system with control device

Notes:

1. Internal floating roofs shall be designed and installed in accordance with U.S EPA 40 CFR Part 60 subpart Kb.

SECTION - 3

3. Water Environment

Standards on water quality includes ambient water quality criteria for both Red Sea and Arabian Gulf, wastewater pretreatment standards and guidelines at the point of discharge to the central treatment facilities, water quality standards for direct discharge to coastal waters, ballast water discharge as well as irrigation and potable water quality standards.

3.1 Coastal Water Quality Criteria

3.1.1 The criteria for the coastal water quality of the Red Sea and Arabian Gulf receiving water are established at levels which:

a) Do not harm public health.
b) Do not impair the visual or aesthetic appearance of the water.
c) Do not result in adverse impact on the adjacent gulf / red sea waters.
d) Maintain marine life.
e) Protect fisheries.
f) Maintain the amenity value of the waters.
g) Are suitable for use as industrial cooling water.
h) Do not interfere with the use as a source for desalination water.

3.1.2 The coastal receiving water criteria for the Red Sea and Arabian Gulf are specified in Table 3A for the Industrial City area.

3.2 Water Quality Standards

3.2.1 Various water quality standards have been developed for the Industrial City to protect the environment and public health. The standards are as follows:

a) Wastewater Pretreatment Standards at the point of discharge to the Central Wastewater Treatment Facilities (refer Table 3B).
b) Water Quality Standards for Discharge of seawater cooling and Brine to the Sea/Seawater Return and Storm water/Dewatering Discharges to Surface Drainage Ditches (refer Table 3C)
c) Water Quality Standards for Discharge of Variance Stream and Cooling Tower Blow Down to Sea Water Return Line (refer Table 3C-1)
d) Irrigation Water Quality Standards at the Point of Discharge to Irrigation System and Use Points (refer Table 3D).
e) Ballast Water Discharge Standards (refer Table 3E).
f) Drinking Water Standards at the Point of Supply to Drinking Water Distribution Network and Use (refer Table 3F)

3.2.2 Discharging any water is prohibited unless it meets the water quality in compliance with clause 3.2.1 and authorized by RC.

3.3 General Water Quality Regulations

3.3.1 The operator of a facility shall not discharge any chemicals, water or effluents which contain contaminants in such concentration and of such volume as to adversely affect environment, or cause nuisance to, public health or welfare, animal or aquatic life, vegetation or property.

3.3.2 The operator of a facility shall use BAT, as defined in clause 1.1.11, to control all water discharges.

3.3.3 The operator of a facility shall not discharge to Storm Water Channels and Coastal receiving waters, any water (including hydrotesting water and dewatering water) without prior authorization from the Royal Commission.

3.3.4 No visible foreign floating material (including solids and liquid) shall be discharged into the sea, canal, stormwater channel and/or wastewater treatment network.

3.4 Industrial Wastewater Regulations

3.4.1 The operator of a facility shall not discharge industrial wastewater to the Wastewater System if it exceeds the wastewater pretreatment standards at the point of discharge from their facility (refer Table 3B) and/or guideline values (refer Table 3B-I). If necessary, the operator of a facility shall install and operate a pretreatment system at the facility to ensure that the wastewater meets the discharge standards and guidelines.

3.4.2 Any open wastewater storage pond in the facility such as retention pond, emergency holding pond and polishing pond shall be covered appropriately to reduce VOC / odorous emissions.

3.4.3 All facilities shall have an emergency holding pond with a storage capacity to retain three days (72 hours) of industrial wastewater production. Also, the facilities shall meet the following:

a) All the existing unlined and any new holding pond (s) shall be lined with a minimum thickness of 2.0 mm HDPE liner. Existing holding ponds with 1.5 mm HDPE liner are considered to be in compliance with RCER-2025.
b) Wastewater retained in the holding pond shall be discharged within 7 working days from the date of emergency, so that the ponds are normally kept empty to provide containment for emergencies and to minimize fugitive emissions (Applicable from effective date of RCER-2025 Regulations).

3.4.4 No industrial wastewater shall be discharged to the sanitary wastewater system unless specified in the EPO. Any such industrial waste water discharge to the sanitary waste water system shall meet the waste water quality standards in Table 3B.

3.4.5 All the wastewater other than sanitary wastewater shall be sent to IWTP after meeting the limit(s) specified in Table 3B. In case not meeting the limit(s), the wastewater shall be sent to the RC approved waste management facilities for its treatment and final disposal.

3.4.6 The operator of a facility shall not dilute industrial wastewater discharges with process water, potable water, seawater, irrigation water or firewater.

3.4.7 Discharge of treated or untreated wastewater to the following locations is prohibited without authorization from the Royal Commission:

a) Surface water drainage channels
b) Retention ponds without an impermeable barrier
c) On open ground within or outside the facility boundary
d) Below ground surface (e.g., deep well injection, discharge to groundwater etc.)
e) Outside RC boundary
f) Arabian Gulf

3.4.8 The operator of a facility shall not discharge any treated or untreated industrial wastewater to the Red Sea unless it meets the discharge standards in Table 3C and prior authorization from Royal Commission is obtained.

3.4.9 The operator of a Central Wastewater Treatment Facility shall not utilize open ponds such as retention pond, emergency holding pond and polishing pond to store any wastewater. Aboveground closed tanks shall be used to store treated/untreated industrial wastewater unless otherwise authorized by RC.

3.4.10 Surface impoundments or solar evaporation ponds may be utilized at the waste handling facilities to discharge the industrial wastewater containing mainly inorganic compounds which cannot be pretreated to the quality required for discharge to the Industrial Wastewater Treatment Plant provided the following condtions are met:

a) Impoundments are lined with a compatible impervious material (such as: HDPE liner of minimum thickness of 2.0 mm subject to the RC prior approval-constructed after implementation of RCER-2025). Existing impoundments lined with 1.5 mm HDPE liner are considered complying with RCER-2025.
b) No ignitable or reactive materials as defined in clause 4.1.1 and 4.1.3 shall be present
c) Surface water shall not be allowed to drain uncontrolled into the impoundment
d) Adequate freeboard capacity is present to retain 100mm of rainfall
e) The surface impoundments or solar evaporation ponds shall be cleaned once in every five (05) years. Sludge and residues shall be removed and disposed at appropriate waste disposal facilities before closure.
f) The discharge wastewater shall comply with the following parameters and prior approval shall be obtained from RC:

Parameter	Unit	Maximum Concentration
Ammonia as NH_3	mg/l	3.0
Chlorinated Hydrocarbon	mg/l	0.5
Oil & Grease	mg/l	15
pH	pH units	6-9
Sulfide	mg/l	0.1
Cyanide	mg/l	0.1
TOC	mg/l	75
VOC (including odorous compounds)	mg/l	10

g) Waste handling facilities shall conduct analysis of pond water on daily basis and submit monthly report to RC as per Table 9A.
h) Waste handling facilities shall also submit the list of all the wastewater streams discharged to the pond with quantity, analysis and remaining capacity of the pond.
i) Waste handling facilities shall not receive wastewater streams without waste manifest.

3.4.11 The operator of an industrial facility shall install and maintain a flow meter and flow totalizer on all discharges of treated or untreated industrial wastewater at the point of discharge from their facility. The total flow shall be given based on daily average flow.

3.4.12 The facility operator shall install and maintain auto-sampling systems for all continuous discharges and also provide sample points for all discharges of treated or untreated industrial wastewater at the point of discharge from their facility. RC representative (including RC authorized utility operators) shall be allowed by the facility to collect the samples from the auto-sampling system as well as from other sampling points as per requirement. The facility shall get approval from RC prior to finalizing the auto-sampling system." Auto sampling system shall be installed as per Appendix H of RCER-2025, Volume II.

3.4.13 Grab samples for specific parameters shall be detailed in the permit condition of a facility.

3.4.14 The operator of a facility discharging industrial wastewater to the common centralized Industrial Wastewater Treatment Plant (IWTP) shall install, operate and maintain on-line monitoring system for Temperature, pH, Conductivity and TOC. Until their on-line system is integrated with RC on-line system, the facility shall continue submitting monthly reports to RC as per clause 3.4.15.

3.4.15 The operator of a facility discharging industrial wastewater to the Industrial Wastewater Treatment Plant (IWTP) shall prepare and submit a report to the Royal Commission documenting these discharges. This report (soft with electronic signature) shall be prepared and submitted on a monthly basis. The submission of monthly report for all on-line monitored parameters (mentioned in clause 3.4.14) shall be stopped only after the integration of facility's continuous monitoring system with the RC on-line system is completed and fully in operation. The information which shall be included in the report is as follows:

a) Name of the facility
b) Date and time of sample collection
c) Flow rate of the industrial wastewater discharge as specified in the EPO
d) Analytical results for the facility discharge parameters as specified in the EPO and not monitored on line by RC
e) The number, frequency and justification for the non-compliance events
f) Actions taken to mitigate the non-compliance events

3.4.16 The operator of the Wastewater Treatment System/Plant shall install, operate and maintain on-line monitoring system for Temperature, pH, Conductivity, Flow rate, TOC. Until the implementation of on-line system is completed and in operation, the facility shall continue submitting monthly reports to RC as per Clause 3.4.17.

3.4.17 The Operator of the Wastewater System / Plant shall prepare and submit a report (soft copy with electronic signature) to the Royal Commission documenting the water quality of the influent and the treated effluent. This report shall be prepared and submitted on a monthly basis. The submission of monthly report for on-line monitored parameters (mentioned in 3.4.16) shall be stopped only after the integration of facility's continuous monitoring system with the RC on-line system is complete and fully in operation. The information which shall be included in the report is as follows:

a. Date and time of sample collection
b. Composition and flow rate of the IWTP influent and effluent as specified in the EPO and not mentioned for on-line by RC
c. A summary of industrial wastewater discharges found to exceed the standards specified in Table 3B at the point of discharge to the Wastewater System.
d. A summary of the source, quantity and quality of all off-specification wastewater accepted.

3.4.18 The Operator of the Wastewater System / Plant shall not close any effluent line, discharged from the industrial facility to the IWTP, without prior coordination with the concerned facility and shall inform RC immediately.

3.5 Seawater Cooling Regulations

3.5.1 Any operator that utilizes seawater for non-contact cooling shall return the cooling water to the seawater cooling return canal only if the chemical characteristics of the water are not altered except for residual chlorine and temperature. The chemical and physical properties of the cooling water returned to the seawater cooling canal at the point of discharge and brine discharge to the seawater outfall shall meet the standards established in Table 3C.

3.5.2 The operator of a facility shall not discharge any water other than non-contact cooling water and brine (Refer Table 3C) to the seawater cooling discharge without prior authorization from Royal Commission.

3.5.3 Any authorized discharges shall be designated as variance streams in the Environmental Permit to Operate. The Royal Commission decision to authorize a variance stream discharge shall be based on the following criteria:

a) The specific parameters which constitute the variance stream.
b) Compliance of each variance stream with Table 3C-1 standards before dilution with the non-contact cooling water flow.
c) The limited quantity of the variance stream discharge.
d) The duration and frequency of the variance stream discharge.
e) The absence of alternative treatment options.
f) Negligible impact to the marine life.
g) Cooling tower blow down can be discharged continuously to the sea water return in compliance with Table 3C-1.

3.5.4 The facility receiving cooling waters shall provide and maintain flow measurement and online temperature measurement at the seawater intake.

3.5.5 The facility discharging cooling waters to the seawater cooling return canal shall install, operate and maintain on-line monitoring system for their cooling water discharge flow rate, temperature and pH at the seawater outlet. Until their on-line system is integrated with RC on-line system, the facility shall continue submitting monthly reports to RC as per clause 3.5.6.

3.5.6 The operator of a facility discharging cooling waters to the seawater cooling return canal shall prepare and submit a report (soft copy with electronic signature) to the Royal Commission documenting these discharges. This report shall be prepared and submitted on a monthly basis. The submission of monthly report for all on-line monitored parameters (mentioned in clause 3.5.5) shall be stopped only after the integration of facility's continuous monitoring system with the RC on-line system is complete and fully in operation.The information which shall be included in the report is as follows:

a) Name of the facility
b) Date and time of sample collection
c) Analytical results for the facility parameters as specified in the Environmental Permit to Operate and not monitored on-line by RC
d) Inlet flow rate or return flow rate taking into account evaporation losses.
e) The number and frequency of non-compliance events

3.5.7 The operator of a facility discharging variance stream shall provide and maintain sample points for variance stream. The operator of a facility discharging variance streams on batchwise basis to the seawater cooling system shall prepare and submit a report (soft copy with electronic signature) to RC for pH, flow rate, and any other parameter requested by RC on daily basis. In case of any authorized combined variance stream discharge to the seawater return line, each stream joining to the combined stream shall be monitored on bi-weekly basis. In the event the facility is authorized for continuous discharging of variance streams to the seawater cooling return line shall install, operate and maintain on-line monitoring system for variance stream for pH, flow rate and any other parameter requested by RC (e.g. TOC, Ammonia etc.). Until their on-line system is integrated with RC on-line system, the facility shall continue submitting monthly reports to RC which shall include the following as a minimum:

a) Name of the facility
b) Date and time of sample collection
c) Composition and flow rate of the variance stream discharges as specified in the EPO

d) The number and frequency of non-compliance events
e) Sources of Variance Streams

3.6 Cooling Tower (CT) Regulations

3.6.1 The operator of the facility shall install only “Fan Assisted Natural Draught (FAND) cooling towers, except in special circumstances where Mechanical Draught (MD) cooling tower can be justified due to low cooling loads (less than 35000 cu. m/hour circulation water rate) requirement with the RC prior approval. For MD towers, external louvers and windwalls shall be installed in order to avoid problems associated with ground level spray from cross winds.

3.6.2 The operator of the Cooling Tower (CT) shall not use chromium-based water treatment chemicals in any affected tower.

3.6.3 The operator of the CT shall not use sulfuric acid as a scaling inhibitor. However, the polyphosphonates and other similar type scaling inhibitor shall be utilized during operation of the CT.

3.6.4 The blow-down (purge) water from the CT shall be designated as variance stream if it is in compliance with standards provided in Table 3C-1 before dilution with the non-contact cooling water flow.

3.6.5 The sea water utilized in CT shall be dosed with sufficient chlorine to control legionella bacteria in the circulating water. Further, the (total) residual chlorine shall be maintained from 0.2 to 0.5 at all times in the cooling tower blow down.

3.6.6 The operator of CT shall be responsible to develop and implement a program to monitor annually for biological components and for “Legionella Bacteria” within the circulating and effluent water; and wastewater (settled in the basin during turnaround time) of the tower. All the monitoring data shall be maintained for RC inspection and shall be submitted during EPO renewal.

3.6.7 The operator of CT shall be responsible to dispose of the waste material from the cooling tower basin using the most appropriate method (after analyzing for the biological, organic and inorganic components of the waste) with the RC approval.

3.6.8 The operator of a CT shall perform Cooling Tower Drift Loss Test on the cooling towers at the time of the first issuance and renewal of the EPO. The CT drift loss test shall be performed using Cooling Technology Institute Protocols and Methodology (CTI Test Code ATC-140, Isokinetic Drift Measurement. Drift loss test report shall be submitted within 60 days after test completion.

3.7 Storm Water Runoff Regulations

3.7.1 The operator of a facility shall discharge storm water run-off from access roads, non-process areas, grassed or recreational areas directly to the RC storm water drainage system.

3.7.2 The operator of a facility shall provide an impervious (HDPE liner of minimum thickness of 2.0 mm and for existing facility (HPDE liner of 1.5 mm) storm water management system, independent of the industrial wastewater system, to collect the first flush storm water from industrial process areas and hazardous material storage and handling areas. The first flush shall be considered to be the first 30mm of rainfall from each storm event.

3.7.3 After collection of first flush storm water, any additional rain falling on industrial process areas and hazardous material storage and handling areas may be diverted directly to the Royal Commission storm water drainage system.

3.7.4 Any expansion in the existing facility shall construct another dedicated first flush storm water pond (or expand the existing one if possible) to receive the first 30mm of rainfall from each storm event, if the storm water pond constructed in the existing facility is not sufficient to hold first flush storm water from the expansion.

3.7.5 The operator of a facility retaining first flush storm water under clause 3.7.2 and 3.7.4 shall discharge the water according to its chemical analysis as follows:

a) If contained in a dedicated storm water pond, first flush storm water that is compliant with the discharge standards in Table 3C shall be discharged to the Royal Commission storm water drainage system
b) If not contained in a dedicated storm water pond or if it exceeds the standards in Table 3C but meets the water quality standards specified in Table 3B shall be discharged as industrial wastewater in accordance with Section 3.4. Any discharge of first flush storm water to the Wastewater System shall be made upstream of the flow measurement device specified in clause 3.4.11.
c) First flush storm water that is not compliant with the water quality standards specified in Table 3B shall be pretreated on-site until compliant or removed off-site by tanker to waste disposal facilities according to the requirements of Section 5.
d) Storm water management system including channels and pond shall be kept empty all the times except during rain and process area cleaning activities. It shall not be used to handle any other wastewater.

3.8 Sanitary Wastewater Discharge Regulations

3.8.1 All sanitary wastewater produced in the Industrial City shall be transported to the Sanitary Wastewater Treatment Plant (SWTP) via one of the following methods:

a) Sewer
b) Tanker delivery to SWTP
c) Tanker delivery to the Wastewater Tankering Point

3.8.2 All sources of sanitary wastewater within 250m of an existing sewer system shall be connected to the sanitary wastewater system. Installation of holding sump (cesspool) is not permitted within 250m of the Wastewater System sewer network.

3.8.3 Direct discharge of untreated or treated sanitary wastewater to the following locations is prohibited without authorization from the Royal Commission:

a) Surface water drainage channels
b) Unlined retention ponds or lagoons
c) On open ground within or outside the facility boundary
d) Below ground surface (e.g., deep well injection, discharge to groundwater etc.)
e) Outside RC boundary
f) Arabian Gulf or Red Sea

3.8.4 All new Sanitary Wastewater Treatment Plants shall have an emergency holding pond lined with HDPE liner of minimum thickness of 1.5 mm with a storage capacity to retain three days (72 hours) of sanitary wastewater.

3.8.5 The operator of sanitary wastewater treatment facility shall install, operate and maintain on-line monitoring system for their treated water quality parameters such as flow rate, Temperature, pH, conductivity. Until their on-line system is integrated with RC on-line system, the facility shall continue submitting monthly reports to RC as per clause 3.8.6.

3.8.6 The operator of the Sanitary Wastewater Treatment Facility shall prepare and submit a report (soft copy with electronic signature) to the Royal Commission documenting the water quality of the influent and the treated effluent. This report shall be prepared and submitted on a monthly basis. The submission of monthly report for all the on-line monitoring parameters (mentioned in clause 3.8.5) shall be stopped only after the integration of facility's continuous monitoring system with the RC on-line system is complete and fully in operation. The information which shall be included in the report is as follows:

a) Date and time of sample collection
b) Results for the SWTP influent and effluent parameters as specified in the EPO and not monitored on-line by RC
c) A summary of the source, quantity and quality of all off-specification wastewater accepted under Clause 3.4.4.

3.9 Irrigation Water Regulations

3.9.1 All water used for irrigation/landscaping purposes shall meet the irrigation water quality standards specified in Table 3D at both discharge and use points.

3.9.2 The treated effluent irrigation water distribution system shall be clearly marked and utilize unique fittings and materials to avoid cross-connection with drinking water or other water distribution systems.

3.9.3 Any use of treated effluent other than irrigation/landscaping shall require prior approval by the RC on a case by case basis; however treated effluent shall not be used for food crops or forage production in any case.

3.9.4 Treated effluent shall not be applied to landscaping vegetation at elementary schools and kindergartens.

3.9.5 Treated effluent shall not be applied for irrigation by spray distribution systems in areas of heavy public use or in other sensitive areas that may be designated by the Royal Commission.

3.9.6 Treated effluent shall only be applied for irrigation where the soil permeability is sufficient to allow drainage of the applied water to avoid ponding.

3.9.7 Treated effluent shall only be applied for irrigation where no adverse effect on the underlying aquifers or no contamination of surface water drainage channels can occur.

3.10 Marine-related Discharge Regulations

3.10.1 Discharge of any materials (toxic and non-toxic) other than water that meets the standards specified in Table 3C, Table 3C-1 and Table 3E is prohibited. Compliance with the national Executive Regulations for the Sustainable Management of the Marine and Coastal Environment shall be ensured at all times and in case of any necessary discharge, marine vehicles must adhere to the ballast water management plan in accordance with the International Convention for the Control and Management of Ships' Ballast Water and Sediments.

3.10.2 Shipboard ballast sludge and other discharges such as graywater, exhaust gas scrubber wash water etc. shall not be discharged to the Red Sea or Arabian Gulf.

3.10.3 Ballast water, which does not meet the standards, specified in Table 3E shall not be discharged to coastal waters. Contaminated ballast water shall be pre-treated by either on-board or on-shore treatment facilities to the standards specified in Table 3E before discharge to coastal waters.

3.10.4 The operator conducting loading or unloading operations with the potential of polluting the marine environment shall take all necessary precautionary measures to prevent any spillage from its operations and is responsible for the containment and cleanup of any spills to the marine environment. The operator shall notify the Royal Commission and relevant agencies of any incident.

3.11 Groundwater Regulations

3.11.1 The contamination of groundwater is prohibited. The quality of Groundwater shall comply with the groundwater baseline of the area (where the specific facility is constructed) and/or as per the applicable parameters of Table 3C.

3.11.2 The utilization of groundwater for any industrial use is prohibited.

3.11.3 The operator of a facility shall not discharge to the Red Sea / Arabian Gulf receiving waters, Cooling Water Canal, surface water drainage channels or on to the open ground any extracted groundwater without prior authorization from the Royal Commission. Such authorization will only be granted in exceptional circumstances provided that extracted groundwater meets the concentration limits in Table 3C.

3.11.4 The operator of all new facilities shall install a minimum of three (3) permanent groundwater monitoring wells in each hazardous material handling, storage, or process area prior to facility operation. Royal Commission may exempt First Category facilities that have negligible or no impact on the environment at any time and in accordance with the criterias listed in Appendix E, RCER-2025, Volume II. These wells shall be located so that representative samples of the groundwater that may be impacted by the proposed facility operations can be obtained. The number of wells, design and installation of any groundwater monitoring wells shall be subject to review and approval by the Royal Commission as per RC guidelines provided in Appendix E, RCER-2025 Volume II.

3.11.5 The operator of a facility with groundwater monitoring wells installed shall monitor the groundwater quality annually (unless otherwise stated in the EPO) and report (soft copy with electronic signature) the results to the Royal Commission within 90 days after sampling. The specific parameters to be monitored and reported shall be approved by the Royal Commission. The facility shall provide the Royal Commission at least 14 working days prior notice and Royal Commission may elect to witness all or part of the required groundwater sampling and collected samples may also be shared with RC.

3.11.6 Any new facility shall conduct baseline groundwater monitoring and sample analyses prior to the operation of their facility in accordance with Appendix E, RCER-2025, Volume II and shall submit a comprehensive baseline groundwater monitoring report (soft and hard copy) to RC. The specific parameters to be monitored and reported shall be approved by the Royal Commission.

3.12 Drinking Water Regulations

3.12.1 The intake water quality criteria for the desalination plants (including RO plants) which produce drinking water from the Arabian Gulf and Red Sea is specified in Table 3A.

3.12.2 Groundwater shall not be used as raw water for desalination plants (including RO plants).

3.12.3 Chlorine and Sodium Hypochlorite shall not be used for disinfection in all drinking water systems and shall be replaced with Chlorine Dioxide.

3.12.4 The operator of the Drinking Water System (including production and drinking water distribution network) shall ensure that all drinking water distributed through the Drinking Water System meets the Drinking water quality standards in Table 3F at the point of supply to Drinking Water Distribution network and use.

3.12.5 The operator of the Drinking Water System (including production and drinking water distribution network) shall prepare and submit a report (soft copy with electronic signature) to the Royal Commission documenting the drinking water quality at representative locations across the drinking water distribution network and use system. This report shall be prepared and submitted on a monthly basis. The information which shall be included in the report is as follows:

a) Date and time of sample collection. The location of sample collection shall be as specified in the EPO.
b) Analytical results for the drinking water quality parameters as specified in the EPO
c) The number, frequency and explanation for the non-compliance events

3.12.6 Any maintenance activity relating to drinking water storage tanks such as painting, repairing, etc shall be undertaken using internationally approved methods and procedures. Facility shall submit the details of such activity including testing of water and obtain prior approval before starting the work.

3.12.7 Facilities which are intended to build re-mineralization plant of desalinated water for drinking purpose shall adopt the following:

a) Internationally approved process with proven design.
b) Only food grade chemicals shall be used for re-mineralization.

The facility shall submit the design details of the plant to the Royal Commission for prior approval.

3.13 Water Quality Monitoring Requirements

3.13.1 The operator of a facility shall undertake effluent and discharge monitoring of all sources prior to their discharge to either the Industrial Wastewater Treatment Plant, seawater cooling return, stormwater drainage ditches, Arabian Gulf or Red Sea. Such monitoring shall be in accordance with the applicable standards established in these Regulations and any specific requirements established in the Environmental Permit to Operate.

3.13.2 The operator of a facility shall monitor variance streams before dilution with their main cooling water system.

3.13.3 The Royal Commission may waive or reduce the frequency of the effluent or discharge testing requirements if the operator of the facility can demonstrate to the satisfaction of the Royal Commission that the effluent is consistently in compliance with the applicable standard.

3.13.4 All continuous effluent or discharge monitoring systems as required in the Environmental Permit to Operate shall be in continuous operation except for system breakdowns, repairs, calibration checks; and zero and span adjustments.

3.13.5 The operator of all continuous effluent and discharge monitoring systems as required in the Environmental Permit to Operate, shall keep effluent and discharge monitoring records on site for a minimum period of five years. These records shall be available for inspection by the Royal Commission or its designee upon reasonable notice, and shall include:

a) All measurements
b) Verification of calibration and maintenance checks
c) manufacturers' recommended maintenance and calibrations frequencies
d) Occurrence and duration of any startups, shutdowns or malfunctions in the operation of any effluent treatment system.
e) Periods when the monitoring system is inoperative or was not conducted.

3.14 Tables

Table 3-A: Ambient Water Quality Criteria for Coastal Waters

VARIABLE	UNITS	LIMITS		
		Maximum Red Sea & Arabian Gulf	Monthly Average Red Sea	Monthly Average Arabian Gulf
PHYSICAL				
Color	Pt-Co	5	-	-
Floating Particles(1)	mg/l	1	0.5	0.5
Temperature(2)	Δ°Centigrade	4(3)	< 1	2
Total Suspended Solids	mg/l	5	1.5	-
Turbidity	N.T.U(5)	5	1.5	5
CHEMICAL				
Aldrin(10)	mg/l	2.2×10^{-6}		
Aluminium	mg/l	0.05	0.001	-
Ammonia Free (as N)(6)	mg/l	1.0(10)	0.008	0.1
Arsenic	mg/l	0.069	0.001	0.005
Barium	mg/l	1	0.05	-
Benzene (10)	mg/l	0.05		
BOD(10)	mg/l	20		
Cadmium	mg/l	0.04	0.0005	0.001
Carbon Tetrachloride(10)	mg/l	0.001		
Chlordane(10)	mg/l	0.00009		
Chlorinated hydrocarbons	mg/l	0.01		
Chlorine	mg/l	0.013	0.01	0.01
Chloroform(10)	mg/l	0.13		
Chromium (Total)	mg/l	0.05	0.002	0.01
Chromium (Hexavalent)(10)	mg/l	0.02		
Cobalt	mg/l	1	0.001	-
COD(10)	mg/l	40		
Copper	mg/l	0.0135	0.001	0.015
Cyanide (Free) (10)	mg/l	0.001	0.005	0.005
Cyanide (Total) (10)	mg/l	0.1		
DDT(10)	mg/l	1.7×10^{-5}		
Dieldrin(10)	mg/l	4.0×10^{-6}		
Endrin(10)	mg/l	6.0×10^{-6}		
Fluoride	mg/l	1.5	1.4	-
Furans(10)	mg/l	1.0×10^{-6}		
Heptachlor(10)	mg/l	5.0×10^{-6}		
Hexachlorobenzene(10)	mg/l	2.9×10^{-7}		
Iron	mg/l	1	0.001	-
Lead	mg/l	0.21	0.002	0.01
Lindane(10)	mg/l	1.2×10^{-5}		
Manganese	mg/l	0.05	0.0005	-
Mercury	mg/l	0.0001	0.0001	0.0001
Mirex(10)	mg/l	1.0×10^{-6}		
MTBE(10)	mg/l	5		
Nickel	mg/l	0.2	0.002	-
Nitrate	mg/l	1	0.008	0.1
Oil & Grease	mg/l	3.0	2	2
Oxygen – Dissolved (Min.)	mg/l	5(min)	5(min)	5(min)
PAH(10)	mg/l	0.003		

TABLE 3-A (continued)
Ambient Water Quality Criteria for Coastal Waters

VARIABLE	UNITS	LIMITS		
		Maximum Red Sea & Arabian Gulf	Monthly Average Red Sea	Monthly Average Arabian Gulf
PCBs(10)	mg/l	1.9×10^{-6}		
Pentachlorophenol(10)	mg/l	0.005		
TPH(10)	mg/l	0.5		
pH	pH units	6.5 - 8.5(7)	8 - 8.3(7)	8 - 8.5(7)
Phenols(10)	mg/l	0.1(10)	0.1	0.1
Phosphate - total	mg/l	0.025	0.02	0.02
Salinity above ambient	ppt	1.4	1	-
Selenium(10)	mg/l	0.29		
Silver(10)	mg/l	0.2		
Sulphide	mg/l	0.4	0.004	0.004
TCDD(10)	mg/l	3.0×10^{-8}		
Total Kjeldahl Nitrogen (TKN)	mg/l		0.02	0.02
Toluene(10)	mg/l	0.002		
Toxaphene(10)	mg/l	2.1×10^{-5}		
Trichloroethane(10)	mg/l	0.01		
Total Organic Carbon (TOC)	mg/l	15	2	5
Vanadium8)	mg/l	0.08	0.007	0.007
Vinyl Chloride(10)	mg/l	0.002		
Xylenes(10)	mg/l	0.005		
Zinc	mg/l	0.09	0.001	0.1
BACTERIOLOGICAL				
Cyanobacteria(10)	Cells/ml	5000		
E-Coli(10)	MPN/100 ml	<500		
Intestinal Enterococci (10)	MPN/100 ml	<200		
Fecal Coliform9)	MPN/100 ml	-	35	35
Total Coliform9)	MPN/100 ml	-	200	200

Notes:

1) Waters shall be free of all floating particles which may be attributed to wastewater or other discharges.
2) Temperature differential with respect to the water temperature at cooling water canal intake.
3) Refers to maximum temperature at the edge of mixing zone.
4) At the point of discharge from facility boundary to the seawater cooling canal.
5) N.T.U: Nephelometric Turbidity Unit.
6) Non-ionized concentration (pH and temperature dependent).
7) Inclusive range.
8) Water Research Journal 1979, Volume 13, 905-910.
9) USEPA Guidance for Recreational Water and Beaches-Appendix B, July 27, 2000.
10) Adopted from MEWA.

Table 3-B: Wastewater Pretreatment Standards at the Point of Discharge to the Central Wastewater Treatment Facilities [1]

PARAMETER [2]	UNITS	JUBAIL Maximum Limits as Grab	YANBU & JAZAN Maximum Limit as Grab	YANBU & JAZAN Maximum 24h Average
PHYSICAL				
Temperature	°C	60	-	50
Total Dissolved Solids	mg/l	2000	2500	2500
Total Suspended Solids	mg/l	2000	600	500
CHEMICAL [3]				
Aluminum	mg/l	30	-	30
Ammonia, Total as N	mg/l	120	70	40
Arsenic	mg/l	1.25	-	1
Barium	mg/l	2	-	2
BOD_5	mg/l	-	900	800
Boron	mg/l	2.5	-	2.5
Cadmium	mg/l	0.5	-	0.5
Chloride	mg/l	1000	600	400
Chlorinated hydrocarbons	mg/l	0.5	-	0.5
Chromium - Total	mg/l	5	-	3
Chromium - Hexavalent	mg/l	0.25	-	1
Cobalt	mg/l	2	-	2
COD	mg/l	-	1800	1500
Copper	mg/l	1.2	-	1
Cyanide	mg/l	3.5	-	1
Fluoride	mg/l	30	-	25
Foaming Agents (Surfactants)		Nil	Nil	Nil
Iron	mg/l	25	--	4
Lead	mg/l	0.5	-	0.5
Manganese	mg/l	2	-	1
Molybdenum	mg/l	0.01	0.01	-
Mercury	mg/l	0.015	-	0.01
Nickel	mg/l	2.5	-	0.25
Oil and Grease	mg/l	120	200	100
pH[4]	pH Units	5 - 11	5-11	5 - 9
Phenols	mg/l	100	33	25
Phosphorus, Total P	mg/l	50	-	2
Selenium	mg/l	0.02	0.02	-
Silver	mg/l	0.25	-	0.25
Sodium	mg/l	1000	-	600
Sodium Adsorption Ratio	SAR units	20	-	20
Sulfate	mg/l	800	600	300
Sulfide	mg/l	10	-	10

Table 3-B (Continued): Wastewater Pretreatment Standards at the Point of Discharge to the Central Wastewater Treatment Facilities [1]

PARAMETER[2]	UNITS	JUBAIL Maximum Limits as Grab	YANBU & JAZAN Maximum Limit as Grab	YANBU & JAZAN Maximum 24h Average
Total Organic Carbon (TOC)	mg/l	800	-	400
Vanadium	mg/l	0.1	0.1	-
Zinc	mg/l	10	-	1.5

Notes:

1) Facilities owned by the Operator of the Wastewater System including the Industrial Wastewater Treatment Plant (IWTP), the Sanitary Wastewater Treatment Plant (SWTP) and the associated wastewater sewers and pumping stations. Applicable pre-treatment standards for Ras Al-Khair will be added after developing the wastewater treatment plant.
2) For any parameters not identified, specific standards will be determined on a case-by-case basis.
3) Metals standards represent total metals concentrations except as indicated.
4) Inclusive range not to be exceeded.

Table 3B- 1: Wastewater Pre-treatment Guideline Values at the Point of Discharge to the Central Wastewater Treatment Facilities [1]

Parameter	Pre-treatment Standards (µg/l) (Unless otherwise specified)	
	Maximum for any One day	Maximum for Monthly Average
Total Volatile Organic Compounds (VOC) in mg/l	10	-
Benzene	134	57
Carbon Tetra Chloride	380	142
Chlorobenzene	380	142
Chloroethane	295	110
Chloroform	325	111
1,1-Dichloroethane	59	22
1,2-Dichloroethane	574	180
1,2-Dichlorobenzene	794	196
1,3-Dichlorobenzene	380	142
1,4-Dichlorobenzene	380	142
1,1-Dichloroethylene	60	22
4,6-Dinitro-O-Cresol	277	78
1,2-Dichloropropane	794	196
1,3-Dichloropropylene	794	196
Ethylbenzene	380	142
Hexachlorobenzene	794	196
Hexachlorobutadiene	380	142
Hexachloroethane	794	196
Methyl Chloride	295	110
Methylene Chloride	170	36
Nitrobenzene	6,402	2,237
2-Nitrophenol	231	65
4-Nitrophenol	576	162
Tetrachloroethylene	164	52
Toluene	74	28
1,2,4-Trichlorobenzene	794	196
1,1,1-Trichloroethane	59	22
1,2-Trans-dichloroethylene	66	25
1,1,2-Trichloroethane	127	32
Trichloroethylene	69	26
Vinyl Chloride	172	97

Notes

1) Pretreatment Guideline Values for individual hydrocarbons: derived from 40 CFR Part 414 Section 414.25.

Table 3-C: Water Quality Standards for Discharge of Seawater Cooling and Brine* to the Sea/Seawater Return, and Stormwater/Dewatering Discharges to Surface Drainage Ditches [1]

PARAMETER[2]	UNITS	Maximum Allowable
PHYSICAL		
Floating Particles	mg/m^2	NIL
Oil & Grease (Discharge to the Sea)	mg/l	2[9]
Oil & Grease (Discharge to the Seawater Return)	mg/l	7
Turbidity	N.T.U	5
Temperature (direct discharge to sea)	Δ°C	5
Temperature – Discharge to the Seawater Return	Δ°C	10[3]
Temperature - *Yanbu*	Δ°C	case-by-case
Total Suspended Solids	mg/l	40
CHEMICAL		
BOD_5 (Direct discharge to the Sea)	mg/l	25
BOD_5 (Discharge to the Seawater Return)	mg/l	50
COD (Direct discharge to the Sea)	mg/l	50
COD (Discharge to the Seawater Return)	mg/l	100
Oxygen – Dissolved	mg/l	2.0[5]
Total Kjeldahl Nitrogen (TKN)	mg/l	10
Ammonia, Total as N	mg/l	3.0
Phosphorus, total as PO4	mg/l	6
Chlorine (Free - minimum)	mg/l	0.1
Phenols	mg/l	1
pH	pH units	6 – 9[7]
Aluminum	mg/l	15[9]
Arsenic	mg/l	0.5
Barium	mg/l	2.0
Cyanide	mg/l	0.1
Cadmium	mg/l	0.05
Chromium (Hexavalent)	mg/l	0.1
Chromium (Total)	mg/l	0.5
Cobalt	mg/l	0.2[9]
Copper	mg/l	1
Fluoride	mg/l	25
Iron	mg/l	5
Mercury	mg/l	0.005
Lead	mg/l	0.5
Manganese	mg/l	1.0
Nickel	mg/l	0.5
Selenium	mg/l	0.02
Zinc	mg/l	1
Chlorinated Hydrocarbons	mg/l	0.5
Chlorine Residual (Total)	mg/l	0.3
Molybdenum	mg/l	0.01
Nitrate	mg/l	10
PAH[6]	mg/l	0.01
Salinity**	Δ ppt	2
Sulfide	mg/l	0.1
TOC	mg/l	40
Vanadium[8]	mg/l	0.1

Table 3-C (Cont.):
Water Quality Standards for Discharge of Seawater Cooling and Brine* to the Sea/Seawater Return, and Stormwater/Dewatering Discharges to Surface Drainage Ditches (1)

PARAMETER(4)	UNITS	Maximum Allowable
BIOLOGICAL		
Total Coliform (30 days average)	MPN/100ml	1000
Enterococci (30 days average)	Colony Forming Units/100ml	35
E-Coli (30 days average)	Colony Forming Units/100ml	126

** RO reject of sanitary and/or industrial wastewater treatment is not permitted. However, in case of Yanbu, such discharges may be permitted on a case-by-case basis.*
*** Salinity standard is not applicable to brine, storm water and dewatering discharges.*

Notes:

1) Applicable to storm water discharges only, unless permission to discharge wastewater granted under Section 3.7.
2) For any parameters not identified, specific standards will be determined on a case-by-case basis.
3) Differential temperature between seawater cooling intake and seawater cooling discharge.
4) Differential standard between seawater cooling intake and seawater cooling discharge for non-contact cooling water, absolute standard for all other discharges.
5) Dissolved oxygen requirement is a minimum concentration requirement.
6) PAH: Polycyclic Aromatic Hydrocarbons.
7) Allowable range.
8) Ministry of Environment and Climate Affairs, Advanced Regulatory Wiki Application (ARWA), Second Edition, Omani Environmental Regulations, International References Documents, Sohar Environmental Unit (SEU) Guidance notes.
9) The Ministry of Environment, Water and Agriculture (MEWA) Standards.

Table 3C- 1: Water Quality Standards for Discharge of Variance Stream and Cooling Tower Blow Down to Sea Water Return Line [1]

PARAMETER[2]	UNITS	Maximum Allowable
PHYSICAL		
Floating Particles	mg/m^2	NIL
Total Suspended Solids	mg/l	10
Turbidity	N.T.U	15
CHEMICAL		
Aluminum	mg/l	15
Ammonia, Total as N	mg/l	2.0
Arsenic	mg/l	0.1
Barium	mg/l	2.0
BOD_5	mg/l	15
Cadmium	mg/l	0.01
COD	mg/l	50
Chlorinated Hydrocarbons	mg/l	0.1
Chlorine Residual (Total)	mg/l	0.2-0.5
Chromium (Total)	mg/l	0.3
Chromium (Hexavalent)	mg/l	0.05
Cobalt	mg/l	0.1
Copper	mg/l	0.2
Cyanide	mg/l	0.1
Fluoride	mg/l	15
Iron	mg/l	5
Lead	mg/l	0.1
Manganese	mg/l	0.2
Molybdenum	mg/l	0.01
Mercury	mg/l	0.001
Nickel	mg/l	0.2
Nitrate	mg/l	5
Oil and Grease	mg/l	7
Oxygen – Dissolved	mg/l	5.0[3]
PAH[4]	mg/l	0.01
pH	pH units	6 - 9[5]
Phenols	mg/l	0.3
Phosphorus, total as P	mg/l	1
Selenium	mg/l	0.02
Sulphide	mg/l	0.1
Total Kjeldahl Nitrogen (TKN)	mg/l	5
Total Organic Carbon (TOC)	mg/l	25
Vanadium[6]	mg/l	0.1
Zinc	mg/l	2
BIOLOGICAL		
Total Coliform	MPN/100m	500

Notes:

1) Permission to discharge variance streams subject to Section 3.5.3. Standards are applicable to variance stream discharges before dilution with the main non-contact cooling water flow.
2) For any parameters not identified, specific standards will be determined on a case-by-case basis.
3) Dissolved oxygen requirement is a minimum concentration requirement.
4) PAH: Polycyclic Aromatic Hydrocarbons.
5) Allowable range
6) Ministry of Environment and Climate Affairs, Advanced Regulatory Wiki Application (ARWA), Second Edition, Omani Environmental Regulations, International References Documents, Sohar Environmental Unit (SEU) Guidance notes.

Table 3-D: Irrigation Water Quality Standards [1] at the Point of Discharge to the Irrigation System and Use Points

PARAMETER[2]	UNITS	Maximum Allowable
PHYSICAL		
Floating Particles	mg/m^2	Nil
Total Suspended Solids	mg/l	10
Total Dissolved Solids	mg/l	2000
Turbidity[3]	N.T.U.	5
CHEMICAL		
Aluminum	mg/l	5
Ammonia, Total as N	mg/l	5
Arsenic	mg/l	0.1
Barium	mg/l	1
Beryllium	mg/l	0.1
BOD_5	mg/l	10
Boron	mg/l	2.4
Cadmium	mg/l	0.01
COD	mg/l	50
Chloride	mg/l	1000
Chlorine Residual (Free)	mg/l	0.5-1
Chromium	mg/l	0.01
Cobalt	mg/l	0.05
Copper	mg/l	0.2
Cyanide	mg/l	0.05
Dissolved Oxygen[4]	mg/l	2.0 (min.)
Fluoride[5]	mg/l	15
Iron	mg/l	5
Lead	mg/l	0.5
Lithium	mg/l	2.5
Manganese	mg/l	0.2
Mercury	mg/l	0.001
Molybdenum	mg/l	0.01
Nickel	mg/l	0.02
Nitrate (as NO_3-N)	mg/l	10
Oil and Grease	mg/l	Nil
pH	pH units	6 - 8.4
Phenols	mg/l	0.002
Phosphorus, total as P	mg/l	30
Selenium	mg/l	0.02
Silver	mg/l	0.5
Sodium	mg/l	1000
Sodium Adsorption Ratio (SAR)	SAR units	20
Sulfate	mg/l	600
Sulfide	mg/l	0.1
Total Kjeldahl Nitrogen	mg/l	60
Total Organic Carbon	mg/l	40
Vanadium	mg/l	0.1
Zinc	mg/l	2

Table 3-D (cont.): Irrigation Water Quality Standards [1] at the Point of Discharge to the Irrigation System and Use Points

VARIABLE	UNITS	Maximum Allowable
BACTERIOLOGICAL		
Total Coliform [6]	MPN/100 ml	23
Fecal Coliform	MPN/100 ml	1
PARASITOLOGICAL		
Nematodes (eggs)	No./1000 ml	1
Protozoan Cysts	No./10 ml	1
Platyhelminths-flatworms	No./10 ml	1

Notes:

1) Adopted from Ministry of Municipality and Rural Affairs (MOMRA) Standards (2014) and RCJY Studies.
2) For any parameters not identified, specific standards will be determined on a case-by-case basis.
3) Maximum turbidity not to be exceeded more than 5% of the time in the 24-hour period.
4) Dissolved oxygen level is a minimum concentration requirement.
5) Fluoride levels assume well-drained sandy soil for irrigation which will not be used for forage.
6) Reclaimed water shall at all times be adequately disinfected, oxidized, clarified and filtered.
7) The wastewater shall be considered disinfected if the median number of coliform organisms in the effluent does not exceed 2.2 total coliform MPN per 100 ml, as determined from the results of the last seven days for which analyses have been completed, AND if the number of coliform does not exceed 23 total coliform per 100 ml in any sample.

Table 3-E: Ballast Water Discharge Standard

VARIABLE	UNITS	Maximum Allowable
Ammonia, Total as N	mg/l	3.0
Floatables	mg/l	NIL
pH	pH units	6 - 9[1]
Suspended Solids	mg/l	35
Total Oil & Grease	mg/l	10
Total Organic Carbon	mg/l	150

Notes:
1) Inclusive range not to be exceeded.

Table 3-F: Drinking Water Quality Standards at The Point of Supply to Drinking Water Distribution Network and Use [1]

PARAMETER	UNITS	Minimum Concentration	Maximum Concentration
PHYSICAL			
Temperature	^{0}C	--	<40[11]
Taste & Odour	-	-	Unobjectionable
Total Dissolved Solids	mg/l	100	500
Turbidity[2]	N.T.U.	-	1
ALKALINITY			
Calcium	mg/l	30	-
CO_2 (free)	mg/l	-	0.0
Magnesium	mg/l	5.0	-
PH	pH units	6.5	8.5
Total Alkalinity (as $CaCO_3$)	mg/l	40	-
Total Hardness (as $CaCO_3$)	mg/l	75	300[11]
INORGANIC			
Aluminum	mg/l	-	0.1
Ammonium (as NH_4^+) [3]	mg/l	-	0.5
Antimony	mg/l	-	0.02
Arsenic	mg/l	-	0.01
Barium	mg/l	-	0.7
Boron	mg/l	-	2.4
Bromate	mg/l	-	0.01
Cadmium	mg/l	-	0.003
Chlorate	mg/l		0.7
Chloride	mg/l	-	250
Chlorite	mg/l	-	0.7
Chlorine Dioxide*	mg/l	0.1[11]	0.7[11]
Chlorine Residual (Free)	mg/l	0.2	0.5
Chromium (Total)	mg/l	-	0.05
Copper	mg/l	-	2
Cyanide	mg/l	-	0.07
Dissolved Oxygen[4]	mg/l	-	-
Fluoride	mg/l	0.5	1.5
Iron	mg/l	-	0.3
Lead	mg/l	-	0.01
Manganese	mg/l	-	0.4
Mercury (Inorganic)	mg/l	-	0.006
Molybdenum	mg/l	-	0.07
Nickel	mg/l	-	0.07
Nitrate as NO_3 [3]	mg/l	-	50
Nitrite as NO_2 [5]	mg/l	-	0.2
Potassium	mg/l	-	10
Selenium	mg/l	-	0.04
Sodium	mg/l	-	30
Sulfate	mg/l	-	250
Sulfide	mg/l	-	0.002
Uranium	mg/l	-	0.03
Zinc	mg/l	-	3.0

Table 3-F: Drinking Water Quality Standards at The Point of Supply to Drinking Water Distribution Network and Use [1]

PARAMETER	UNITS	Minimum Concentration	Maximum Concentration
ORGANIC			
Acrylamide	mg/l	-	0.0005
Alachlor	mg/l	-	0.02
Aldicarb	mg/l	-	0.01 applies to sulfoxide and sulfone
Aldrin and Dieldrin	mg/l	-	0.00003 for combined Aldrin & dieldrin
Atrazine and chloro-s-triazine metabolites	mg/l	-	0.1
Benzene	mg/l	-	0.01
Benzo-a-pyrene	mg/l	-	0.0007
Bromoform	mg/l	-	0.1
Bromodichloromethane	mg/l	-	0.06
Carbofuran	mg/l	-	0.007
Carbon Tetrachloride	mg/l	-	0.004
Chlordane	mg/l	-	0.0002
Chloroform	mg/l	-	0.3
Chlorotoluron	mg/l	-	0.03
Chlorpyrifos	mg/l	-	0.03
Cyanazine	mg/l	-	0.0006
Cyanogen Chloride	mg/l	-	0.07
2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/l	-	0.03 applies as free acid
2,4-DB (2,4-Dichlorophenoxybutyric acid)	mg/l	-	0.09
DDT (Dichlorodiphenyltrichloroethane) and metabolites	mg/l	-	0.001
Dibromoacetonitrile	mg/l	-	0.07
Dibromochloromethane	mg/l	-	0.1
1,2-Dibromo-3-chloropropane	mg/l	-	0.001
1,2-Dibromoethane	mg/l	-	0.0004
Dichloroacetic acid	mg/l	-	0.05 applies as free acid
Dichloroacetonitrile	mg/l	-	0.02
1,2-Dichlorobenzene	mg/l	-	1
1,4-Dichlorobenzene	mg/l	-	0.3
1,2-Dichloroethane	mg/l	-	0.03
1,2-Dichloroethene	mg/l	-	0.05
Di(2-ethylhexyl)phthalate	mg/l	-	0.008
1,2-Dichloropropane	mg/l	-	0.04
1,3-Dichloropropene	mg/l	-	0.02
Dichlorprop	mg/l	-	0.1
Dimethoate	mg/l	-	0.006
1,4-Dioxane	mg/l	-	0.05
Edetic acid (EDTA)	mg/l	-	0.6 (Free acid)
Endrin	mg/l	-	0.0006

Table 3-F: Drinking Water Quality Standards at The Point of Supply to Drinking Water Distribution Network and Use [1]

PARAMETER	UNITS	Minimum Concentration	Maximum Concentration
ORGANIC			
Epichlorohydrin	mg/l	-	0.0004
Ethylbenzene	mg/l	-	0.3
Fenoprop	mg/l	-	0.009
Hexachlorobutadiene	mg/l	-	0.0006
Hydroxyatrazine	mg/l	-	0.2 (Atrazine metabolites)
Isoproturon	mg/l	-	0.009
Lindane	mg/l	-	0.002
MCPA (4-chloro-2-methylphenoxyacetic acid)	mg/l	-	0.002
Mecoprop	mg/l	-	0.01
Methoxychlor	mg/l	-	0.02
Metolachlor	mg/l	-	0.01
Molinate	mg/l	-	0.006
Monochloramine	mg/l	-	3
Microcystin-LR (Total)	mg/l	-	0.001
N-nitrosodimethylamine (NDMA)	mg/l	-	0.0001
Nitrilotriacetic acid	mg/l	-	0.2
Pendimethalin	mg/l	-	0.02
Phenol[6]	mg/l	-	0.001
Pentachlorophenol	mg/l	-	0.009
Simazine	mg/l	-	0.002
Sodium dichloroisocyanurate	mg/l	-	50 40 as Cyanuric Acid
Styrene	mg/l	-	0.02
2,4,5-T (2,4,5-trichlorophenoxyacetic acid)	mg/l	-	0.009
Terbuthylazine	mg/l	-	0.007
Tetrachloroethene	mg/l	-	0.04
Toluene	mg/l	-	0.7
Total Trihalomethanes (THMs)[7]	mg/l	-	0.08 [8]
Trichloroethene	mg/l	-	0.02
Trichloroacetic acid	mg/l	-	0.1
2,4,6-Trichlorophenol	mg/l	-	0.2

Table 3-F: Drinking Water Quality Standards at The Point of Supply to Drinking Water Distribution Network and Use [1]

PARAMETER	UNITS	Minimum Concentration	Maximum Concentration
ORGANIC (cont)			
Trifluralin	mg/l	-	0.02
Vinyl chloride	mg/l	-	0.0003
Xylenes	mg/l	-	0.5
BACTERIOLOGICAL [9]			
Total Coliform	MPN/100 ml	0	0
E-coli or thermotolerant coliform bacteria [10]	MPN/100 ml	-	0

* The use of chlorine as disinfectant in the existing network will be prohibited after one year from the date of issuance of these regulations.

Notes:

1) World Health Organization, Guidelines for Drinking-water Quality Second Edition (Volume 2) Health criteria and other supporting information (1999); WHO Guidelines for Drinking-water Quality Fourth Edition (2011).
2) Median turbidity value shall not exceed 1 NTU and not exceeding 5NTU in any single sample.
3) Department for Regional Development, European and National Drinking Water Standards, Northern Ireland Environment Agency. (http://www.doeni.gov.uk/niea/water-home/drinking_water/public_water/regulations_guidance.htm)
4) DO level shall be maintained as near saturation as possible.
5) Drinking-Water Standards for New Zealand (Revised 2008), Ministry of Health, Wellington, New Zealand.
6) Handbook of Drinking Water Quality, Second Edition (1997) by John De Zuane, John Wiley & Sons, Inc.
7) Where elevated levels of THMs are found in any sample, other disinfection by-products (as Table 3F) shall be analyzed.
8) National Primary Drinking Water Regulations, US EPA 816-F-09-004, May 2009.
9) Immediate investigative action must be taken if E. Coli or total coliform are detected. The minimal action in the case of total coliform bacteria is repeat sampling, if these bacteria are detected in the repeat sample, the cause must be determined by immediate further investigation.
10) E-Coli shall be used as indicator for the presence of pathogens arising faecal contamination from a water supply.
11) Water Regulator / MEWA.

SECTION - 4

4. Hazardous Materials Management

A hazardous material is defined as any material in a quantity or concentration that, if improperly managed, may pose a hazard to public health or the environment. Hazardous materials may be solids, semi-solids, liquids or gases and include hazardous wastes.

4.1 Hazardous Materials Classification

The classification of hazardous materials includes materials with the following characteristics:

4.1.1 Ignitable - a material is considered ignitable if a representative sample of the material has any of the following properties:

a) It is a liquid, other than an aqueous solution which contains less than 24% alcohol by volume; and has a flash point less than 60^0C (140^0F).
b) It is not a liquid and is capable under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes, and when ignited, burns so vigorously and persistently that it creates a hazard.
c) It is an ignitable compressed gas.
d) It is an oxidizer that can cause or contribute to the combustion of other materials by yielding oxygen or other oxidizing substances, whether or not the substance is itself combustible.

4.1.2 Corrosive - a material is considered corrosive if a representative sample of the material has either of the following properties:

a) It is aqueous and/or its aqueous solution has a pH less than or equal 2 or greater than or equal to 12.5.
b) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm per year at a test temperature of 55°C (130°F).

4.1.3 Reactive - a material is considered reactive if a representative sample of the material has any of the following properties:

a) It is normally unstable and readily undergoes violent change without detonating.
b) It reacts violently with water.
c) It forms a potentially explosive mixture with water.
d) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to public health or the environment.
e) It is a cyanide or sulfide bearing material which, when exposed to pH between 2 and 12.5 can generate toxic gases, vapors or fumes in quantity sufficient to present a danger to health and the environment.
f) It is capable of detonation, explosive decomposition or reaction at standard temperature or pressure.

4.1.4 Toxic - a material is considered toxic if it is present in quantities and concentrations, which based on available human, animal or botanical toxicity testing data have the potential to be harmful to human health or living organisms in their natural environment.

4.1.5 Radioactive - radioactive materials are any materials which spontaneously emits either alpha particles, beta particles, gamma or x-rays, neutrons and or other atomic particles above natural background levels.

4.1.6 Biohazard - biohazard materials are those materials which contain biological materials that are capable of causing harm to human health or the environment. Included in the classification of biohazard materials are etiologic materials, which are capable of harboring or transmitting disease. Also included in the classification of biohazard materials are materials which contain plants, animals, or other organisms that would cause harmful effects if released into the environment.

4.2 Hazardous Materials Inventory Regulations

4.2.1 The operator of a facility shall retain on file current Material Safety Data Sheet (MSDS) information for all hazardous materials present at the facility.

4.2.2 The operator of a facility shall develop and maintain an inventory of hazardous materials stored at the facility in quantities greater than 50 kg for highly toxic materials and 5000 kg for other hazardous materials. The inventory shall summarize the following information for each hazardous material present at the facility:

a) The chemical name, trade name and CAS number of the hazardous material
b) Chemical composition including concentration of hazardous components
c) Physical form of the material
d) Storage Temperature (°C) and true vapor pressure (kPa) for liquids and gases.
e) Storage quantity (annual average and maximum values)
f) Associated hazard classification
g) End use

4.2.3 The use of chemicals which are prohibited either Nationally or Internationally e.g., PCBs shall not be permitted in any facility. In addition, the use of any internationally restricted chemical shall comply with the National Authority Regulations.

4.2.4 The operator of a facility shall provide an annual hazardous material inventory report to the Royal Commission on or before 15th January of the following year, summarizing the information as identified in clause 4.2.2 for the preceding calendar year.

4.3 Hazardous Materials Storage and Handling Regulations

4.3.1 Any hazardous material including hazardous wastes shall be managed in such a manner as to minimize to the fullest extent possible the potential for harm to human health or the environment

4.3.2 Containers, storage tanks, storage areas and impervious barriers used to contain or store hazardous materials shall be designed, constructed and maintained to permanently contain the hazardous materials.

4.3.3 All solvents and volatile organic chemicals drums and pails shall be kept under designated shaded areas with proper spill containment arrangement and proper labelling and signs posted.

4.3.4 All containers used to hold hazardous materials shall be kept closed at all times except when adding or removing materials from the container.

4.3.5 Access to a hazardous material storage area shall be controlled to prevent entry of unauthorized persons or vehicles.

4.3.6 Incompatible materials shall not be placed in common containment areas, the same containers or on the same vehicles. Table 4 provides a list of materials that are presumed to be incompatible.

4.3.7 The operator of hazardous material drum or other moveable container storage areas shall provide these areas with secondary containment. The secondary containment shall be provided by:

a. An outer shell or multiple-wall tank, where volume of secondary containment shall be at least 100% of the volume held in the primary container, or
b. a bunded or bermed area which is impervious to the hazardous material being stored and where the volume inside the secondary containment shall be the greater of 10% of the total volume of hazardous material storage within the containment area plus water accumulation from a 100mm storm event.

4.3.8 The operator of fixed hazardous material storage tanks containing materials which are liquid at standard conditions (0°C, 101,325 Pa) shall provide secondary containment and leak protection as follows:

a. An outer shell or multiple-wall tank, where volume of secondary containment shall be at least 100% of the volume held in the primary container, or
b. A bunded or bermed area, including tank bottoms which is impervious (HDPE liner of minimum thickness of 2.0 mm for new facility and of minimum thickness of 1.5 mm for existing facilities) to the hazardous material being stored and where the volume inside the secondary containment shall be the greater of either 10% of the total volume of hazardous material storage within the containment area plus water accumulation from a 100mm storm event; or 110% of the volume of the largest tank within the containment area plus the water accumulation from a 100mm storm event. All the facilities constructed before September 2005, shall comply with RCER-2025 within a timeframe to be mutually agreed between RC EPCD and the facility.
c. Tank overspill protection and tank leak detection systems including monitoring wells around the tank to detect leakage. These shall be examined for any spills or leakage annually or as per EPO conditions.

4.3.9 All valves, fittings, and other appurtenances associated with hazardous materials storage tanks or hazardous materials transfer (other than those associated with fill and discharge pipelines) shall be located within secondary containment.

4.3.10 Stockpiles of solid hazardous materials which may produce a hazardous leachate with hazardous properties as defined in Sections 4.1 or 5.1a(ii) shall be stored, loaded and unloaded in impervious areas equipped with dikes, berms, curbs or collection systems designed to retain leachate and precipitation. The containment system shall be of sufficient size to retain the accumulation from a 100mm storm.

4.3.11 Any spilled materials collected by secondary containment shall be removed in a timely manner and recycled or disposed in accordance with the requirements of Section 5.

4.3.12 The operator of a facility shall maintain hazardous material stockpiles to prevent wind dispersion of the material.

4.3.13 Hazardous materials stored in drums or other moveable storage containers shall be stored with sufficient aisle spacing to allow inspection and movement of the drums or containers. Drums may be stacked on pallets or skids, no more than two (2) drums high.

4.3.14 Containers holding hazardous materials shall be individually labeled to reflect the actual contents of the container. The labeling shall include either:

a) contents and associated hazards using the United Nations chemicals hazard classification; or
b) a unique identification which is cross-referenced to a document which lists the contents and the hazards

4.3.15 Hazardous material storage areas shall be labeled. The labeling shall at a minimum include the following information:

a) The type of material being stored within the area;
b) Identification of the hazard classification of the stored material in accordance with the U.S. National Fire Protection Association Standard No. 704;
c) The United Nations chemicals hazard classification.

4.3.16 The operator of a facility shall not utilize surface impoundments to store hazardous liquid materials.

4.3.17 All operators having radioactive materials/devices/equipment/others shall obtain the necessary approvals from Nuclear and Radiological Regulatory Commission for handling/use/disposal and a copy of approval shall be submitted to the RC.

4.3.18 All operators of facilities storing and handling hazardous materials shall maintain on-site adequate spill control equipment and chemicals to cope with realistic and probable emergencies associated with the hazardous materials.

4.3.19 All operators of facilities storing, handling or transporting hazardous materials in the Industrial City shall prepare and implement a contingency plan to address emergencies involving those hazardous materials. At a minimum the contingency plan shall include (refer Volume II, Appendix D for more details):

a) realistic and probable accident, spill or emergency scenarios
b) procedures for accessing emergency services
c) identification of safety, control and alarm equipment associated with the storage, transport, or disposal of hazardous materials
d) nominated responsible individuals and roles for the facility emergency response team and facility contact personnel
e) nominated responsible individuals for co-ordination with external emergency services
f) procedures for initial and annual update training to address plant emergencies
g) procedures for inspection and maintenance of emergency and spill control equipment
h) provisions for review and update of the contingency plan

4.3.20 The operator of a facility shall develop and follow a written schedule for inspecting all hazardous material storage areas and associated monitoring, safety and emergency equipment. The schedule of the inspection shall address the probable risks, which are associated with the type of hazardous material storage.

4.3.21 All operators of facilities storing and handling hazardous materials shall immediately notify the Royal Commission of any emergency involving the hazardous materials stored at the facility, consistent with clause 9.2.7 of these regulations.

4.3.22 Relabelling of materials whose original labels have been obliterated or lost shall be conducted with care to avoid mislabeling. Unidentified substances shall be tested or analyzed to confirm the identity of the material, prior to relabelling.

4.3.23 The contents of compressed gas cylinders shall be clearly marked.

4.3.24 The possibility of leakage arising from chemical attack on metal containers or dissolution of fiber cartons must be avoided by providing protection against wetting.

4.3.25 Containers stored in outdoor areas shall be stored in a fenced enclosure or otherwise protected against damage and unauthorized access.

4.3.26 Areas where hazardous liquids are transferred by pouring from one container to another shall be diked, or otherwise contained to prevent the escape of any material from the area.

4.4 Hazardous Material Transportation Regulations

4.4.1 All the facilities shall ensure that the transporter of a hazardous material under transportation shall be responsible for the safety of the shipment. This responsibility includes implementing emergency response contingency plans (clause 4.3.19) and any corrective action (Section 1.4) following accidental spillage or release within the Industrial City. The facility shall communicate such requirements to the transporter/owner. The RC has the right to obtain information and data concerning details of transportation of hazardous materials.

4.4.2 All the facilities shall ensure that the transporter of hazardous materials in the Industrial City shall clearly placard the vehicle with the hazard classification of the material being transported in accordance with the United Nations chemical hazard classification system for the transport of dangerous goods.

4.4.3 All the facilities shall ensure that no transporter shall accept a consignment of hazardous materials without the following:

a) Proper containerization of the hazardous material
b) Clear labeling of the hazardous material in Arabic and English
c) Documentation identifying the name address and contact details of the owner, transporter, consignor and consignee of the hazardous material
d) Documentation in Arabic and English identifying the technical name, quantity, and hazard classification of the hazardous material
e) All the above documents shall be kept in the vehicle during the transportation.

4.4.4 All vehicles and containers used to transport hazardous materials shall be operated and maintained such that the release of liquids, litter, dust, solids or odor are prevented while in transit

4.4.5 Containers of hazardous materials shall be secured during transport to prevent movement or dislodgment under normal operating conditions.

4.4.6 All the facilities shall ensure that all drivers transporting hazardous materials shall be trained in hazard awareness and emergency response procedures.

4.4.7 The facility shall notify the Royal Commission Industrial Security and Safety Department (ISSD) and EPCD immediately in the event of an accident, spill or discharge involving hazardous materials within the Industrial City.

a) The following information shall be reported to the Royal Commission Industrial Security Department:

i. Spill/accident location
ii. Name of hazardous substance released
iii. Transporter's company name

b) In the event of an accident, spill, discharge or any illegal activity, the facility shall be responsible to clean and dispose the material from accident site to the RC approved disposal facility. After the cleaning and disposal of the material, the facility shall conduct EIA/Site Risk Assessment (if required by RC) to evaluate the impact on the site and take additional appropriate remedial actions (if needed).

4.4.8 In the event of any spill during transit outside the industrial city, the facility shall be responsible to notify the local authority, RC and receiver and implement appropriate actions as required by the authority. In case of an accident, spill, discharge or any illegal activity inside/outside the industrial city, the facility, shall be responsible along with the transporter to clean and dispose the material from accident site to the RC approved disposal facility. After the cleaning and disposal of the material, the facility and transporter shall conduct EIA/Site Risk Assessment (if required by RC/relevant authority) to evaluate the impact on the site and take additional appropriate remedial actions (if needed).

4.4.9 If any transporter dealing with hazardous material is found violating any of the RCER regulations within RCCs, RC has the right to stop or suspend the transporter operations until the generator submits and implements an action plan to take appropriate action and ensure that such violations will not be repeated in future.

4.5 Underground Storage Tank Regulations

4.5.1 An underground storage tank (UST) system is defined as any one tank or combination of tanks, inclusive of the underground piping connected to such tanks and any associated containment system, that is used to contain hazardous materials, and the volume of which, inclusive of the connected underground piping volume, is 10% or more beneath the surface of the ground.

4.5.2 No facility shall be permitted to construct any new underground storage tank except those facilities permitted under clause 4.5.5. However, the existing facilities having USTs shall follow the USTs regulation as provided in this section.

4.5.3 All the existing septic tanks and USTs serving for waste and wastewater applications shall be removed by employing procedures approved by the RC within a period of three years after implementation of RCER-2025. Sanitary waste storage tanks connected to sewerage network are not considered as UST.

4.5.4 The UST regulations apply to all operators of UST's except as provided below:

a) pipeline system carrying single use feedstock for process or other use
b) surface impoundment, pit, pond, or lagoon
c) storm water or wastewater collection system
d) liquid traps or associated gathering lines directly related to oil or gas production operations

4.5.5 Commercial enterprises installing a UST system, shall comply with the following minimum requirements:

a) leak detection and secondary containment provisions in accordance with clauses 4.3.7and 4.3.8
b) corrosion protection
c) overfill and overspill protection

4.5.6 Operators of UST systems which are not equipped with secondary containment and leak detection shall perform tank tightness testing at a minimum of once every three years. Such tightness testing shall include the entire tank system, as defined in clause 4.5.1, and shall be capable of detecting a

leak of 12.5 ml/min or greater from the UST system. The results of the latest tank tightness testing shall be kept on record at all times.

4.5.7 At least thirty days before permanently closing a UST or removing it from service, operators shall notify the Royal Commission of their intent to permanently close the system and the methods or procedures to be used to close or remove the system from service.

4.5.8 All the sumps shall be lined with 2.0 mm thick HDPE liner.

4.6 Tables

The mixing of Group A materials with those identified Group B materials may produce the noted hazardous reactions resulting in unsafe or unhealthy conditions.

Table 4: Potentially Incompatible Materials

Group I: Potential Consequences: Heat generation, violent reaction	
Group I - A	**Group I - B**
Acetylene sludge Alkaline caustic liquids Alkaline cleaner Alkaline corrosive liquids Alkaline corrosive battery fluid Caustic wastewater Lime sludge; other corrosive alkalis Lime wastewater Lime and water Spent caustic	Acid sludge Acid and water Battery acid Chemical cleaners Electrolyte acid Etching acid liquid or solvent Pickling liquor; other corrosive acids Spent acid Spent mixed acid Spent sulphuric acid

Group II: Potential Consequences: Fire or explosion; generation of flammable hydrogen gas	
Group II - A	**Group II - B**
Aluminium Beryllium Calcium Lithium Magnesium Potassium Sodium Zinc powder; other reactive metals and metal hydrides	Any waste in Group I-A or I-B

.

Group III: Potential Consequences: Fire, explosion, or heat generation; generation of flammable or toxic gases	
Group III - A	**Group III - B**
Alchohols Water	Any concentrated waste in Group I-A/I-B Calcium Lithium, Potassium Metal Hydrides Sodium Sulfuryl chloride (SO_2Cl_2), Thionyl Chloride ($SOCl_2$), Phosphorus trichloride (PCl_2), Methyl trichlorosilane (CH_2SICl_2) and other water reactive wastes

Table 4: Potentially Incompatible Materials (cont.)

The mixing of Group A materials with those identified Group B materials may produce the noted hazardous reactions resulting in unsafe or unhealthy conditions.

Group IV: Potential Consequences: Fire, explosion or violent reaction	
Group IV - A	**Group IV - B**
Alcohols Aldehydes Halogenated hydrocarbons Nitrated hydrocarbons Unsaturated hydrocarbons Other reactive organic compounds and solvents	Concentrated Group I-A or I-B wastes or Group II-A wastes

Group V: Potential Consequences: Generation of toxic hydrogen cyanides or hydrogen sulphide gas	
Group V- A	**Group V - B**
Spent cyanide and sulphide solutions	Group I-B wastes

Group VI : Potential Consequences: Fire, explosion or violent reaction	
Group VI - A	**Group VI - B**
Chlorates Chlorine Chlorites Chromic Acid Hypochlorites Nitrates Nitric acid, fuming Perchlorates Permanganates Peroxides Other strong oxidizers	Acetic acid; other organic acids Concentrated mineral acids Group II-A wastes Group IV-A wastes Other flammable and combustible wastes

Group VII: Potential Consequences: Release of toxic substances in case of fire or explosion	
Group VII - A	**Group VII - B**
Asbestos waste, other toxic waste Beryllium wastes Un-rinsed pesticide containers Waste pesticides	Cleaning solvents Data processing liquid Obsolete explosives Refinery or petroleum waste Retrograde explosives Solvents Waste oil; other flammable and explosive wastes

SECTION - 5

5. Waste Management

This section covers regulations and standards to govern the proper transportation, treatment, storage and disposal of waste.

5.1 General Regulations for Waste Management

5.1.1 Waste generated in the Industrial City shall be classified into one of the following or additional categories based on RC/MWAN guidelines:

a) **Hazardous Industrial Waste**: These wastes are defined as any solid, semi-solid, liquid, or contained gaseous waste, or combination of such wastes, which may because of its quantity, concentration, physical or chemical characteristics pose a hazard or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. These wastes shall also include:

i. All wastes with properties as defined in Section 4.1 of these Regulations, including chemical wastes identified as discarded commercial chemical products, off-specification products/chemicals, container residues and spill residues.
ii. Any waste, if after application of the test method 1311 Toxic Characteristic Leachate Procedure (TCLP), as established in U.S. EPA 40CFR Part 261 Appendix II the extract from the waste contains contaminant concentrations equal to or greater than those listed in Table 5.
iii. Any waste identified as hazardous by MEWA.

b) **Non-hazardous Industrial Waste**: These wastes include solid, liquid, semi-liquid or contained gaseous materials or wastes resulting from industrial, mining, and agricultural operations and sludge from industrial, agricultural, or mining, water supply treatment, wastewater treatment or air pollution control facilities, provided that they are not hazardous, municipal or inert wastes as otherwise defined in these Regulations.

c) **Municipal Waste**: Municipal wastes include garbage, refuse, food waste, office waste, waste vegetation and other decomposable material resulting from operation of residential, commercial, municipal, industrial or institutional establishments and from community activities.

d) **Inert Waste**: Inert wastes are those wastes which are not biologically or chemically active in the natural environment, such as glass, concrete and brick materials, broken clay and manufactured rubber products.

5.1.2 Waste generators shall, through testing of the waste or knowledge of the process by which the waste is generated, classify their wastes according to clause 5.1.1 and send for disposal as per waste classification.

5.1.3 A hazardous waste or its container may be reclassified as non-hazardous provided it is treated in such a way that the resulting material or container no longer exhibits the characteristic that made it hazardous.

5.1.4 A hazardous waste or its container is not considered a waste once it has been acceptably recycled.

5.1.5 All RC authorized waste transporters shall install Global Positioning System (GPS) Tracking Device to each waste transportation vehicle.

5.1.6 All facilities shall submit to RC a "Waste Reduction Plan" at the time of EPO renewal to show data pertaining to significant reduction in the existing amount of wastes being generated by their facilities by effective operational measures, maximizing recycling of wastes (inside) and retrofitting of cleaner best available process technology into the existing process streams. No waste generator shall send their waste for disposal such as landfilling, incineration, etc unless the waste is evaluated for recycling, reusing and regeneration option as a first choice.

5.1.7 All the waste generated in industrial city shall be transported by RC authorized transporter to RC authorized Waste Management Facility (WMF)/ Waste Recycling Facility (WRF).

5.1.8 Waste generator is responsible for declaring all wastes that will be generated during construction and operation

a. Waste generator shall ensure (at time of operations) that estimated waste information shall be in consistent with the information declared in PAP form PA-H2 (Volume II).

b. If any discrepancies due to changes in design or process are observed by waste generator, then waste generator shall report to RC and update form PA-H2 immediately.

5.1.9 Hiring maintenance contractors for cleanup-works/shutdown/turnaround/emergencies for tanks, equipment and other units shall be limited to maintenance works only and shall not be permitted to undertake waste management and recycling works.

5.1.10 All generated waste within the facility premises by maintenance contractor shall be under the responsibility of waste generator and the waste generator shall be liable for any illegal transport/disposal/recycle of waste as per RCER.

5.1.11 The operator of a facility shall submit to RC for any temporary hazardous material storage requirements during major shutdown / turnaround activities and get approval. Further, a temporary storage shall address the following requirements:

a. The storage area shall be accessible in case of emergency and for purposes of inspection and monitoring;
b. The storage shall be enclosed but adequately ventilated;
c. The storage area shall properly be secured and not easily accessed by unauthorized persons;
d. Drums shall be in pallets to allow passage of water and circulation of air;
e. All containers shall be checked regularly for leaks;
f. The waste containers shall be properly labeled and segregated.

5.1.12 All wastes shall be properly segregated prior to transport to WMF/WRF. Current categorization of any existing waste stream from disposal to recycling and vice-versa shall not be changed without RC prior approval. Additionally, any existing / new waste stream shall not be classified as by-product and any new waste stream shall not be sent for disposal / recycling without RC approval.

5.1.13 Operators of all WMF/WRF shall keep the final PAP at the facility (previously submitted to RC) and make available to RC (whenever requested).

5.1.14 Operators of all WMF/WRF shall retain for at least three years all operational data logs including lab reports for all analysis results of the waste received/disposed and products dispatched including reclaimed water and shall make available all the these documents during RC inspection (if requested).

5.1.15 Open burning of any waste (solid, liquid or gaseous) is prohibited in the RCCs.

5.2 Waste Manifest Regulations

5.2.1 No waste material (industrial hazardous/ non-hazardous) shall be transported from any facility to WMF/WRF and from WMF/WRF to any facility whithin or oustide JIC without prior approval by RC and without waste manifest.

5.2.2 Each facility is required to obtain prior approval from RC for sending any waste material to WMF/WRF by using RC Electronic Waste Tracking System. Until the implementation of this, the waste generator shall provide the following information in order to obtain the RC approval:

a) Name of each waste, quantity, important properties including physical and chemical composition, source of generation, proposed recycle, treatment or disposal methods including safety and precautionary measures for handling hazardous wastes and the proposed Waste Management Facility(WMF) /Waste Recycle Facility (WRF).
b) Name of the RC authorized waste transporter(s).

5.2.3 The generator shall provide the information required in the manifest and sign it certifying that the waste is properly classified, described, packaged, marked and labeled according to the requirements of these Regulations.

5.2.4 RC will evaluate generator's request and may require additional information as needed. If found satisfactory, RC will provide approval / manifest for transporting waste materials to the designated WMF/WRF.

5.2.5 Before transportation of hazardous and non-hazardous industrial waste away from a generator's facility, either for recycle, reuse, treatment, storage or disposal the generator shall complete a waste manifest containing, as a minimum, the following information (see Appendix D)

a) A unique, sequential manifest number
b) The company name, address, telephone number and contact name of the generator
c) The company name, address, telephone number and contact name of the transporter
d) The company name, address, telephone number and contact name of the disposer
e) For non-hazardous industrial waste, a description of the waste including compositional data
f) For hazardous waste a detailed chemical and physical analysis, safety and hazardous material handling precautions, and hazard class consistent with Section 4.1
g) Proposed recycle, reuse, treatment or disposal method
h) The total quantity of waste being transported, and the number and type of containers being transported to the designated disposal facility.
i) All industrial waste transportation activities shall be undertaken by RC authorized transporters.

5.2.6 The generator shall, prior to transporting the waste, obtain the signature of the waste transporter on the manifest acknowledging acceptance of the waste by the transporter.

5.2.7 The generator shall retain a copy of the manifest for record purpose at their facility for a period of time not less than five (5) years from the date of transportation of the waste from the generator's facility.

5.2.8 The RC authorized transporter shall maintain the manifest with the corresponding waste at all times (one manifest for each truck load) until such time as possession of the waste passes to either another transporter or to the permitted WMF/WRF.

5.2.9 If the transporter transfers the waste to another RC approved waste transporter, the first transporter shall write the date of transfer and obtain the signature of the responsible individual of the second transporter on the manifest. The second transporter shall assume responsibility for the waste and for the transmittal of the manifest to the WMF/WRF.

5.2.10 Upon delivery of the waste to the designated WMF/WRF, the transporter shall write the date of delivery and obtain the signature of the responsible individual at the WMF/WRF on the manifest. The WMF/WRF shall be responsible for the waste until it is disposed of permanently/recycled in a environmentally safe and sound manner.

5.2.11 A designated WMF/WRF accepting hazardous and non-hazardous industrial waste, shall adhere to the waste manifest procedures as follows:

a) Upon arrival at the WMF/WRF, the WMF/WRF shall certify that the wastes as delivered are consistent with the description of the accompanying manifest documentation. All these wastes shall be unloaded and stored in designated areas within 24 hours.
b) If any discrepancies exist between the wastes described on the manifests and those to be received, they shall be noted on the manifest documentation
c) The WMF/WRF shall return a completed copy of the manifest to the generator within thirty (30) days after acceptance and signature for receipt of the waste material from the transporter
d) The WMF/WRF shall retain a signed copy of the used manifest for a period not less than five (5) years from the date of receipt of the waste shipment at their facility.

5.2.12 The operator of a hazardous or non-hazardous industrial waste disposal facility which rejects waste delivered to its site shall notify the Royal Commission within 24 hours of the following:

a) The names of the generator and transporter
b) Date and time when waste was rejected
c) A copy of the manifest
d) The reason for not accepting the waste

Subsequently, the generator shall get RC prior approval for the management of such deviant waste.

5.2.13 If the generator has not received a completed manifest from the designated disposal facility within thirty (30) days of initial transport, the generator shall contact the disposal facility to determine the waste disposition and to request a copy of the completed manifest.

5.2.14 If the generator has not received a completed manifest from the disposal facility within forty five (45) days of initial transport, the generator shall return the completed white copy of the original manifest to RC and any other pertinent information relating to the waste disposition. This shall not relieve the generator from determining the waste disposition and obtaining a copy of the completed manifest.

5.2.15 The RC waste manifest is valid for 180 days from the date of issuance to the waste generator. The waste generator shall return any unused waste manifests once expired, with the explanation why these were not utilized.

5.3 Waste Transportation Regulations

5.3.1 No wastes generated within the Industrial City shall be transported outside the boundary of Industrial City for storage, treatment or disposal.

5.3.2 No wastes generated within the Industrial City shall be transported to a WRF located outside the boundary of Industrial City for recycle / reuse/recovery without Royal Commission prior approval and in compliance with MWAN/MEWA regulations. The RC will not approve transportation of waste outside of industrial city for recycle / reuse, or recovery if the waste can be processed by an existing WRF being operated inside the industrial city with the sufficient capacity. RC approval to the WRF located outside industrial city will be based on the following conditions:

a) The WRF is employing internationally recognized design/process, RC accepted best available technology and techniques/ operating procedures to recycle the industrial wastes.
b) The outside WRF shall follow in general the standards and guidelines covered in MEWA and RCER for their emissions and discharge control.
c) The outside WRF accepts the right of RC for inspection as per clauses 1.1.17 and 1.1.18 of RCER-2025, Volume I.
d) The outside WRF submits a monthly report to RC which includes the followings:

i. Date of receiving waste and completion of its processing and recycling
ii. Recycling and process used in recycling the waste from industrial city
iii. Quantity and characteristics of waste
iv. Quantity of recovered material
v. Process employed to dispose the residue
vi. Utilization of the recovered material

e) The WRF shall be capable to recycle/recover the recyclable materials as per RC requirement specific to a particular waste from the total volume of the waste and shall prove the usage of recovered materials viable.

f) The WRF shall be capable to manage the residual waste in accordance with this regulation.

5.3.3 No wastes generated outside the Industrial City shall be transported inside the boundary of Industrial City for any activity without prior approval from RC.

5.3.4 A transporter shall not transport hazardous or non-hazardous industrial waste from a generator unless it is accompanied by the following documentation:

a) RC approval to the generator for transfer and disposal of the waste.
b) A manifest completed and signed in accordance with Section 5.2.
c) A copy of the Waste Transportation Registration Certificate in accordance with Section 5.8.

5.3.5 The generator shall ensure that all wastes are placed in waste compatible containers that properly contain the waste to prevent any spillage or leakage during transportation.

5.3.6 The generator shall clearly label all industrial and hazardous waste containers with the following minimum information regarding the waste to be transported:

a) Name of industrial or hazardous waste
b) Generator's name
c) Date of waste generation
d) Hazard classification as per Section 4.1 and hazardous labeling as per clause 4.3.14. The identification system shall correlate to the waste manifest.

5.3.7 The WMF/WRF shall only utilize waste transporters/accept wastes from waste transporters that are registered and authorized by the Royal Commission to transport hazardous and non-hazardous industrial waste from the generator. Such transporters shall meet the requirements as established in Section 5.8 of these regulations.

5.3.8 All motor vehicles transporting industrial (excluding municipal) wastes shall carry placards in accordance with the United Nations chemical hazard classification system for the transport of dangerous goods.

5.3.9 All vehicles and containers used to transport waste shall be operated and maintained such that the release of liquids, litter, dust, solids or odor are prevented while in transit.

5.3.10 Containers of hazardous waste shall be secured during transport to prevent movement or dislodgment under normal transportation conditions.

5.3.11 Totally enclosed compactor-type vehicles and skips shall be used for collection of municipal wastes. Vehicles and container systems for industrial non-hazardous and hazardous wastes shall be suitable for the specific materials being transported.

5.3.12 In the event of an accident, spill or discharge involving hazardous waste in transit, and where the integrity of the container(s) has been compromised, transfer of the waste material shall occur using collection methods and containers compatible with the hazardous material being collected. Any transfer shall be documented on the manifest document accompanying the waste.

5.3.13 In the event of an accident, spill or discharge involving waste during transit: a) inside RCC, the transporter shall be responsible to notify the RC, generator and receiver (WMF/ WRF); b) outside the RCC, the transporter shall be responsible to notify the RC, local authority, generator and receiver (WMF/ WRF).

5.3.14 The facility which hires transporter shall be responsible along with the waste transporter in the event of an accident, spill, discharge or any illegal activity to clean and dispose the waste from accident site to the RC approved disposal facility.

After the cleaning & disposal of the material, the company & the transporter shall conduct EIA/ Site Risk Assessment (if required by RC) to evaluate the impact on the site and take additional appropriate remedial action (if needed).

5.3.15 The transporter shall deliver the entire quantity of the waste that they accepted from a generator, or other transporter, to the designated WMF/WRF.

5.3.16 A transporter of hazardous waste shall deliver the waste to the designated disposal facility within 48 hours of acceptance of the waste material from the generator if the disposal facility is situated within the Industrial City.

5.3.17 A transporter of hazardous waste shall deliver the waste to the WRF within 6 days of acceptance of the waste material from the generator, if the RC approved WRF (as per clause 5.3.2) is situated outside Industrial City.

5.3.18 Upon delivery of the waste to the WMF/WRF , the transporter shall write the date of delivery and obtain the signature of the responsible individual at the WMF/WRF on the manifest. The WMF/WRF shall assume responsibility for the waste once received from the transporter.

5.3.19 Municipal waste shall not remain in collection vehicles for more than 24 hours, and shall only be left in a collection vehicle overnight when this practice does not constitute a fire, health or safety hazard to workers or the public.

5.3.20 In the event that the WMF/WRF cannot accept the waste, the transporter shall return the waste to the generator within 24 hours and shall inform the RC immediately.

5.3.21 Waste transporters shall submit monthly reports within 2 weeks following end of the calendar month to the RC giving full details of wastes transported during the period.

5.3.22 Waste transporter shall assume responsibility for safe transport of shipment from time of receiving waste load from waste storage site at generator facility, till shipment reaches to the WMF/WRF. After that, responsibility shall be on WMF/WRF until the waste is treated/disposed/recycled as per approved methodology.

5.3.23 If any waste transporter is found violating any of the RCER regulations, RC has the right to stop or suspend the transporter operations until the transporter will submit and implement an action plan to take appropriate action and ensure that such violations will not be repeated in future.

5.4 Hazardous and Non-Hazardous Industrial Waste Treatment and Disposal Regulations

5.4.1 All hazardous and non-hazardous industrial wastes generated within the Industrial City shall be treated and / or disposed of at the Royal Commission approved WMF located inside the Industrial City within one hundred and eighty (180) days of the waste being generated, unless otherwise approved by the Royal Commission. The 180 days shall include the storage period of wastes at the premises of generating facility and the disposal facility. Recyclable/re-usable industrial waste may be stored onsite by the waste generator for more than 180 days only if RC has already approved recycling/re-use action plan of the facility for the specific waste.

5.4.2 Illegal/un-authorized disposal of industrial waste (hazardous or non-hazardous) including radioactive material is prohibited. Any such waste found to be disposed of illegally shall be retrieved by the generator and disposed of at the generators cost in accordance with these Regulations.

5.4.3 Operators of hazardous and non-hazardous industrial WMF/WRF shall have an updated operational manual (s) and shall follow standards for the selection of the most appropriate pretreatment and disposal/recycle techniques for industrial and hazardous waste in their control in accordance with the regulations, methodologies and techniques established by the U.S. EPA in Title 40 CFR Parts 261, 264, 266, 268, 270 and their updated versions and the Royal Commission.

5.4.4 The following hazardous industrial wastes shall be disposed by incineration:

a) Waste containing organic solvents in excess of five wt. percentage.
b) Wastes containing in excess of 50ppm of PCB or 1000mg/kg of Halogenated Organic Compounds (HOC).
c) Refer to Title 40 CFR Part 268 for other incinerable hazardous industrial waste.

5.4.5 Landfill disposal of hazardous industrial wastes shall only take place at a Class 1 disposal site which has, as a minimum the following characteristics:

a) All landfill operations shall be performed by RC approved WMF and by WRF (only for its own generated waste, if allowed).
b) Waste shall be covered on daily basis (0.2 m) with inert materials to minimize problems associated with litter, odor and vermin etc.
c) Hazardous industrial waste is isolated from the ground or groundwater by means of a double liner system.
d) Surface water runoff is prevented from entering the landfill cell.

e) Leachate and runoff water from the landfill cells are collected and treated before being allowed to leave the boundary limits of the landfill area. The treated leachate/runoff effluent shall meet the relevant water quality criteria provided in Section 3, depending upon the final point of discharge.
f) The disposal site has impermeable and stable foundations and embankments.
g) The site is fenced and designated as off limits to the public.
h) Each landfill cell is equipped with leachate monitoring wells.
i) The site is surrounded with a minimum of one up gradient and three down gradient groundwater monitoring boreholes.
j) No liquid/slurry wastes shall be disposed at landfill
k) All Class I Landfill shall be constructed as per the following minimum required specification (starting from Top Layer):
    i. Geotextile (filter) Layer
    ii. Minimum 0.30 m thick Leachate Collection (LC) sand layer
    iii. Geotextile Protection Layer
    iv. Minimum 2.5 mm thick HDPE liner
    v. 0.75 m Compacted Clay Liner (CCL)/ or Geo-synthetic Clay Liner (GCL)
    vi. Geotextile (filter) Layer
    vii. 0.30 m thick Leak Detection System/ or Composite Geo-Net
    viii. Minimum 2.5 mm thick HDPE liner
    ix. Minimum 1.5 m clay liner with $K \leq 1 \times 10^{-9}$ m/s or 0.75 m GCL
    x. Existing landfills with 1.5 mm liner are in compliance with the requirements.
    xi. Subgrade Layer of min. thickness 0.30 m

5.4.6 Small containers of compatible hazardous industrial waste in overpack drums (laboratory packs) may be placed in a Class I (double lined) landfill without pretreatment if the following requirements are met:

a) The waste shall be packaged in non-leaking containers, which are of a material that will not react dangerously with, be decomposed by or ignited by the waste.
b) The containers shall be tightly sealed and over packed in a compatible drum.
c) The drum shall be provided with sufficient quantity of absorbent material to completely absorb all the liquid contents of the inside containers.
d) The absorbent material used shall be of a material that will not react dangerously with, be decomposed by or ignited by the waste.

5.4.7 A label on the outer container or overpack shall clearly identify each hazardous substance within the container.

5.4.8 All Class I landfills shall be operated such that:

a. Wastes deposited in the landfill are compatible with the landfill liner.
b. Only physically, chemically and biologically compatible wastes are deposited in the same landfill cell.
c. Adequate equipment is to be maintained on-site to control fire, dust and odor problems.
d. Operating procedures including monitoring, safety and emergency procedures approved by the Royal Commission are followed.
e. Reporting of operating landfill shall be in accordance with EPO conditions and Section 9 of this volume.

5.4.9 Non-hazardous industrial waste shall be disposed of in a Class II (single lined) industrial landfill site which have, as a minimum, the following characteristics:

a) All landfill operations shall be performed by RC approved WMF and by WRF (only for its own generated waste, if allowed).
b) The disposal site is above the highest groundwater elevation.
c) Separate landfill cells exist to segregate non-hazardous industrial waste from municipal waste.
d) Surface water is diverted from entering the landfill cell.
e) A leachate and runoff collection system is installed.
f) Leachate and runoff water from the landfill cells are collected and treated before being allowed to leave the boundary limits of the site. The treated leachate/runoff effluent shall meet the relevant water quality criteria given in Section 3 depend upon the final point of discharge.
g) Each landfill cell is equipped with landfill gas venting, monitoring system & gas control (if required).
h) The disposal site has stable foundations and embankments.
i) The site is fenced and designated as off limits to the public.
j) The site is surrounded with a minimum of one up-gradient and three down gradient groundwater monitoring boreholes.
k) All Class II Landfills shall be constructed as per the following minimum required specifications (starting from Top Layer):
    i. Geotextile (filter) Layer
    ii. Minimum 0.30 m thick Leachate Collection (LC) sand layer
    iii. Geotextile Protection Layer (GPL)
    iv. Minimum 2.5 mm thick HDPE liner
    v. Min. 1.5 m Clay Liner with K≤1×10-9 m/s or 0.75 m GCL
    vi. Existing landfills with 1.5 mm liner are in compliance with the requirements.
    vii. Subgrade Layer of min. thickness 0.30 m

5.4.10 All Class II industrial landfills shall be operated such that:

a. Wastes deposited in the landfill are compatible with the landfill liner.
b. Municipal wastes are segregated from non-hazardous industrial wastes.
c. Only physically, chemically and biologically compatible wastes are deposited in the same landfill cell.
d. Waste is immediately spread and compacted and a daily cover of inert materials is applied to the waste to minimize problems associated with litter, odor and vermin.
e. No unauthorized burning of waste takes place.
f. No feeding of farm or domestic animals within the site boundaries shall be permitted
g. Sludge and other wet materials are pretreated to reduce moisture before landfill disposal.
h. Adequate equipment is to be maintained on-site to control fire and dust problems.
i. Operating procedures including monitoring, safety and emergency procedures approved by the Royal Commission are followed.
j. No liquid / slurry waste shall be disposed of in the landfill.

5.4.11 All Landfills (Class I and II) shall be constructed such that the distance between the landfills (bottom most layer) and the groundwater will be minimum 3.5 m vertical distance.

5.4.12 Upon completion of Class I and Class II landfill cells, the cells shall be capped in accordance with MWAN specifications including an impermeable liner and cover to prevent erosion.

5.4.13 Monitoring of groundwater around a Class I and Class II landfill sites shall be undertaken during the operation annually and for 30 years after site closure according to a schedule approved by the Royal Commission.

5.4.14 The operator of WMF/ (if allowed) WRF shall conduct stability and integrity study of the landfill once every five years or as per requirement by RC approved contractor.

5.4.15 The operator of a hazardous and non-hazardous industrial WMF/WRF shall develop an updated operational manual/procedures and follow a written schedule for inspecting all waste storage and treatment areas and associated monitoring, safety and emergency equipment. The schedule of the inspection shall address the probable risks that are associated with the type of industrial and hazardous material storage and treatment.

5.4.16 The operator of a facility generating industrial waste (Hazardous & Non-Hazardous) shall provide the Royal Commission with a completed waste audit form (see APPENDIX E) quarterly. The following information regarding the waste generated at their facility shall be included:

a) Name of facility generating the waste
b) Description of the waste generated,
c) Waste classification,
d) Quantity of waste generated for the time period in question,
e) Dates of disposal
f) Manifest number
g) Quantity and type of waste recycled
h) Method of waste recycling

5.4.17 The operator of a WMF/WRF shall report to the Royal Commission monthly the following information:

a) Name of facility generating the waste
b) Description of the waste disposed,
c) If required by RC: analysis or literature data on the physical and chemical composition, hazardous properties
d) Total quantity of waste received
e) The breakdown of waste quantities (LF Class 1, LF Class 2, Incinerated, Recycled, Evaporated)
f) Dates of disposal
g) Manifest number
h) Method of treatment and disposal for the waste streams
i) Final disposal method/ deposition amount of residual materials after recovery of recycling materials

5.4.18 All the facilities are required to submit a waste generation report during the major planned shutdowns and turnaround Maintenance activities. The waste report shall include quantity, type of waste, method of treatment, disposal/ recycling of waste, name and address of WMF/WRF, name and address of waste transport company, etc.

5.4.19 Any oily waste or other type of waste-generated from the industrial city shall not be allowed to be treated / disposed by land farming method either within the industrial city or outside the industrial city.

5.4.20 Dismantling, removal, transportation and disposal of asbestos wastes shall be carried out by licensed/certified companies only in accordance with the guidelines and procedures provided in RCER, Volume II, Appendix F and as per latest USEPA and OSHA guidelines. Further, prior approval shall be obtained from RC before proceeding with any of these activities.

5.5 Municipal Waste Collection Regulations

5.5.1 Containers, on-site collection systems, and storage areas for municipal waste shall be selected and designed to prevent the accumulation of refuse and the creation of health and fire hazards or nuisance.

5.5.2 Containers for municipal waste shall be of adequate size and provided in sufficient numbers to contain all food wastes, rubbish, ashes and municipal waste(s) that a residence or other establishment generates in the period of time between collections.

5.5.3 Containers shall be selected for the specific service intended, and shall be equipped with tightly fitting lids for all municipal wastes except for those used for inert, non-blowing wastes. The selected containers shall be reusable and be constructed of corrosion resistant metal or other material that shall not absorb water, grease, or oil. The containers shall be leakproof. Lightweight plastic or paper bags shall not be used as containers.

5.5.4 Suitable containers shall be provided to hold the municipal waste awaiting collection, and disposal.

5.5.5 The minimum municipal waste collection frequency shall be as follows:

a) Residential Areas	Three times per week
b) Commercial establishments generating wastes (restaurants, hotels) putrescible food	Daily
c) Other commercial establishments	Twice per week
d) Litter containers	Daily

5.5.6 Owners of the vehicles (voluntarily abandoned or damaged) shall remove such vehicles from streets, roads, and vacant properties fourteen (14) days from the time the owner of either the vehicle or the property where the vehicle is located, have received notification from the Royal Commission to remove the vehicle.

5.6 Municipal Waste Disposal Regulations

5.6.1 All municipal waste generated within the Industrial City and not intended for recycle or reuse shall be disposed of at RC Sanitary Landfill located within the Industrial City. Disposal of industrial waste at the RC Sanitary Landfill is prohibited.

5.6.2 Open burning and illegal/unauthorized disposal of waste is prohibited in the Industrial City.

5.6.3 Operators of facilities that deliver municipal waste to the RC Sanitary Landfill shall follow/obtain the RC Environmental Services Department approvals, requirements and procedures before disposal of such materials.

5.6.4 Muncipal and inert waste shall be managed as below:

a) Municipal waste and inert waste shall be segregated at all times.

b) No industrial waste shall be mixed with municipal waste.

5.6.5 Disposal of municipal waste from industrial facilities shall be the responsibility of the generator. The minimum collection and delivery frequency for such wastes shall, unless otherwise approved by the Royal Commission, be as follows:

a) Municipal waste - putrescible materials	Daily
b) Municipal waste – other (e.g., office waste and packaging waste)	Twice per week
c) Sewage sludge, grit, screenings	Daily

5.6.6 Any municipal waste found to be disposed of illegally shall be retrieved by the generator and disposed of at the generators cost in accordance with these Regulations.

5.6.7 Municipal waste shall be disposed of in a Class II (single lined) landfill site which have, as a minimum, the following characteristics:

a) The landfill cells are lined with an impervious material (HDPE liner of minimum thickness of 2 mm) to prevent direct contact of the wastes with surface water and groundwater. Existing landfills with 1.5 mm liner are considered complying with the requirements.
b) The disposal site is above the highest groundwater elevation.
c) Surface water is diverted from entering the landfill cell.
d) A leachate and runoff collection system is installed
e) Leachate and runoff water from the landfill cells are collected and treated before being allowed to leave the boundary limits of the site. The treated leachate/runoff effluent shall meet the relevant water quality criteria given in section. 3 depend upon the final point of discharge
f) Each landfill cell is equipped with landfill gas venting/treatment and monitoring system.
g) The disposal site has stable foundations and embankments.
h) The site is fenced and designated as off limits to the public.
i) Each landfill cell is equipped with landfill gas monitoring, venting system and gas control (if required).
j) The site is surrounded with a minimum of one up gradient and three down gradient groundwater monitoring boreholes.

5.6.8 All Class II landfill sites shall be operated such that:

a) Wastes deposited in the landfill are compatible with the landfill liner.
b) Only physically, chemically and biologically compatible wastes are deposited in the same landfill cell.
c) Waste is immediately spread and compacted and a daily cover of inert materials is applied to the waste to minimize problems associated with litter, odor and vermin.
d) No unauthorized burning of waste takes place.
e) No feeding of farm or domestic animals within the site boundaries shall be permitted.
f) Adequate equipment is to be maintained on-site to control fire and dust problems. In addition; controls and measures shall be adopted to avoid odor and to comply with RC ambient air quality standards.
g) Operating procedures including monitoring, safety and emergency procedures approved by the Royal Commission are followed.

5.6.9 Scavenging of municipal waste shall only be permitted by parties authorized by the Royal Commission or their designee.

5.6.10 Completed portions of the Class II landfill sites shall be finished with final cover to support vegetation, and vegetation shall be established. Post-closure control shall include maintenance of fill areas and vegetation to minimize erosion.

5.6.11 Monitoring of landfill gas production, and groundwater around the landfill shall be undertaken anually during landfill operations and for 30 years after site closure according to a schedule approved by the Royal Commission.

5.6.12 The operator of a facility generating municipal waste shall provide the Royal Commission with a completed waste audit form (see APPENDIX E) once every six (6) months. The following information regarding the municipal waste generated at their facility shall be included:

a) Name of facility generating the waste,
b) Description of the waste generated,
c) Waste classification,
d) Quantity of waste generated for the time period in question, and
e) Dates of disposal.
f) Quantity and type of waste recycled
g) Method of waste recycling

5.7 Inert Waste Disposal Regulations

5.7.1 All inert waste shall be disposed of at Royal Commission approved waste disposal facilities located in the Industrial City.

5.7.2 Operators of facilities that collect and deliver inert waste (non-contaminated) to the Royal Commission Sanitary Landfill shall follow the RC Environmental Services Department procedures/approval before disposal of such materials.

5.7.3 Construction debris and demolition waste shall be collected and removed to the designated solid waste disposal area on a regular basis. These wastes shall not be allowed to accumulate such that the material presents a safety hazard for workers or members of the public, or create a nuisance to the community.

5.7.4 Any inert waste found to be disposed of illegally shall be retrieved by the generator and disposed of at the generators cost in accordance with these Regulations.

5.7.5 Inert wastes (non-contaminated) shall be deposited in a Class III Disposal site with, as a minimum the following characteristics:

a) The disposal site is above the highest groundwater elevation.
b) The site is fenced and designated as off limits to the public.
c) The site is fenced to prevent small objects from being blown away from the site.

5.7.6 All Class III landfill sites shall be operated such that:

a) Only inert solid waste material is deposited in a Class 3 cell.
b) Operating procedures including monitoring, safety and emergency procedures approved by the Royal Commission are followed.
c) No unauthorized burning of waste takes place.

5.7.7 Scavenging of inert waste shall be only be permitted by parties authorized by the Royal Commission or their designee.

5.7.8 Completed portions of the Class III landfill sites shall be finished with final cover to support vegetation, and vegetation shall be established. Post-closure control shall include maintenance of fill areas and vegetation to minimize erosion.

5.8 Waste Transporter Registration Regulations

5.8.1 The transporter of hazardous and non-hazardous industrial waste shall obtain an authorization certificate from the Royal Commission before transporting hazardous and non-hazardous industrial waste. The license application procedure is specified in Volume II of these regulations.

5.8.2 The waste transportation license shall be valid for a period of three (3) years, at which time it shall be renewed by the submission of revised or new information in accordance with clause 5.8.1 of these regulations.

5.8.3 The operator of a waste transport facility shall be responsible for compliance with RCER specifically of Section 5. Demonstrated failure to comply with the Regulations related to waste transport and disposal may lead to the Royal Commission revoking the waste transport authorization. In case of transporter collecting municipal waste from multiple industries/locations in the same vehicle, the transporter shall have proper labelling system to clearly identify the generator name for each waste (except for food or other wastes for which labelling is not possible, a record of generators for each trip shall be maintained with date & time).

5.9 Waste Disposal Facility Closure/ Post Closure Care Regulations

5.9.1 When closing the disposal facility, the operator shall leave the wastes, the disposal units and equipment in such a manner that they will not pose a future threat to human health or the environment, soil and structures.

5.9.2 The operator shall have facility closure plan approved by the Royal Commission. The closure plan shall contain description of process for closing the facility units, closure start/ completion dates, description of closure methods and steps to comply with closure standards such as groundwater monitoring, leachate collection and monitoring of gas emission control. The closure and post-closure requirements shall be in accordance with USEPA 40 CFR Part 264/265 and other applicable international standards.

5.9.3 The operator must give a timetable 60 days in advance of beginning of facility closer activities. Within 90 days of beginning closure, all waste on-site shall be removed or disposed of. Within 180 days of beginning the closure, all closure activities must be completed. Further, the owner shall certify that they have completed closure of the facility as per approved plan.

5.9.4 The disposal facility operator shall implement post closure care plan approved by the Royal Commission.

5.9.5 After closing the disposal facility, the operator shall be responsible for its maintenance and monitoring in the post closure care phase for about 30 years or until the waste is stabilized and poses no further hazard to the environment, whichever is longer. The activities that shall be performed include:

a) Maintaining the final cover, the Leachate Detection System and groundwater monitoring systems, gas emission monitoring
b) Preventing migration of liquid in to the closed unit by providing drainage and accommodating settling of waste in the unit
c) Protecting final covers, liners, monitoring systems from any disturbance
d) Monitoring groundwater to detect any release of hazardous constituents

5.9.6 The disposal facility operator shall demonstrate that they have the financial resources to pay for both bodily injury and property damage that may result from waste management and that they are able to properly conduct closure and post closure activities in a manner that protect human health and the environment.

5.9.7 The facility shall demonstrate through trust fund, surety bond, letter of credit, insurance or corporate guarantee that fund are available to pay for closure, post closure and liability requirements if the land lease agreement is less than 30 years after landfill closure and the facility shall continue postclosure care and monitoring activities as per RCER requirements.

5.9.8 The facility shall prepare a cost estimate through hiring a third party for closing the facility and conducting post closure activities for a period of about 30 years. Cost estimate shall reflect the maximum possible cost of the activities and shall be adjusted for yearly inflation.

5.10 Tables

Table 5: Maximum Concentrations of Contaminants for the TCLP

Contaminant	Concentration Level (mg/l)
Arsenic	5.0
Barium	100.0
Benzene	0.5
Cadmium	1.0
Carbon Tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100.0
Chloroform	6.0
Chromium	5.0
Cresol (total)	200.0
2,4-D	10.0
1,4-Dichlorobenzene	7.5
1,2-Dichloroethane	0.5
1,1-Dichloroethylene	0.7
2,4-Dinitrotoluene	0.13[1]
Endrin	0.02
Heptachlor (and its epoxide)	0.008[1]
Hexachlorobenzene	0.13[1]
Hexachlorobutadiene	0.5
Hexachloroethane	3.0
Lead	5.0
Lindane	0.4
Mercury	0.2
Methoxychlor	10.0
Methyl ethyl ketone	200.0
Nitrobenzene	2.0
Pentachlorophenol	100.0
Pyridine	5.0
Selenium	1.0
Silver	5.0
Tetrachloroethylene	0.7
Toxaphene	0.5
Trichloroethylene	0.5
2,4,5-Trichlorophenol	400.0
2,4,6-Trichlorophenol	2.0
2,4,5-TP (Silvex)	1.0
Vinyl Chloride	0.2

Notes:

1. Denotes the detection limit for the specific analyte of concern.

SECTION - 6

6. Soil Quality

Standards on soil quality are intended for the protection of soil from contamination within the Royal Commission Cities, including measures to prevent soil contamination, treatment and rehabilitation after contamination has occurred.

6.1 Soil Quality Standards and Regulations

Soil Quality Standards, rules and guidelines are designed to prevent Soil Contamination, implement Standards for administration, managing, and controlling risks, “who pollutes shall remediate,” and advocate established principles of prevention, prioritizing protection. The purpose of this regulation is to facilitate the implementation of countermeasures against soil contamination by formulating measures to grasp the situation of soil contamination by specified chemicals and substances that the Royal Commission for Jubail and Yanbu, the Ministry of Agriculture prohibits, the Food and Drug General Authority, the National Center for the Development of Vegetation Cover and Combating Desertification and or any concerned party, thereby preventing contamination that can harm human health resulting from that soil contamination, protecting human health, terrestrial and aquatic life, groundwater, and the environment.

6.1.1 Any site within RCCs that exceeds the soil quality standards provided in these regulations (Table 6) or the RC approved baseline data is considered a contaminated site.

Baseline Data Collection Criteria: The baseline shall include all the parameters listed in Table 6 and any other chemicals not listed in Table 6 and are being used in the facility in liquid or solid state shall be included in establishing the baseline data.

6.1.2 RC periodically implement studies, site inspections and monitoring for detection of violations of this regulation.

6.2 Soil Contamination

6.2.1 The owner/operator of a facility or occupier (hereinafter referred to as the “owner, etc.”) of land used as a site for a plant or workplace of a specified facility or occupier of the facility or site used for manufacturing, storing, processing, transporting, handling chemicals is responsible to protect and prevent soil/ground at the site or facility from contamination.

6.2.2 The owner/operator of a facility is responsible to develop a risk management plan to protect and prevent soil/ground at the site facility from contaminating the soil and groundwater.

6.2.3 The owner/operator shall develop procedures to contain the potential spill/incident, leakages, source of contamination and control the spread that can cause harm to human health, terrestrial and aquatic life, groundwater, and the environment.

6.2.4 The owner/operator shall take immediate measures; mitigation and corrective actions in case of the incident to contain the spill/incident, stop the source and reduce the spread that could cause harm to human health, terrestrial and aquatic life, groundwater, and the environment.

6.2.5 In case any facility/operator/owner failed to report and or falsify the contamination information, RC has the right to impose fines/penalties as per the RCER (Volume III).

6.3 Soil Contamination Investigation

6.3.1 The owner/operator shall submit a plan to investigate, treat and rehabilitate the contaminated site within 60 days from the date of notification. The facility shall follow the RECR Environmental Site Assessment and Remediation Guidelines to assess the soil contamination. A phased approach to an investigation in relation to a site/land/facility to determine the environmental condition of a site/facility, and whether a particular site is contaminated or potentially contaminated. It includes a phase I "Environmental Site Assessment-Screening", and a phase II "Environmental Site Assessment-Confirmatory and delineation Investigation to determine the horizontal and vertical extent of the contamination.

6.3.2 The facility/operator/owner shall conduct the investigations to sites through the competent and experienced third party approved by RC for conducting Soil Contamination Investigations.

6.3.3 It is the responsibility of the facility/operator/owner to ensure that the site is accessed or scanned for buried utilities as part of the ESA as per the RCER Environmental Site Assessment Investigation Process, soil and groundwater samples are collected and compared with the current RCER regulatory standards, and the investigation report is prepared as per the guidelines to evaluate the impacts on-site. The report shall demonstrate whether or not the site is clean or impacted by contamination.

6.3.4 The facility/operator/owner shall submit the detailed investigation report to the RC within 60 days after completion of the investigation.

6.4 Soil Delineation and Remediation

6.4.1 In case of contamination exceeding the standards, it is the responsibility of the owner/operator/facility to execute remediation as per ESA remediation guidelines onsite within 180 days from the incident notification date. The facility shall continue periodic surface/groundwater monitoring for the spill/incident or other sources of contamination.

6.4.2 Remediation Execution Plan shall be submitted within 30 days of the completion of the site investigation.

6.4.3 The owner/operator shall perform a delineation investigation as part of the investigation or part of the remediation program.

6.4.4 The owner/operator shall execute onsite remediation activities after the RC approval within 180 days.

6.4.5 The owner/operator shall comply with RCER Table 6: Soil Quality Standards. The remediation report shall be submitted within 60 days after completion of the remediation work to the RC for approval.

6.4.6 The remediation report serves as evidence of the remediation work and the remediation certificate serves as validation of the removal of contamination based on the current RC environmental regulations.

6.4.7 The facility shall continue periodic surface/groundwater monitoring for the spill/incident or other sources of contamination for one year after the remediation. In case residual impact exceeds the guidelines, mitigation measures and further investigation shall be carried out.

6.5 Soil Rehabilitation

6.5.1 The facility owner/operator of the facility or land used as a site for a plant or workplace of a specified facility or occupier of the facility or site for manufacturing, using, storing, processing, and transporting chemicals is responsible to rehabilitate the site after the remediation as per the RCER remediation guidelines.

6.5.2 The owner/operator shall submit a reclamation plan to RC for approval. The approval of rehabilitation shall depend on the site remediation report and remediation certificate.

6.5.3 The owner/operator shall execute onsite reclamation/rehabilitation activities within 60 days after the approval of the reclamation plan and complete the activities within 180 days.

6.5.4 The owner/operator shall comply with RCER and submit the detailed reclamation report to RC for the rehabilitation/reclamation certificate.

Tables 6:
Soil Quality Standards

S/N	Item	Unit	Coarse Soil					Fine Soil				
			Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial	Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial
1	pH (in 0.01M $CaCl_2$)	pH	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
2	Cyanide (Free)	mg/kg	0.9	0.9	0.9	8	8	0.9	0.9	0.9	8	8
3	Fluoride	mg/kg	200	200	200	2000	2000	200	200	200	2000	2000
4	Sulphur	mg/kg	500	500	500	500	500	500	500	500	500	500
Metals												
5	Antimony (sb)	mg/kg	20	20	20	40	40	20	20	20	40	40
6	Arsenic (inorganic) as	mg/kg	17	17	17	26	26	17	17	17	26	26
7	Barium (non-barite) (Ba)	mg/kg	750	750	500	2000	2000	750	750	500	2000	2000
8	Barite- barium	mg/kg	10000	10000	10000	15000	140000	10000	10000	10000	15000	140000
9	Beryllium Be	mg/kg	5	5	5	8	8	5	5	5	8	8
10	Boron (saturated phase extract) b	mg/kg	3.3	3.3	3.3	5	5	3.3	3.3	3.3	5	5
11	Cadmium (Cd)	mg/kg	3.8	1.4	10	22	22	3.8	1.4	10	22	22
12	Chromium hexavalent Cr+6	mg/kg	0.4	0.4	0.4	1.4	1.4	0.4	0.4	0.4	1.4	1.4
13	Chromium total	mg/kg	64	64	64	87	87	64	64	64	87	87
14	Cobalt Co	mg/kg	20	20	20	300	300	20	20	20	300	300
15	Copper Cu	mg/kg	63	63	63	91	91	63	63	63	91	91
16	Lead pb	mg/kg	70	70	140	260	600	70	70	140	260	600
17	Mercury inorganic	mg/kg	12	6.6	6.6	24	50	12	6.6	6.6	24	50
18	Molybdenum Mo	mg/kg	4	4	4	40	40	4	4	4	40	40
19	Nickel Ni	mg/kg	45	45	45	89	89	45	45	45	89	89
20	Selenium Se	mg/kg	1	1	1	2.9	2.9	1	1	1	2.9	2.9
21	Silver	mg/kg	20	20	20	40	40	20	20	20	40	40
22	Thallium Ti	mg/kg	1	1	1	1	1	1	1	1	1	1

TABLE 6. SOIL QUALITY STANDARDS (Continue)

SN	Item	Unit	Coarse Soil					Fine Soil				
			Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial	Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial
23	Tin Sn	mg/kg	5	5	5	300	300	5	5	5	300	300
24	Uranium U	mg/kg	33	23	23	33	300	33	23	23	33	300
25	Vanadium V	mg/kg	130	130	130	130	130	130	130	130	130	130
26	Zinc Zn	mg/kg	200	200	200	360	360	200	200	200	360	360
Hydrocarbons Compounds												
27	Benzen C_6H_6 (Topsoil)	mg/kg	0.078	0.073	0.073	0.078	0.078	0.046	0.046	0.046	0.046	0.046
28	Benzen C_6H_6 (Subsurface Soil)	mg/kg	0.078	0.078	0.078	0.078	0.078	0.046	0.046	0.046	0.046	0.046
29	Toluene C_7H_8 (Topsoil)	mg/kg	0.12	0.12	0.12	0.12	0.12	0.52	0.52	0.52	0.52	0.52
30	Toluene C_7H_8 (Subsurface Soil)	mg/kg	0.12	0.12	0.12	0.12	0.12	0.52	0.52	0.52	0.52	0.52
31	Ethylbenzen C_8H_{10} (Topsoil)	mg/kg	0.14	0.18	0.14	0.14	0.14	0.073	0.073	0.073	0.073	0.073
32	Ethylbenzen C_8H_{10} (Subsurface Soil)	mg/kg	0.14	0.14	0.14	0.14	0.14	0.073	0.073	0.073	0.073	0.073
33	Xylenes C_8H_{10} (Topsoil)	mg/kg	1.9	0.003	1.9	1.9	1.9	0.99	0.99	0.99	0.99	0.99
34	Xylenes C_8H_{10} (Subsurface Soil)	mg/kg	1.9	1.9	1.9	1.9	1.9	0.99	0.99	0.99	0.99	0.99
35	Styrene C_8H_8	mg/kg	0.8	0.8	0.8	0.8	0.8	0.68	0.68	0.68	0.68	0.68
36	F1:C_6 To C_{10} (Topsoil)	mg/kg	210	24	24	270	270	210	210	210	320	320
37	F2:C_{10} To C_{16} (Topsoil)	mg/kg	150	130	130	260	260	150	150	150	260	260
38	F3:C_{16}To C_{34} (Topsoil)	mg/kg	300	300	300	1700	1700	1300	1300	1300	2500	2500
39	F4:C_{34}To C_{50} (Topsoil)	mg/kg	2800	2800	2800	3300	3300	5600	5600	5600	6600	6600
40	F1:C_6 To C_{10} (Subsurface Soil)	mg/kg	420	30	30	440	440	420	420	420	640	640
41	F2:C_{10} To C_{16} (Subsurface Soil)	mg/kg	300	160	160	520	520	300	300	300	520	520
42	F3:C_{16}To C_{34} (Subsurface Soil)	mg/kg	600	600	600	3400	3400	2600	2600	2600	4300	4300
43	F4:C_{34}To C_{50} (Subsurface Soil)	mg/kg	5600	5600	5600	6600	6600	10000	10000	10000	10000	10000
44	Acenapthene $C_{12}H_{10}$	mg/kg	0.38	0.38	0.38	0.38	0.38	0.32	0.32	0.32	0.32	0.32

TABLE 6. SOIL QUALITY STANDARDS (Continue)

SN	Item	Unit	Coarse Soil					Fine Soil				
			Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial	Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial
45	Anthracene $C_{14}H_{10}$	mg/kg	0.0056	0.0056	0.0056	0.0056	0.0056	0.0046	0.0046	0.0046	0.0046	0.0046
46	Fluoranthene $C_{16}H_{10}$	mg/kg	0.039	0.039	0.039	0.039	0.039	0.032	0.032	0.032	0.032	0.032
47	Fluorene $C_{13}H_{10}$	mg/kg	0.34	0.34	0.34	0.34	0.34	0.29	0.29	0.29	0.29	0.29
48	Naphtalene $C_{10}H_8$	mg/kg	0.017	0.017	0.017	0.017	0.017	0.014	0.014	0.014	0.014	0.014
49	Phenanthrene $C_{14}H_{10}$	mg/kg	0.061	0.061	0.061	0.061	0.061	0.051	0.051	0.051	0.051	0.051
50	Pyrene $C_{16}H_{10}$	mg/kg	0.04	0.04	0.04	0.04	0.04	0.034	0.034	0.034	0.034	0.034
51	Carcinogenic PAHs	mg/kg	1	1	1	1	1	1	IACR<1	1	1	1
52	Benz a Anthracene $C_{18}H_{12}$	mg/kg	0.083	0.083	0.083	0.083	0.083	0.07	0.07	0.07	0.07	0.07
53	Benzo b+j Fluoranthene	mg/kg	6.2	6.2	-	-	-	6.2	6.2	-	-	-
54	Benzo k Fluoranthene $C_{20}H_{12}$	mg/kg	6.2	6.2	-	-	-	6.2	6.2	-	-	-
55	Benzo a Fluoranthene $C_{20}H_{12}$	mg/kg	0.6	0.6	0.77	0.77	0.77	0.6	0.6	0.70	0.70	0.70
56	Chrysene $C_{18}H_{12}$	mg/kg	6.2	6.2	-	-	-	6.2	6.2	-	-	-
57	Vinyl Chloride C_2H_3Cl	mg/kg	0.02	0.00034	0.00034	0.00043	0.00043	0.014	0.0083	0.0083	0.014	0.014
58	1.1 Dichloroethene $C_2H_2Cl_2$	mg/kg	0.24	0.021	0.021	0.24	0.24	0.15	0.15	0.15	0.15	0.15
59	Trichloroethene - Trichloroethylene TCE	mg/kg	0.081	0.012	0.012	0.081	0.081	0.054	0.054	0.054	0.054	0.054
60	Tetrachloroethene C_2Cl_4	mg/kg	0.46	0.018	0.018	0.22	0.22	0.26	0.26	0.26	0.26	0.26
61	1.2 - Dichloroethan $C_2H_4Cl_2$	mg/kg	0.041	0.0027	0.0027	0.033	0.033	0.025	0.0062	0.025	0.025	0.15
62	Dichloromethane Methylene Chloride CH_2Cl_2	mg/kg	0.095	0.048	0.095	0.095	0.095	0.1	0.052	0.1	0.1	0.1
63	Trichloromethane Chloroform $CHCl_3$	mg/kg	0.003	0.003	0.003	0.003	0.003	0.0029	0.0029	0.0029	0.0029	0.0029
64	Tetrachloromethane Carbon Tetrachloride CCl_4	mg/kg	0.062	0.00056	0.00057	0.0069	0.0069	0.037	0.013	0.013	0.037	0.037
65	Dibromochloromethane $CHBr_2Cl$	mg/kg	1.5	0.12	0.27	1.5	1.5	0.91	0.12	0.91	0.91	0.91
66	Chlorobenzene C_6H_5Cl	mg/kg	1.1	0.018	0.018	0.22	0.22	0.61	0.39	0.39	0.61	0.61
67	1.2 Dichlorobenzene $C_6H_4Cl_2$	mg/kg	0.18	0.18	0.18	0.18	0.18	0.097	0.097	0.097	0.097	0.097

TABLE 6. SOIL QUALITY STANDARDS (Continue)

SN	Item	Unit	Coarse Soil					Fine Soil				
			Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial	Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial
68	1.4 Dichlorobenzene $C_6H_4Cl_2$	mg/kg	0.098	0.098	0.098	0.098	0.098	0.051	0.051	0.051	0.051	0.051
69	1.2.3 Trichlorobenzene $C_6H_3Cl_3$	mg/kg	0.31	0.26	0.26	0.31	0.31	0.26	0.26	0.26	0.26	0.26
70	1.2.4 Trichlorobenzene $C_6H_3Cl_3$	mg/kg	0.93	0.23	0.23	0.93	0.93	0.78	0.78	0.78	0.78	0.78
71	1.3.5 Trichlorobenzene $C_6H_3Cl_3$	mg/kg	3.6	0.13	0.13	1.3	1.3	1.9	1.9	1.9	1.9	1.9
72	1.2.3.4 Tetrachlorobenzene $C_6H_2Cl_4$	mg/kg	0.05	0.05	0.05	0.05	0.05	0.042	0.042	0.042	0.042	0.042
73	1.2.3.5 Tetrachlorobenzene $C_6H_2Cl_4$	mg/kg	0.7	0.1	0.1	0.7	0.7	0.37	0.37	0.37	0.37	0.37
74	1.2.4.5 Tetrachlorobenzene $C_6H_2Cl_4$	mg/kg	0.37	0.052	0.052	0.37	0.37	0.19	0.19	0.19	0.19	0.19
75	Pentachlorobenzene C_6HCl_5	mg/kg	4.5	4.5	4.5	4.5	4.5	3.7	3.7	3.7	3.7	3.7
76	Hexachlorobenzene C_6Cl_6	mg/kg	7	0.5	0.5	6	6	3.6	0.8	3.6	3.6	3.6
77	2.4 Dichlorophenol $C_6H_4Cl_2O$	mg/kg	0.0034	0.0034	0.0034	0.0034	0.0034	0.0029	0.0029	0.0029	0.0029	0.0029
78	2.4.6 Trichlorophenol $C_6H_2Cl_3OH$	mg/kg	0.37	0.37	0.37	0.37	0.37	0.19	0.19	0.19	0.19	0.19
79	2.3.4.6 Tetrachlorophenol $C_6H_2Cl_4O$	mg/kg	0.047	0.047	0.047	0.047	0.047	0.039	0.039	0.039	0.039	0.039
80	Pentachlorophenol C_6HCl_5O	mg/kg	0.029	0.029	0.029	0.029	0.029	0.024	0.024	0.024	0.024	0.024
81	Dioxin And Furans	mg/kg	0.00025	0.000004	0.000004	0.000004	0.000004	0.00025	0.000004	0.000004	0.000004	0.000004
82	Polychlorinated Biphenyl PCBs	mg/kg	1.3	13	22	33	33	1.3	1.3	22	33	33
Pesticides												
83	Aldicarbs $C_7H_{14}N_2O_2S$	mg/kg	0.065	0.012	0.065	0.065	0.065	0.041	0.012	0.041	0.041	0.041
84	Aldrin $C_{12}H_8Cl_6$	mg/kg	11	3.4	3.4	5.1	11	5.9	3.4	3.4	5.1	5.9
85	Altrazine And Metabolites	mg/kg	0.01	0.01	0.01	0.01	0.01	0.0088	0.0088	0.0088	0.0088	0.0088
86	Azniphos Methyl $C_{10}PN_3H_{12}S_2O_3$	mg/kg	0.75	0.75	0.75	0.75	0.75	0.41	0.41	0.41	0.41	0.41

TABLE 6. SOIL QUALITY STANDARDS (Continue)

SN	Item	Unit	Coarse Soil					Fine Soil				
			Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial	Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial
87	Bendiocarb $C_{11}H_{13}NO_4$	mg/kg	0.21	0.21	0.21	0.21	0.21	0.14	0.14	0.14	0.14	0.14
88	Bromacil $C_9H_{13}BrN_2O_2$	mg/kg	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
89	Bromoxynil $C_7H_3Br_2NO$	mg/kg	0.052	0.052	0.052	0.052	0.052	0.044	0.044	0.044	0.044	0.044
90	Carbaryl $C_{12}H_{11}NO_2$	mg/kg	3.6	3.6	3.6	3.6	3.6	1.9	1.9	1.9	1.9	1.9
91	Carbofuran $C_{12}H_{15}NO_3$	mg/kg	1.2	0.089	1.2	1.2	1.2	0.68	0.082	0.68	0.68	0.68
92	Chlorothalonil $C_8Cl_4N_2$	mg/kg	0.01	0.01	0.01	0.01	0.01	0.0084	0.0084	0.0084	0.0084	0.0084
93	Chlorpyrifos $C_9H_{11}Cl_3NO_3PS$	mg/kg	95	3.8	95	95	95	49	3.20	49	49	49
94	Cynazine $C_9H_{13}ClN_6$	mg/kg	0.21	0.032	0.21	0.21	0.21	0.12	0.029	0.12	0.12	0.12
95	2.4 Dichlorophenoxyacetic Acid $C_8H_6Cl_2O_3$	mg/kg	0.67	0.1	0.67	0.67	0.67	0.43	0.1	0.43	0.43	0.43
96	Dichlorodiphenyltrichloroethane $C_{14}H_9Cl_5$	mg/kg	0.7	0.7	12	12	12	0.7	0.7	12	12	12
97	Diazinon $C_{12}H_{21}N_2O_3PS$	mg/kg	4.2	4.2	4.2	4.2	4.2	2.2	2.2	2.2	2.2	2.2
98	Dicamba $C_8H_6Cl_2O_3$	mg/kg	0.79	0.12	0.79	0.79	0.79	0.5	0.12	0.5	0.5	0.5
99	Diclofop Methyl C_{16} $H_{14}Cl_2O_4$	mg/kg	2.4	0.095	2.4	2.4	2.4	2.000	0.079	2	2	2
100	Dieldrin $C_{12}H_8Cl_6O$	mg/kg	1.1	1.1	1.1	1.1	1.1	0.59	0.59	0.59	0.59	0.59
101	Dimethoate $C_5H_{12}NO_3PS_2$	mg/kg	0.0055	0.0027	0.0055	0.0055	0.0055	0.0058	0.0028	0.0058	0.0058	0.0058
102	Dinoseb $C_{10}H_{12}N_2O_5$	mg/kg	5.5	1.7	5.5	5.5	5.5	2.8	1.4	2.8	2.8	2.8
103	Diquat $C_{12}H_{12}Br_2N_2$	mg/kg	21	21	21	21	21	11	11	11	11	11
104	Diuron $C_9H_{10}Cl_2N_2O$	mg/kg	3.5	3.5	3.5	3.5	3.5	1.9	1.9	1.9	1.9	1.9
105	Endosulfan $C_9H_6Cl_6O_3S$	mg/kg	0.0015	0.0015	0.0015	0.0015	0.0015	0.0013	0.0013	0.0013	0.0013	0.0013
106	Endrin $C_{12}H_8Cl_6O$	mg/kg	4.7	4.7	4.7	4.7	4.7	2.4	2.4	2.4	2.4	2.4
107	Glyphosate $C_3H_8NO_5P$	mg/kg	0.049	0.049	0.049	0.049	0.049	0.054	0.054	0.054	0.054	0.054
108	Heptachlor Epoxide $C_{10}H_5Cl_7O$	mg/kg	0.076	0.01	0.01	0.076	0.076	0.039	0.039	0.039	0.039	0.039
109	Lindane $C_6H_6Cl_6$	mg/kg	0.6	0.13	0.6	0.6	0.6	0.31	0.11	0.31	0.31	0.31
110	Linuron $C_9H_{10}Cl_2N_2O_2$	mg/kg	0.059	0.059	0.059	0.059	0.059	0.051	0.051	0.051	0.051	0.051
111	Malathion $C_{10}H_{19}O_6PS_2$	mg/kg	1.3	1.3	1.3	1.3	1.3	0.82	0.82	0.82	0.82	0.82

TABLE 6. SOIL QUALITY STANDARDS (Continue)

SN	Item	Unit	Coarse Soil					Fine Soil				
			Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial	Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial
112	MCPA	mg/kg	0.66	0.025	0.66	0.66	0.66	0.42	0.026	0.42	0.42	0.42
113	Methoxychlor $C_{16}H_{15}Cl_3O_2$	mg/kg	0.056	0.056	0.056	0.056	0.056	0.046	0.046	0.046	0.046	0.046
114	Metolachlor $C_{15}H_{22}ClNO_2$	mg/kg	0.055	0.055	0.055	0.055	0.055	0.048	0.048	0.048	0.048	0.048
115	Metribuzin $C_8H_{14}N_4OS$	mg/kg	0.028	0.014	0.028	0.028	0.028	0.024	0.012	0.024	0.024	0.024
116	Paraquat dichloride	mg/kg	2.2	2.2	2.2	2.2	2.2	1.1	1.1	1.1	1.1	1.1
117	Parathion $C_{10}H_{14}NO_5PS$	mg/kg	14	14	14	14	14	7.2	7.2	7.2	7.2	7.2
118	Phorate $C_7H_{17}O_2PS_3$	mg/kg	0.14	0.14	0.14	0.14	0.14	0.075	0.075	0.075	0.075	0.075
119	Picloram $C_6H_3Cl_3N_2O_2$	mg/kg	0.022	0.022	0.022	0.022	0.022	0.024	0.024	0.024	0.024	0.024
120	Simazine $C_7H_{12}ClN_5$	mg/kg	0.038	0.038	0.038	0.038	0.038	0.033	0.033	0.033	0.033	0.033
121	Tebuthiuron $C_9H_{16}N_4OS$	mg/kg	0.046	0.046	0.046	0.6	0.6	0.046	0.046	0.046	0.6	0.6
122	Terbufos $C_9H_{21}O_2PS_3$	mg/kg	0.15	0.15	0.15	0.15	0.15	0.08	0.08	0.08	0.08	0.08
123	Toxaphene $C_{10}H_8Cl_8$	mg/kg	6.3	4.8	4.8	6.3	6.3	3.3	3.3	3.3	3.3	3.3
124	Triallate $C_{10}H_{16}Cl_3NOS$	mg/kg	0.0092	0.0092	0.0092	0.0092	0.0092	0.0077	0.0077	0.0077	0.0077	0.0077
125	Trifluarin $C_{13}H_{16}F_3N_3O_4$	mg/kg	0.045	0.045	0.045	0.045	0.045	0.038	0.038	0.038	0.038	0.038
Other Organic Compounds												
126	Aniline $C_6H_5NH_2$	mg/kg	0.6	0.6	0.6	0.6	0.6	0.36	0.36	0.36	0.36	0.36
127	Bis 2 Ethyl Hexyl Phthalate $C_{24}H_{38}O_4$	mg/kg	41	41	41	41	41	34	34	34	34	34
128	Dibutyl Phthalate $C_{16}H_{22}O_4$	mg/kg	0.65	0.65	0.65	0.65	0.65	0.54	0.54	0.54	0.54	0.54
129	Dichlorobenzidine	mg/kg	8.1	8.1	8.1	8.1	8.1	4.2	4.2	4.2	4.2	4.2
130	Diethanolamine $C_4H_{11}NO_2$	mg/kg	3.5	3.5	3.5	3.5	3.5	2	2	2	2	2
131	Diethylene Glycol $C_4H_{10}O_3$	mg/kg	15	15	15	15	15	10	10	10	10	10
132	Diisopropanolamine $C_6H_{15}NO_2$	mg/kg	17	17	17	17	17	14	14	14	14	14
133	Ethylene Glycol $C_2H_6O_2$	mg/kg	62	62	62	62	62	60	60	60	60	60
134	Hexachlorobutadiene C_4Cl_6	mg/kg	0.031	0.0067	0.0067	0.031	0.031	0.0026	0.0026	0.0026	0.0026	0.0026
135	Methanol CH_3OH	mg/kg	11	11	11	11	11	37	37	37	37	37
136	Methylmethacrylate $C_5H_8O_2$	mg/kg	1.8	0.1	0.1	1.3	1.3	1.3	1.3	1.3	1.3	1.3

TABLE 6. SOIL QUALITY STANDARDS (Continue)

SN	Item	Unit	Coarse Soil					Fine Soil				
			Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial	Natural Soil	Agricultural Soil	Residential Soil	Commercial	Industrial
137	Monoethanolamine C_2H_7NO	mg/kg	10	10	10	10	10	20	20	20	20	20
138	Methyl Tert Butyl Ether Mtbe	mg/kg	0.062	0.046	0.046	0.062	0.062	0.044	0.044	0.044	0.044	0.044
139	Nonylphenol Ethoxylates	mg/kg	5.7	5.7	5.7	14	14	5.7	5.7	5.7	14	14
140	Phenol C_6H_6O	mg/kg	0.0024	0.0012	0.0024	0.0024	0.0024	0.0028	0.0014	0.0028	0.0028	0.0028
141	Sulfolane ($(CH_2)_4SO_2$)	mg/kg	0.21	0.21	0.21	0.21	0.21	0.18	0.18	0.18	0.18	0.18
142	Triethylene Glycol ($C_6H_{14}O_4$)	mg/kg	150	150	150	150	150	100	100	100	100	100
Radioactive Elements												
143	Uranium 238 Series All Progeny	becquerels per gram (Bq g-1)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
144	Uranium 238 (U238- Th 234- Mpa234- U234)	(Bq g-1)	10	10	10	10	10	10	10	10	10	10
145	Thorium 230	(Bq g-1)	10	10	10	10	10	10	10	10	10	10
146	Radium 226 (In Equilibrium with its Progeny)	(Bq g-1)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
147	Lead 210 (In Equilibrium With 210 Bi And 210 Po)	(Bq g-1)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
148	Thorium 232 Series All Progeny	(Bq g-1)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
149	Thorium 232	(Bq g-1)	10	10	10	10	10	10	10	10	10	10
150	Radium 228 (In Equilibrium with 228 Ac)	(Bq g-1)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
151	Thorium 228 (In Equilibrium with its Progeny)	(Bq g-1)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
152	Potassium 40	(Bq g-1)	17	17	17	17	17	17	17	17	17	17

Note: Adopted from MEWA Regulations.

SECTION - 7

7 Dredging

7.1 Dredging Regulations

7.1.1 No dredging activity is accepted without an EIA and MEWA approval as per Royal decrees. No dredging or disposal of dredged material shall take place outside the Harbor without specific approval being granted by the Royal Commission. Approval will be subject to an assessment of the environmental impact of the proposed dredging and dredged material disposal activities, which will be based on information provided to the Royal Commission on Permit Application Package (PAP-M3) form included in RCER-2025, Volume II.

7.1.2 Dredging, dewatering, and disposal of dredged material shall not cause any form of pollution of the marine ecology, including siltation, odors, and fugitive dust.

7.1.3 Silt curtain or any floating barrier shall be placed prior to the dredging operation, particularly in sensitive marine areas, such as: seagrass bed, coral reef, mangrove community and other areas of concern.

7.1.4 Offshore disposal of dredged material is prohibited unless authorized by the RC (for area under its jurisdiction) or other concerned legal authority in special cases.

7.1.5 No dredged materials shall be disposed of within enclosed bays, inlets or within the 20m low tide depth contour unless the dredged material is being used for approved construction purposes.

7.1.6 Dredged material that does not meet the standards in Table 7A shall not be disposed of at offshore locations. Such materials may be disposed of at RC approved WMF in accordance with Sections 4 and 5.

7.1.7 Dredged materials proposed for beach nourishment or landscaping shall not exceed the criteria provided in Table 7B.

7.1.8 Dredged materials can be classified according to the level of pollution as Non-Polluted, Moderately polluted and Heavily polluted as given in Table 7C.

7.1.9 Supernatant water decanted from dredged material shall not be disposed of within enclosed bays or inlets or within the 20m low tide depth contour unless a visual clarity of at least 0.5m has been achieved. Supernatant water quality parameters shall meet the maximum pollutant level standards established in Section 3.2.

7.1.10 The use of surface impoundments to retain and settle dredged materials shall conform to the standards given in clause 3.4.10 of these regulations.

7.2 Tables

7-A: Maximum Pollutant Levels for Dredged Material Disposal

PARAMETER	DRY SEDIMENT (mg/kg)
Volatile Solids	8 %
Chemical Oxygen Demand (COD)	50,000
Total Kjeldahl Nitrogen (TKN)	1,000
Oil and Grease	1,500
Mercury	1
Lead	50
Zinc	75
Arsenic	5
Cadmium	2
Chromium	100
Copper	50
Nickel	50

7-B: Maximum Pollutant Levels of Dredged Material for Beach Nourishment

PARAMETER	DRY SEDIMENT (mg/kg)
Oil and Grease	Nil
Silt and Clay	10 %
Sediment Moisture	25 %
Mercury	0.5
Lead	25
Zinc	25
Arsenic	1.7
Cadmium	1.0
Chromium	10
Copper	10
Nickel	5.0

7-C: Guidelines for Classifying Sediments According to Levels of Selected Heavy Metals (µg/g dry wt.) [a]

Metal	Non-Polluted	Moderately Polluted	Heavily Polluted
Arsenic	<3	3-8	>8
Cadmium	-	-	>6
Chromium	<25	25-75	>75
Copper	<25	25-50	>50
Lead	<90	90-200	>200
Mercury (Total)	<1	-	>1
Nickel	<20	20-50	>50
Silver	-	-	-
Tin	-	-	-
Zinc	<90	90-200	>200

a) US. EPA, Region V, Guidelines for Classifying Sediments According to Levels of Selected Heavy Metals.

SECTION - 8

8 Noise

The following regulations and standards have been established to ensure that noise levels are maintained within limits that do not cause nuisance or harm to the citizens or the environment.

8.1 Environmental Noise Standards

8.1.1 Noise level standards for residential, business and industrial areas, and roadside areas are specified in Table 8. Environmental noise standards apply to the noise levels measured at the outside of the facility's fence adjacent to the source of the noise or to noise levels in public areas.

8.2 Environmental Noise Regulations

8.2.1 No person, facility, agency or contractor shall operate equipment that creates, noise levels at their boundary fence in excess of the environmental noise standards in Table 8.

8.2.2 The operator of a facility with equipment operating at noise levels in excess of 85 dBA shall conduct a perimeter noise survey at their facility at a frequency of at least once per year. The results of the noise survey shall be reported to the Royal Commission within thirty (30) days of completion of the monitoring.

8.2.3 The Royal Commission may waive or reduce the frequency of noise monitoring requirements if the operator of the facility can demonstrate to the Royal Commission that the facility is consistently in compliance with the applicable standard.

8.2.4 The operator of a facility subject to clause 8.2.3 shall monitor the noise levels based on the ISO 1996 Acoustic-Description, Measurement and Assessment of Environmental Noise or an equivalent standard using an instrument that meets the BS EN 61672-12013 Class 2 or better. Guideline for Noise measurement and submitting a report as per requirement (within 30 days of conducting noise monitoring) are provided in Appendix J, RCER-2025, Volume II.

8.2.5 The operator of a facility conducting noise monitoring, subject to clause 8.2.3, shall provide the RC at least 14 days prior notice. The RC may elect to witness all or a part of the noise monitoring activity.

8.3 Tables

Table 8: Noise Criteria for Occupied Areas

Occupied Areas	Maximum Noise Measured at Property Line Not to be exceeded >10% of Measured Time (dBA) (L_{10})
1. Residential and Institutional	50* (L10 for 18 hr)
2. Small Business and Commercial	65*(1)
3. Industrial	75*(1)

*The values will remain same for the industry for day and nighttime, however, for residential and small business and commercial areas, RC and applicable national standards shall be complied with.

Notes:

1) L_{10} (1 hr) represents the noise level which is exceeded 10% of the time.

SECTION - 9

9 Reporting and Record-Keeping

9.1 Quality Control/ Quality Assurance

9.1.1 The operator of a facility shall establish a Quality Control/Quality Assurance program for the reporting, monitoring and recordkeeping requirements established in these Regulations. Elements of such a program shall include but not be limited to:

a) Defining standard operating procedures for instrumentation installation, calibration, and maintenance.
b) Define calibration and preventive maintenance schedules and establish recordkeeping procedures to be used during calibration, maintenance and reporting of results and data.
c) Define responsibilities for all personnel
d) Define quality control criteria to be followed during review and validation of data
e) Establishing documentation on specified forms for all laboratory and field activities

9.2 Reporting Requirements Regulations

9.2.1 The operator of a facility shall provide the Royal Commission with at least thirty (30) days advance notice of any start-up of a new or modified facility.

9.2.2 The operator of a facility shall submit periodic monitoring reports (soft copy with electronic signature) in accordance with any monitoring schedules developed in conjunction with the Environmental Permit to Operate. All the submitted information/data shall be accurate, demonstrable and traceable.

9.2.3 The operator of a facility shall submit to the Royal Commission all relevant reports (soft copy with electronic signature) and at the specific frequency referenced in Table 9A. The submitted reports shall contain as a minimum all of the specific information requested in the relevant sections of these Regulations.

9.2.4 The operator of a facility shall report all required monitoring data in units specified in the relevant standards.

9.2.5 Gap Analysis and Facility Compliance Status Reporting

Operators of all existing facilities shall submit a “Gap Analysis Report” within 06 months from the effective date of this regulation and then quarterly “Compliance Status Report” containing accurate information/data within one month for their facilities. The report shall:

a) Identify the regulations and standards in this document which cannot be met consistently by the facility at the time of reporting.
b) Include a schedule of actions proposed to correct the non-compliance issues identified in “a”.
c) Identify any measures specifically taken to bring the facility into compliance with these Regulations.
d) The non-compliance shall not be considered by RC as long as the agreed compliance plan milestones are met.

9.2.6 Reporting of Events/Activities having potential for non-complianace:

The operator of a facility shall identify and report to the Royal Commission all events /activities having potential for non-compliance for the following:

a) All planned start-ups, shutdowns and maintenance activities shall be reported in 15 working days advance.

b) All upsets and emergencies resulting in non-compliance and other events (such as fire, odor, noise etc.) shall be reported immediately as per APPENDIX G of RCER 2025 Volume I. A written report more fully explaining the circumstances of the event shall be provided to the RC within one week of occurrence of the event.

c) A separate notification with justification shall be submitted to RC for evaluation, prior to the expiry of the exempted period.

As a minimum the reports shall contain the following, as applicable.

i. Description of the events/activities having potential for non-compliance (air emissions, spills, flaring etc.).
ii. Duration.
iii. Estimated quantity and type of emissions or discharges.
iv. Action to be undertaken to minimize releases.

9.2.7 Reporting of Hazardous Material Releases

The operator of a facility shall report immediately to the Royal Commission all incidents which result in spills or releases of hazardous materials in quantities which may impact groundwater or the environment outside the plant boundaries. The report shall contain as a minimum the following:

a) Description of the incident,
b) Duration,
c) Estimated quantity and type of emissions, discharges or hazardous waste,
d) Action to be undertaken to minimize releases, and
e) Action to be undertaken to clean up these releases.

A written report more fully explaining the circumstances of the event shall be provided to the Royal Commission within one week of the occurrence.

9.3 Recordkeeping Requirements

9.3.1 The operator of a facility shall, as a minimum, maintain true and correct records required by these Regulations in accordance with the relevant sections of these Regulations. All data and records required by these Regulations shall be maintained on site in an organized and legible fashion.

9.3.2 Records for monitoring information shall include as a minimum the following information:

a) The dates, places and time of sampling or measurements,
b) The date analyses were performed, and
c) The analytical techniques used.

9.3.3 The operator of the subject facility shall retain records of all monitoring information, copies of all records required by these Regulations referenced in Table 9B, for a period of at least five (5) years from the date of the information.

9.3.4 The operator of a facility shall upon reasonable notification make available for inspection all data and records required in connection with compliance with these Regulations.

9.4 Tables 9 A: Reporting Requirements

The following table summarizes the required reports and their frequency as dictated in the relevant parts of these Regulations.

REQUIRED REPORT	FREQUENCY OF REPORTING	REFERENCE SECTION	REPORTING DUE DATE
PROCESS CONSTRUCTION			
1. Notification of completion date	Once	1.2.6	30 days before construction completion
AIR:			
1. Qty. & Estimated Composition of gases flared (Facilities having flares)	Monthly	2.4.4	Two weeks after the end of the month
2. Stack Emission Testing Notification	Each Time	2.5.7	14 working days in advance
3. Point Source Emission Data	Annually for each source	2.5.8	Within 60 days after completion test
4. Continuous Monitoring Summary	Monthly	2.6.7	Two weeks after the end of the month
5. Fugitive Emission Report	Annual	2.8.4/2.8.10	14 days prior notice Report within 60 Days after the test completion
6. Affected pollutants & odorous chemicals Report	Monthly	2.1.3	Within Two weeks after the end of the month
7. Seal Inspection Notification	Each Time	2.9.5	14 days in advance
8. Air Emission Inventory	Annual	2.11.1	On/before 15th March of the following Year
WATER:			
1. Industrial Wastewater Discharges	Monthly	3.4.15 or 3.4.17	2 weeks following end of the calendar month
2. Seawater Cooling Discharge	Monthly	3.5.6	2 weeks following end of the calendar month
3. Variance Streams	Monthly	3.5.7	2 weeks following end of the calendar month
4. Cooling Tower Drift Loss Test	First EPO and each EPO renewal	3.6.8	First EPO and each EPO renewal. Within 60 days after test completion date.
5. Treated Effluent (SWTP)	Monthly	3.8.6	2 weeks following end of the calendar month
6. Groundwater Monitoring	Annually	3.11.5	90 days after sampling
7. Base Line Groundwater Analysis	Prior to First time Operation	3.11.6	New Facility
8. Drinking Water Monitoring	Monthly	3.12.5	2 weeks following end of the calendar month
HAZARDOUS MATERIALS			
1.Hazardous Substances Inventory	Annually	4.2.4	January of the following year
2.Tank Tightness Test-UST	Every three years	4.5.6	Once every three years
3.UST Removal Notification	Prior to removal	4.5.7	30 days before removal
WASTE MANAGEMENT			
1. Disposal Facility - Rejected Waste	Each occurrence	5.2.12	Within 24 hours

Table 9-A: Reporting Requirements (Cont.)

REQUIRED REPORT	FREQUENCY OF REPORTING	REFERENCE SECTION	REPORTING DUE DATE
2. Waste Manifest - not returned to Generator	Each occurrence	5.2.13/14	Within one month / 45 days of due date
3. Return of unused manifest to RC	Each occurrence	5.2.15	Immediately After Expiry
4. Waste Transporter Report (Notification for Disposal Facility not accepting waste)	Each Occurrence	5.3.20	Immediately
5. Waste Transporter's Report	Monthly	5.3.21	2 weeks following end of the calendar month
6. Industrial Waste Audit/Disposal – Generator Report	Quarterly	5.4.16	Within a month following end of the Quarter
7. Municipal/Waste Audit/Disposal – Generator Report	Once every six months	5.6.12	Jan/Jul for previous six months
8. Waste disposal/Recycling Report – Disposal Facilities	Monthly	5.4.17	2 weeks following end of the calendar month
9. Waste Management Report (Shutdown/Maintenance)	Each occurrence	5.4.18	Within a month following the occurrence
10. Waste Disposal Facility Closure Notification	Each Occurrence	5.9.3	60 Days in advance of beginning closure activities
11. Surface Impoundment/Solar Evaporation Pond Water Quality Report	Monthly	3.4.10 (g)	2 weeks following end of the calendar month
12. Wastewater Discharge Report	Monthly	3.4.10 (h)	2 weeks following end of the calendar month
13. Waste Reduction Plan	With EPO Renewal	5.1.6	With EPO Renewal Submittal
PERMIT APPLICATION PACKAGE/RENEWAL FORM			
1. New /Modified/Reconstructed Facilities	As proposed	1.2.4	Six months before starting any construction
2. Existing facility (Permit Renewal Form/PAP)	Once every five years (Renewal Form) & PAP, if requested)	1.3.6	Renewal Form: Six months before EPO expiry date
3. Modified Facilities	As proposed	1.3.7	60 days before planned start-up
COMPLIANCE REPORTING			
1. Hazardous Materials Release	Each occurrence	4.3.21 / 4.4.7 / 9.2.7	Notify Immediately + report in 7 days
2. Start up and Commissioning of New and Modified Facilities	Each occurrence	9.2.1	30 days advance notice
3. Gap Analysis and Facility Compliance Status Reporting	Gap Analysis Report: Once Compliance Status Report: Quarterly	9.2.5	Gap Analysis Report: Once within 06 months from the date of notification for the promulgation of this regulation Compliance Status Report: Within one month after the end of the quarter
4. Potential Non-Compliance Events	Each occurrence	9.2.6	Planned events in 15 days advance. Upsets & emergencies shall be notified immediately, event summary within 24 hours and detailed report within one week.

Table 9-A: Reporting Requirements (Cont.)

REQUIRED REPORT	FREQUENCY OF REPORTING	REFERENCE SECTION	REPORTING DUE DATE
SOIL:			
1. Soil Contamination Investigation	Each Occurrence	6.3.4	Within 60 days after completion of investigation
2. Soil Remediation	As proposed	6.4.5	Within 60 days after completion of Remediation
3. Soil Reclamations/Rehabilitation	As proposed	6.5.4	Within 60 days after completion of Rehabilitation
NOISE			
1. Notice Prior to Noise Monitoring	Each occurrence	8.2.5	14 working days in advance
2. Boundary Noise Survey/Monitoring	Annually	8.2.2	Within 30 days after completion of test

9B: Record Keeping Requirements

The following table summarizes the record keeping requirements specified in the relevant parts of these Regulations.

REQUIRED RECORDS	REFERENCE SECTION
AIR:	
Continuous Air Monitoring Operations	2.6.5
BIF hazardous material composition / quantity	2.7.5
Fugitive Emissions - Components Inventory	2.8.10
Fugitive Emissions - Monitoring and Maintenance	2.8.11
Storage Tank Inspections	2.9.6
VOC Storage Information	2.9.7
VOC Loading and Unloading	2.10.6
WATER:	
Seawater Cooling Tower Operation Monitoring	3.6.6
Continuous Water Monitoring Operations	3.13.5
HAZARDOUS MATERIALS:	
Material Safety Data Sheet (MSDS)	4.2.1
Hazardous Materials Inventory	4.2.2
Hazardous Materials Contingency Plan/ EERP	4.3.19
Hazardous Materials Inspection Schedule	4.3.20
Underground Storage - Tank Tightness Testing	4.5.6
WASTE	
Waste Disposal Manifests - Generator	5.2.7
Waste Disposal Manifests - Disposal Facility	5.2.8
Final PAP (Only for WMF and WRF)	5.1.13
All Required Documents as Stated in Clauses (Only for WMF and WRF)	5.1.14

APPENDIX A: ENVIRONMENTAL PERMIT TO CONSTRUCT

الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

صفحة :1 من1 تاريخ
الإصدار :xx/xx/xxxx
رقم الطلب : xx-xxxx-xx-xx-xxx

تصريح بيئي للإنشاء
Environmental Permit for Construction

إسم المنشأة	اسم المرفق لصناعي

تاريخ بداية التصريح	تاريخ نهاية التصريح

رقم التصريح	رقم الإصدار	فئة المنشأة

رقم السجل التجاري	رقـم الإتفاقيـة الإستثمارية	النشاط

الموقع	خط الطول (شمالا)	خط الطول (شرقا)

العنوان

الإشتراطات العامة

- يجب أن يكون الإنشاء وفقاً للوصف والتصميم والمعدات والمواصفات الفنية والرسومات وبيانات المعدات المقدمة في نماذج طلب التصريح والمراسلات ذات الصلة
- يجب أن تلتزم المنشأة بتطبيق لائحة المعايير والاشتراطات البيئية بمدن الهيئة الملكية 2015 والتحديثات اللاحقة
يجب التقدم بطلب الحصول على التصريح البيئ للتشغيل قبل 60 يومًا من اكتمال إنشاء المشروع من خلال تقديم وتعبئة نماذج طلب التصريح البيئية للتشغيل، ولن يتم إصدار
- التصريح البيئ للتشغيل إلا بعد التحقق من أن الإنشاء تم وفقاً لمتطلبات شروط التصريح البيئ للإنشاء من خلال التفتيش الذي تجريه الهيئة الملكية
- لا يجوز للمنشأة البدء في التشغيل التجريبي أو التشغيل المسبق بدون موافقة الهيئة الملكية ولا يجوز لها بدء التشغيل الدائم دون تصريح بيئ للتشغيل ساري المفعول

Kingdom Of Saudi Arabia - Royal Commission City
National Address : (xxxxxxx)
Tel : xxxxxxxxxxxxx
Fax : xxxxxxxxxxxx

المملكة العربية السعودية - مدينة الهيئة الملكية
العنوان الوطني: (xxxxxxxxxxxx)
هاتف :xxxxxxxxxxxxx
فاكس :xxxxxxxxxxxxx

الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

APPENDIX B: ENVIRONMENTAL PERMIT TO OPERATE

الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

صفحة :1 من 1
تاريخ الإصدار :xx/xx/xxxx
رقم الطلب :xx-xxxx-xxxx

تصريح بيئي للتشغيل

Environmental Permit for Operation

إسم المنشأة	اسم المرفق لصناعي

تاريخ بداية التصريح	تاريخ نهاية التصريح

رقم التصريح	رقم الإصدار	فئة المنشأة

رقم السجل التجاري	رقم الإتفاقية الإستثمارية	النشاط

الموقع	خط الطول (شمالا)	خط الطول (شرقا)

العنوان

الاشتراطات الخاصة

الإشتراطات العامة

- يجب أن يكون تشغيل المنشآة وفقاً للوصف والتصميم والمعدات والمواصفات الفنية والرسومات وبيانات المعدات المقدمة في نماذج طلب التصريح والمراسلات ذات الصلة
- يجب أن تلتزم المنشأة بتطبيق لائحة المعايير والاشتراطات البيئية بمدن الهيئة الملكية 2015 والتحديثات اللاحقة
- يجب أن تلتزم المنشأة بتشغيل جميع معدات التحكم بالتلوث بشكل كامل وبالكفاءة القصوى المطلوبة أثناء التشغيل
يجب إرسال النفايات الصناعية الناتجة عن عمليات المنشأة إلى منشآت إدارة / إعادة تدوير النفايات الصناعية المعتمدة من قبل الهيئة الملكية من خلال ناقل نفايات معتمد من قبل
- الهيئة الملكية
يجب أن تلتزم المنشأة بالسماح لمفتشي الهيئة الملكية أو ممثلها المفوض بدخول المنشأة في أي وقت وبدون سابق إنذار للتفتيش وأخذ العينات في حالة وجود أي شكوى أو وضع غير
- طبيعي يتعلق بالقضايا البيئية
- المنشأة هي المسؤولة عن أعمال المعالجة في حالة تلوث الأرض أو المياه الجوفية أو مياه البحر وما إلى ذلك من مسببات التلوث الناتجة عن أنشطتها
في حال تعديل أو إضافة أو تغيير أو توسعة في النشاط دون موافقة الهيئة الملكية أو في حال كانت البيانات المقدمة من قبل المنشأة في نماذج طلب التصريح غير دقيقة فإن التصريح يعتبر
- لاغياً

المملكة العربية السعودية
مدينة الهيئة الملكية xxxxxxxxxxxxxxxxx
العنوان الوطني : (xxxxxxx)
فاكس :xxxxxxxx

Kingdom Of Saudi Arabia
Royal Commission City xxxxxxxxxxxxxxxxxxx
National Address : (xxxxxxxx)
Fax : xxxxxxxxx

الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

APPENDIX C: ENVIRONMENTAL LICENSE TO TRANSPORT INDUSTRIAL & HAZARDOUS WASTE AND ENVIRONMENTAL LICENSE FOR 3rd PARTIES

الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

ENVIRONMENTAL LICENSE TO TRANSPORT INDUSTRIAL WASTE

رخصة بيئية لنقل النفايات الصناعية

License No.: **LICENSE ######**
Issue Date: **DD/MM/YYYY G**
Expiry Date: **DD/MM/YYYY G**
Revision No. **###**

رقم الرخصة : **LICENSE ######**
تاريخ الإصدار : **DD/MM/YYYY** H
صالح لغاية : **DD/MM/YYYY** H
رقم الإصدار : **###**

The Royal Commission for Jubail and Yanbu issues this Environment License to transport Industrial Waste to:

تمنح الهيئة الملكية للجبيل وينبع رخصة بيئية لنقل النفايات الصناعية للسادة:

XXXXXXX
P. O. Box #####
XXXXXX- ######

XXXXXX
ص. ب. #####
XXXXX- #####

The above company is licensed to transport hazardous / non-hazardous industrial waste within Royal Commission Cities in accordance with the Royal Commission Environmental Regulations.

الشركة المشار إليها أعلاه مرخص لها بنقل النفايات الصناعية الخطرة وغير الخطرة ، داخل المدن التابعة للهيئة الملكية، وفقاً للائحة المعايير والاشتراطات البيئية بمدن الهيئة الملكية:

Facility : **XXXXXXX**

المنشأة الصناعية :

Royal Commission representative:

ممثل الهيئة الملكية المفوض :

Name: _____ الاسم:
Title: _____ الوظيفة:
Signature: _____ التوقيع:

I certify that xxxxxxx will follow the Royal Commission Environmental Regulations when transporting waste in Royal Commission Cities.

تتعهد شـــركة XXXXXXX بتطبيق لائحة المعايير والاشـــتراطات البيئية بمدن الهيئة الملكية عند نقل النفايات داخل المدن التابعة للهيئة الملكية.

Company representative:

ممثل الشركة المفوض :

Name: _____ الاسم:
Title: _____ الوظيفة:
Signature: _____ التوقيع:

الختم
Stamp

الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

ENVIRONMENTAL LICENSE TO CONDUCT ENVIRONMENTAL IMPACT ASSESSMENT

رخصة بيئية لإجراء دراسة الاثر البيئي

License No.: **LICENSE ######**
Issue Date: **DD/MM/YYYY G**
Expiry Date: **DD/MM/YYYY G**
Revision No. **###**

رقم الرخصة : **LICENSE ######**
تاريخ الإصدار : **DD/MM/YYYY H**
صالح لغاية : **DD/MM/YYYY H**
رقم الإصدار : **###**

The Royal Commission for Jubail and Yanbu issues this environment license to conduct Environmental Impact Assessment (EIA) to:

تمنح الهيئة الملكية للجبيل وينبع رخصة بيئية لإجراء دراسات الأثر البيئي للسادة:

XXXXXXX
P. O. Box #####
XXXXXX- ######

XXXXXX
ص. ب. #####
XXXXX- #####

The above company is licensed to conduct Environmental Impact Assessment (EIA) within Royal Commission Cities in accordance with the Royal Commission Environmental Regulations and conditions attached to this license.

المكتب المشار إليه أعلاه مرخص له لإجراء دراسات الأثر البيئي، داخل المدن التابعة للهيئة الملكية وفقا للائحة المعايير والاشتراطات البيئية بمدن الهيئة الملكية و الاشتراطات المرفقة مع هذه الرخصة:

Facility : **XXXXXXX**

المنشأة الصناعية :

Royal Commission representative:

ممثل الهيئة الملكية المفوض :

Name: _____ الاسم:
Title: _____ الوظيفة:
Signature: _____ التوقيع:

I certify that xxxxxxx will follow the Royal Commission Environmental Regulations when conducting Environmental Impact Assessment (EIA) in Royal Commission Cities.

تتعهد شـركة XXXXXXX بتطبيق لائحة المعايير والاشـتراطات البيئية بمدن الهيئة الملكية عند إجراء دراسـة الأثر البيئي، داخل المدن التابعة للهيئة الملكية.

Company representative:

ممثل الشركة المفوض :

Name: _____ الاسم:
Title: _____ الوظيفة:
Signature: _____ التوقيع:

الختم
Stamp

Note: Description of this license would be changed based on the 3rd party service (Stack & cooling tower drift, Laboratory & Noise, Fugitive Emissions etc.)

الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

APPENDIX D: INDUSTRIAL AND HAZARDOUS WASTE MANIFEST

ROYAL COMMISSION FOR JUBAIL AND YANBU

ENVIRONMENTAL PROTECTION & CONTROL DEPARTMENT

INDUSTRIAL & HAZARDOUS WASTE MANIFEST

PART A: TO BE COMPLETEED BY WASTE GENERATOR

Waste Generator Name and Address :	Facility ID No :	Manifest No:
Contract Person Name :	Email Address :	Telephone No:
Transporter Name and Address :	Transporter ID No :	Telephone No:
Treatment Storage& Disposal(TSD)/Recycle Facility Name & Address:	TSD/ Recycle Facility ID No:	Telephone No:

Industrial/Hazardous Waste Name	Important Properties	Quality	Unit (ton/ drum)	Container Type	TSD/ or recycle Method

Description of per-treatment completed on the waste(s):

Royal Commission's Approval Letter No. With Date :

Generator's Certification: This is to certify that above named waste materials are properly described, packaged, marked and are in proper condition for transportation according to the applicable regulations. These waste materials were consigned to the transporter named.

Name (Print or type) _____ Signature _____ Date Consigned _____

Transporter's Certification when receiving Waste(s) Shipment: To the best to my knowledge, the contents of the shipment I have accepted for transport, confirm to the description on this manifest.

Name (Print or type) _____ Signature _____ Date Consigned _____

PART B: TO BE OMPLETED BY TRANSPORTER

Transporter's Certification when delivering the Waste(s) to the designated TSD/ Recycle Facility: I hereby certify that I have not tempered with or altered the contents of this shipment.

Name (Print or type) _____ Signature _____ Date Consigned _____

PART C: TO BE COMPLETED BY TSD/RECYCLE FACILITY

Indicate any differences between description on this manifest and actual shipment:

TSD/ Recycle Facility's Certification: I hereby certify that upon visual inspection, the contents of this shipment conform to the description on this manifest except for those differences noted above,

Name (Print or type) _____ Signature _____ Date Consigned _____

Original (White) –RC Environmental Control Dept.
Copy 2 (Green) – TSD/ Recycle Facility
Copy 3 (Gold) – Transporter
Copy 4 (Blue) Waste Generator
Copy 5 (Pink) - Waste Generator (Initial Copy)

INSTRUCTIONS

This manifest and below listed instructions shall be used by all the facilities operating in RCC for transporting industrial and hazardous waste materials for Treatment, Storage & Disposal (TSD)/ or Recycling unless otherwise specified by RC.

1. The waste generator shall apply to the Environmental Protection & Control Department, Royal Commission for proper approval well in advance before the actual shipment of the waste to the designated TSD/ Recycle facility.

2. The waste generator shall complete **Part "A"** of the manifest and shall have transporter sign and certify the receipt of the shipment. The waste generator shall then retain **Copy 5** "Initial Copy" of this manifest before handing over manifest and waste shipment to the transporter.

3. Upon delivery of the waste shipment to the designated TSD/ Recycle facility, the transporter shall sign and certify in **Part "B"** the delivery of the shipment.

4. The TSD/ Recycle facility shall complete, sign and certify in **Part "C"** of the manifest and retain **Copy 2**.

5. The TSD/ Recycle facility shall give **Copy 3** to the transporter. The TSD/ Recycle facility sends **Copy 1** and **Copy 4** to the waste generator.

6. The generator shall retain **Copy 4** and send **Copy 1**, containing all original signatures, to the Environmental Protection & Control Department.

7. If more than five (5) waste materials are involved in the shipment, additional manifest(s) must be used.

8. Royal Commission approval letter and manifest(s) shall always be carried along with the shipment while transporting the waste to the designated TSD/ Recycle facility.

<table>
<tr><th colspan="4">GENERATOR</th><th>TRANSPORTER</th><th>DISPOSAL FACILITY</th></tr>
<tr><td colspan="4">Company
Address

Tel / Fax
Contact</td><td>Name 1st transporter
Address

Tel / Fax
Contact</td><td>Name
Address

Tel / Fax
Contact</td></tr>
<tr><td>Waste Description</td><td>Class</td><td>Quantity</td><td>Packing</td><td>Date accepted</td><td>Date accepted</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td>Transferred to 2nd transporter yes / no</td><td>Date of disposal</td></tr>
<tr><td>This is to certify that the described materials have been accepted from the generator for transportation and delivery to the identified disposal facility in accordance with the applicable regulations of MEWA and the Royal Commission
Signature
Name
Title
Date</td><td>Final disposal location

Address

Tel / Fax
Pretreatment / disposal method</td></tr>
<tr><td colspan="4">Special Instructions</td><td>Name 2nd transporter
Address

Tel / Fax</td><td rowspan="3">Discrepancies between waste and manifest</td></tr>
<tr><td colspan="4">Analysis attached yes / no</td><td>Date accepted</td></tr>
<tr><td colspan="4">Date removed from site</td><td>Transferred to 3rd transporter yes / no</td></tr>
<tr><td colspan="4">This is to certify that the above materials are properly classified, described, packed and labeled and are in proper condition for transportation and disposal in accordance with the applicable regulations of MEWA and the Royal Commission

Signature
Name
Title
Date</td><td>This is to certify that the described materials have been accepted from the first transporter for transportation and delivery to the identified disposal facility in accordance with the applicable regulations of MEWA and the Royal Commission

Signature 2nd transporter
Name 2nd transporter
Title
Date</td><td>This is to certify that the described materials have been delivered by the named transporter, that the manifest details are correct and that the wastes have been disposed of properly in accordance with the applicable regulations of MEWA and the Royal Commission

Signature
Name
Title
Date</td></tr>
</table>

APPENDIX E: WASTE AUDIT FORM

WASTE AUDIT FORM

Generator Quarterly Report for the ---------- Quarter # ----------

1. Name of Industry / Installation ----------
2. RC Contract Number ----------
   (In the case of industry, lease number)
3. Installation Mailing Address ----------
4. Location of Industry / Installation ----------
5. Industry / Installation Contact (Name, Phone) ----------
6. Transportation Service Used ----------
   (Name of the transporter whose services were used during the reporting period)

7. Waste Identification

Industry (a) Waste No. (RC)	Description of Waste	Classification (B)	Amount of Waste in MT or Cu.M (c)	Date of Generation	Date of Disposal	Disposal Facility

---------- ---------- ----------
-
Authorized Officer **Signature**
Date

Note: Use Additional Sheet (Sheet No. 2), if Necessary & submit the data in excel only.

Waste Generation and Disposal Summary Report*

	Description of Waste	Physical state (liquid, Solid, Sludge, Slurry)	Total Quantity of waste generated in Q1 & Q2 (MT)	Total Quantity of waste generated in Q3 & Q4 (MT)	Classification (Haz/Non Haz.)	Total Quantity of waste disposed in Q1 & Q2 (MT)	Total Quantity of waste disposed in Q3 & Q4 (MT)	Waste Transporter	Disposal/ Recycle Facility	Treatment /Disposal Method

**Should be submitted in Excel Format Only.*

APPENDIX F: AMENDMENTS TO REGULATIONS

Volume Number	Item Number	Proposed Amendment

APPENDIX G: ENVIRONMNENTAL EVENT NOTIFICATION

Appendix G: Environmental Event Notification[1]

Description of event:

Unit Name & Number:

Impacts from the Event:

1	Air quality	Fume cloud/smoke	☐
		Gas release	☐
		Odor	☐
		Flaring	☐
		Fire	☐
2	Water quality	Abnormal discharge to IWTP	☐
		Accumulation in Emergency Pond	☐
3	Waste management/ Hazardous Materials Management	Spill/Leak	☐
4	Noise impacts	Loud noise	☐
5	Other		☐

Date and Time of Event:

Duration:

Meteorological conditions (as applicable):

Wind Direction:

Wind Speed: Temperature:

Estimated quantity of emissions or discharges:

[1] Shall be used for incident reporting as per section 9.2.6 & 9.2.7

_____ **Potential Chemicals Involved:** _____
Actions undertaken to minimize emissions/releases: _____ _____
Additional measures to be taken to avoid re-occurrence: _____ _____ _____

Shall be used for incident reporting as per section 9.2.6 & 9.2.7