

Technical Guidance Document for Operation Environmental Management Plan (OEMP) EAD-EQ-PCE-TG-06

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* Refer to SG Circular S.G/C-08/12 Concerning Appointment and Responsibilities of the Corporate Management Representative at the Environment Agency – Abu Dhabi.		

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Operation Environmental Management Plan (OEMP)

List of Abbreviations

AD EHS Center	Abu Dhabi Environment, Health, and Safety Center
CEMP	Construction Environmental Management Plan
CEHSP	Construction Environment, Health and Safety Plan
DMP	Discharge Management Plan
EAD	Environment Agency–Abu Dhabi
EAP	Environmental Action Plan
EHS	Environment, Health, and Safety
EHSMS	Environment, Health and Safety Management System
EIA	Environment Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
EPA	Environmental Permit Application
MSDS	Material Safety Data Sheet
NOC	No Objection Certificate
ODS	Ozone-Depleting Substance
PCB	Polychlorinated Biphenyls
PER	Preliminary Environmental Review
SRA	Sector Regulatory Authority

Definitions of Terms

Audit—A systematic, independent, and documented review of operations and practices to ensure that relevant requirements are met. Qualified professionals with relevant auditing experience can conduct most audits and, where possible, independent external auditors should also be used.

Commissioning—The time period that corresponds to the commencement of operations at the proposed project or development. Prior to commissioning, the Operation Environmental Management Plan must be approved by EAD, new facilities and equipment must be ready for occupancy and use, and personnel must be properly trained.

Construction—The time period that corresponds to any event, process, or activity that occurs during the construction phase (e.g., building of site, buildings, processing units) of the proposed project or development. This phase terminates when the development goes into full operation or use starting with the commissioning of the project.

Contractor and Subcontractor—Companies employed by the source owner to perform construction or decommissioning activities at the project site. It is the responsibility of the main contractor and subcontractors to adhere to requirements contained in approved environmental management plans and all applicable environmental regulations.

Decommissioning—The time period that corresponds to any event, process, or activity that occurs during the decommissioning phase (i.e., destruction, dismantling) of the proposed project or development. The decommissioning phase follows the operation phase.

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Hazard—Any substance, physical effect, or condition with potential to harm people, property, or the environment.

Hazardous Waste—Waste containing properties that are potentially harmful to human health and the environment, such as toxic, explosive, flammable or radioactive substances.

Incident—An unplanned event that results in undesirable consequences to the personnel, facility, property, neighboring community, or environment.

Inspection—A walk-through of the physical areas of the facility with the goal of identifying non compliance with internal policies or EAD requirements.

Mitigation Measures—Methods used to minimize or eliminate adverse impacts to personnel or to the environment from project-related activities.

Operation—The time period that corresponds to any event, process, or activity that occurs during the operational (i.e., fully functioning) phase of the proposed project or development. (The operation phase follows construction phase and then terminates when the project or development goes into the decommissioning phase.)

Project Area—The physical area within which the proposed development—all construction, operations and decommissioning activities and processes—will take place; the boundary of the project area is defined by the titled property boundary. The project area is equivalent to the project site.

Project Site—Equivalent to the project area.

Proponent—The developer, permit applicant, company, or agency associated with the proposed development.

Risk—The product of the measure of the likelihood of an occurrence of an undesired event and the potential adverse effects that this event may have on people, the environment, or the owner's assets or reputation.

Solid Waste—Rubbish, debris, garbage, and other discarded solid materials resulting from any event, process, or activity.

Purpose of This Guidance Document

This guidance document outlines the requirements for developing an Operation Environmental Management Plan (OEMP) in Abu Dhabi Emirate for review and evaluation by Environment Agency—Abu Dhabi (EAD), which is the Competent Authority in the environmental field. These guidelines will be revised periodically, and proponents are encouraged to use the most current guidance as published on EAD's Web site.

Operation Environmental Management Plan (OEMP)

Section I. Background Information

The preparation and implementation of an OEMP helps to ensure that the operation of various establishments does not directly or indirectly cause pollution of the land, water and air environments, in accordance with the requirements outlined in Federal Law No. 24 of 1999 for the Protection and Development of the Environment and the Abu Dhabi Emirate Environment, Health and Safety Management System (EHSMS) Regulatory Framework (Decree 42 of 2009).

If a nominated entity, under the EHSMS, is required to submit an OEMP to EAD, then the requirements of the OEMP shall be incorporated into the entity's EHSMS. The Sector Regulatory Authority (SRA; i.e., the Authority responsible for implementing EHSMS in each Emirate sector), in conjunction with EAD and the Abu Dhabi Environment, Health, and Safety Center (AD EHS Center; i.e., the Competent Authority for the EHSMS Regulatory Framework), will review, approve and monitor the EHSMS.

For entities that are currently not nominated under the EHSMS Regulatory Framework, the Sector SRA/AD EHS Center retains the right to request the OEMP to consider health and safety. All requirements for health and safety are included within the AD EHSMS Regulatory Framework and will be incorporated into an OEMP when requested.

Definition of OEMP

The OEMP is a site-, project-, or industry-specific plan developed to ensure that environmental management practices to eliminate and control environmental impacts are followed during commissioning and operation.

Objective of the OEMP

The intent of the OEMP is as follows:

- Provide effective, site-specific, and implementable procedures to monitor and control environmental impacts throughout the operation phase of the project.
- Ensure that events, processes, or activities do not adversely impact health, safety, amenity, traffic, or the environment in the surrounding area.
- Ensure that environmental studies that have been previously submitted to and approved by EAD (e.g., Environment Impact Assessment [EIA], Preliminary Environmental Review [PER], Construction Environmental Management Plan [CEMP]) have been properly implemented, including each plan's conditions for approval or consent. If no EIA or PER was completed for the project, the OEMP should describe in further detail the extent to which environmental effects, impacts, and risks exist.
- Respond to changes in project implementation that were not considered in the previous studies.
- Provide feedback for continual improvement in environmental performance.
- Assist the project proponent and environmental consultant in formulating the OEMP for the project.

Applicability and Approach

This OEMP guidance document applies to projects and facilities in the following categories:

- Industrial facilities that contain manufacturing processes
- Development and infrastructure projects, including, but not limited to, railways, ports, harbors, terminals, airports, waste management facilities, water and sanitation, and gas distribution systems
- Power projects (e.g., power and desalination plants, geothermal plants, renewable energy facilities)
- Any project required by EAD to perform an environmental study (e.g., EIA, PER) or otherwise required to obtain a license to operate.

The Abu Dhabi Emirate Environment EHSMS is a performance-based system that takes into consideration aspects related to the protection of the environment, as well as protection of the human health and safety of workers and the community at large.

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The SRAs are responsible for implementing EHSMS in each sector within the Emirate. The AD EHS Center is the Competent Authority for the EHS Management System, and EAD is the Competent Authority for environmental regulation at Emirate level.

As per Decree No. 42 of 2009 concerning implementation of the EHSMS, entities nominated under the EHSMS by SRAs are required to comply with the EHSMS Regulatory Framework. Any entity not yet nominated by these SRAs is considered to be in a transitional period. During the transitional period, project proponents must comply with the requirements set out in this guidance document for preparation of Environmental Management Plans. Future revisions to this guidance document will endeavor to provide greater clarifications on the requirements for environmental reporting under EAD and the AD EHS Center.

Preparation and Submission of the OEMP

The OEMP should include the information provided within this technical guidance document and must be prepared by a registered consultant who has been approved by EAD. When the OEMP is complete, it must be submitted to EAD for approval no later than 1 month prior to beginning the operation unless EAD has agreed to an alternate date. The operation will not commence until written approval has been received from EAD.

Review of the OEMP

Following submission of the OEMP, the plan will be reviewed by EAD officials to verify that all chapters of the plan are complete and that it meets all of the stipulated requirements. EAD may seek clarification or revisions to the OEMP from the proponent and consultant for the proposed project. Following approval of the OEMP, EAD will issue a No Objection Certificate (NOC) so that operating activities can commence at the project site.

During the review process, EAD will evaluate the quality of the OEMP provided by the proponent or consultant to ensure that the plan adheres to this guidance document and provides sufficient detail.

Section II. Required OEMP Content and Recommended Format

The content of an OEMP may vary by project as the size and scope of an operation varies. To promote familiarity and ease of use, a recommended format for the OEMP is provided in **Table 1**, and an overview of the individual OEMP sections is described below. Where other formats are used, the content of each plan must include, at a minimum, all of the sections listed in Table 1. The OEMP also should include a list of acronyms and abbreviations, a glossary of terms, and full references to sources of information.

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Section 9	Documentation	
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1. Project or Industry Title Page

At a minimum, the title page of the OEMP should include the following information:

- The title of the project or industry
- The proponent's name, address, and contact information
- The consultant's name, contact information, and EAD registration number.

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2. Distribution List

The purpose of the distribution list is to establish communication channels that will enable more effective control of environmental issues. The distribution list should identify individuals and organizations that have or will receive a copy of the OEMP for implementation and provide a brief description of the roles and involvement of all individuals identified. Individuals of importance could include the proponent, the environmental consultant, subcontractors, and any appointed Environmental, Health, and Safety (EHS) managers (or other identifiable titles for the persons in charge of implementing the contents of the OEMP).

3. Introduction

The Introduction section of the OEMP should provide a brief discussion and overview about the proposed development project or the scope of the proposed work, as well as accomplish the following:

- Provide a brief discussion regarding the planned events, processes, or activities during the operation of the project.
- Communicate the purpose and scope of the OEMP.
- Identify the proponent and include information about who retains primary responsibility for the environmental performance of projects, events, processes, or activities. The proponent is responsible for ensuring the preparation, certification, approval, and implementation of an acceptable OEMP. The information must include the name, address, contact information, and other projects or industries inside or outside of the United Arab Emirates (UAE); the names of the contractor and any subcontractor(s); and the proponent's prior performance for similar projects or industries.
- Identify the proponent's existing corporate environmental policy and how it was implemented for the project or industry and attach a copy of the policy to the report. The policy must describe the environmental policies and principles to be applied to the operation of the project or industry and describe, in general, how the environmental performance of the project or industry will be monitored and managed during the operation phase.
- Clearly list and describe what has been assessed or recommended in conjunction with the previously developed environmental studies (i.e., environmental impacts; possible and recommended mitigation measures before, during, and after operation; and designed monitoring units and the monitoring program). Identify all environmental studies previously developed for and submitted to EAD (e.g., EIA, PER, CEMP), as well as statutory and other obligations that the proponent is required to fulfill in relation to operation of the development, including all consents, licenses, approvals, and consultations.

4. Project Description

The Project Description section of the OEMP should include information regarding the location, scope, overall project and planned operating activities, and project schedules and milestones, as discussed below.

4.1 Location

The Location section should include the following background information:

- Provide a general description of the location and existing environment at the project site and surrounding area
- Provide maps that show the geographic location of the project area, project boundaries, and surroundings. Proponents should include all of the necessary information (e.g., a key, scale, North arrow) on the OEMP maps.

4.2 Scope

The Scope section should include a discussion of the objectives and scope of the OEMP. For example, if activities will be conducted in separate phases, and the OEMP is being submitted only for one particular phase of the development, then this section should describe those activities to be addressed by this specific plan.

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4.3 Overall Project and Planned Operating Activities

The Overall Project and Planned Decommissioning Activities section should include information on the baseline conditions, identify sensitive receptors, include a description of the planned operating activities, and provide information on any required permits or licenses. It should include the hours when activities will take place and identify any activities that will take place outside typical work hours. The following subsections provide instructions as to the required information that proponents should include for this section of the OEMP.

4.3.1 Environmental Baseline, Current Conditions, and Sensitive Receptors

This section should accomplish the following:

- Identify and describe the surrounding environmental media (e.g., marine, land, air, flora and fauna, protected areas, residential) that are likely to be affected by the event, process, or activity
- Establish the emissions background level for each environmental media; baseline data could be taken from previous studies, if appropriate
- Provide maps and/or photographs to delineate the precise location of the sensitive receptors and the distance to sensitive receptors
- Identify areas having cultural or heritage importance in the vicinity of the project.

4.3.2 Operation Project Description

This section should include the following background information:

- A description and flow diagrams of processes and operations
- A description and environmental process flow diagrams that show all pollution produced (e.g., gases, liquids, solids, noise, vibration) during start-up, commissioning, and continuous operation, as well as the location and source of these emissions and identification information for monitoring control units
- Information on the type and quantity of equipment and machinery installed for the project, including both process and non-process equipment
- All raw materials used, including their function, location, and quantity consumed, along with relevant Material Safety Data Sheets for hazardous materials
- A description of infrastructure and main services (e.g., natural gas pipelines, storm water sewers), including supplementary maps or drawings of their locations and connections
- An operational methodology that lists the steps, key stages, and phases of the proposed operation
- The timing and duration of key stages of all phases of the proposed operation.

Any significant technical modifications by the contractor must be verified and assessed by the owner and EAD prior to incorporation into the OEMP. Furthermore, any deviation from the final design by the contractor or owner will be considered by EAD for incorporation into the OEMP; however, it will be necessary for the operator to ensure that the level of environmental performance within the final design is as good as or better than the environmental protection standard contained within the previously approved OEMP.

4.3.3 Environmental Permits

The OEMP should include a list of environmental permits required for the project and describe any specific conditions contained with the conditions of the referenced permits.

4.4 Project Schedule and Milestones

The Project Schedule and Milestones section should provide an anticipated schedule for the operation activities. If the project includes different phases or stages, the proponent should provide the proposed schedule for each phase within the overall

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project. This information will be useful in determining whether the mitigation and monitoring measures provided in the plan are appropriate for the duration of the operation phase.

5. Environmental Management

The Environmental Management section of the OEMP should include information regarding the policy statement, Environmental Management Systems, project personnel roles and responsibilities, EHS regulations and requirements, environmental awareness training, OEMP review and updates, and environmental commitments. The following subsections provide instructions as to the required information that proponents should include for this section of the OEMP.

5.1 Policy Statement

The Policy Statement section should describe a clear environmental policy statement, including goals, objectives, targets, appropriate performance indicators, and operational procedures. EAD standards and local limits should also be included and adhered to throughout the operation.

5.2 Environmental Management Systems

If applicable, the Environmental Management Systems section should discuss how the project corresponds to the Environmental Management Systems or Environmental Health and Safety Management System framework of the proponent.

5.3 Roles and Responsibilities

The Roles and Responsibilities section should outline a chain of command and include the roles and responsibilities of personnel in relation to implementation, management, and review. It is the responsibility of all contractors and subcontractors to adhere to requirements contained in the approved OEMP and all applicable environmental regulations, and OEMP adherence stipulations should be contained in any contractual documents between the entities. In keeping with this requirement, the OEMP should accomplish the following:

- Provide names, positions, and contact information of personnel involved with ensuring the proper implementation of the OEMP. For those positions for which personnel have not yet been assigned, the proponent should note this information within the OEMP.
- Clearly discuss the roles, responsibilities, and interrelationships of the identified proponent, contractors, and subcontractors. This will ensure that the OEMP is an effective document that will be properly implemented by all personnel involved during the operation phase.
- Use flowcharts or other diagrams to outline staffing information; these materials will help users of the OEMP understand the relationships between the key individuals and among each of the entities.

5.4 Regulations and Requirements

The Regulations and Requirements section should detail the legal framework and requirements to be adhered to during operation and should include the following information:

- A listing of the applicable EHS regulations with which the proponent will comply; this list should include local, national, and international rules and standards or agreements.
- When particular environmental Standards and Guideline Values apply (e.g., ambient noise levels, air quality, water quality concentrations), sufficient information to clearly define these standards.
- If necessary, information about the approval status for any additional licenses required to perform operations.
- Any voluntary agreements, stakeholder agreements, internal environmental management systems, or procedural requirements that must be adhered to.

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5.5 Environmental Awareness and Training

The Environmental Awareness and Training section should provide information on the proponent's systematic program to ensure that employees are aware of the OEMP and other environmental requirements. The program should define the competency of the training provider, the frequency of training, and the levels of training for personnel. This program should include, but not be limited to, the following information:

- Description of applicable environmental regulations and any implications of permit requirements that apply to the operation and associated work activities
- Identification of all potential environmental effects under all operation scenarios (e.g., commissioning, normal operation, start-up, shutdown, decommissioning)
- A listing of emergency response procedures.

5.6 Document Review and Updates

The Document Review and Updates section should establish procedures for the periodic review of the OEMP to ensure that the plan's contents are correct and that it is being properly implemented. These reviews will ensure that—should conditions arise that alter the plan's contents or requirements—the OEMP remains updated to reflect these changes. The information provided in this section should, at a minimum, accomplish the following:

- Demonstrate how the proponent intends to maintain the OEMP as a “live” document capable of modification both during the project's life cycle and as circumstances dictate
- Indicate who will regularly review, update, and develop the OEMP
- Establish procedures for the periodic review of the OEMP to ensure that its contents are correct and that it is being properly implemented.

5.7 Environmental Commitments

The Environmental Commitments section should include a summary of the environmental commitments made to manage potential environmental effects. The OEMP environmental commitments statement should describe the following:

- Adherence to all outcomes and obligations of this OEMP
- Proposed mitigation measures and monitoring activities against all residual impacts, unexpected releases, and any actions that compromise worker safety
- The nature of the work to be undertaken
- The objectives to be met
- Who is responsible for the OEMP commitments
- Who will undertake the operation
- Who is responsible for monitoring and recording that the OEMP commitments are properly fulfilled
- Who is responsible for reporting that the OEMP commitments have been met.

Each OEMP commitment containing the information in the preceding bulleted list should be numbered and indexed in the body of the OEMP to allow for quick reference to the relevant sections. The OEMP should also be designed to allow interested parties to determine whether relevant issues have been addressed.

5.8 Coordination with External Entities and Addressing Complaints

The Coordination with External Entities and Addressing Complaints section should include descriptions of correspondence with any additional parties that may be affected by the operating activities (e.g., local communities that may be affected by noise or vibration). The proponent should also provide information on how it will create a system to receive and address complaints, including how it will manage documentation of complaints and corrective actions.

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6. Environmental Impacts

The Environmental Impacts section of the OEMP should outline the environmental impacts of the specific operating activities at the project site on the surrounding environment, noting significant impacts. The plan should also explain the methodology used for determining significant impacts and reference any previously performed studies that provide more extensive assessment of these impacts (e.g., EIA, PER). When an EIA or PER was performed, the proponent should ensure that the impacts discussed in the environmental study are included in the OEMP. If no prior environmental study was performed, the OEMP should include in-depth analysis of the identification of potential impacts and how significant impacts were chosen. The environmental impacts that must be assessed in this section are, at a minimum, air emissions, surface water, soil and groundwater, terrestrial ecology, marine ecology, noise and vibration, traffic, and waste management, as discussed below.

6.1 Air Emissions Impacts

The Air Emissions Impacts section should include, but not be limited to, information regarding dust, gaseous pollutants and particulate matter (PM), and odor. The following subsections provide further information on these components.

6.1.1 Dust

Dust or PM may be emitted from various operation activities, including traffic along unpaved roads, wind from soil stockpiles, and graded or desert soil. Therefore, this section should accomplish the following:

- Identify of all types of dust emissions and sources present during different phases of operation, as well as other pertinent information related to these components
- List EAD, Abu Dhabi EHSMS, and other known international emission standard limits and other known international standards.

6.1.2 Gaseous Pollutants and Particulate Matter

Gaseous pollutants, such as nitrous oxides, sulfur oxides, and volatile organic compounds and PM may be emitted from various operation activities, such as the burning of fossil fuel from vehicles and equipment. Therefore, the section on gaseous pollutants and PM should include, but not be limited to, the following information:

- A process flow diagram that shows all the types of gaseous emissions and PM, source, and flow rates present during different phases of operation, as well as other pertinent information related to these components
- A detailed table that shows the fuel consumed for all plant operations, including fuel type (e.g., diesel, gas), consumption rates, source(s), the units that are operated, and the estimated quantity to be stored on site
- A listing of emissions source(s) (e.g., commissioning, normal operation, start-up, shutdown, decommissioning, normal operations)
- A listing of the types of emissions (e.g., suspended particulates, gaseous emissions), their composition, and their risk analysis (i.e., hazardous versus non-hazardous)
- Stack engineering designs that describe associated production units, the number of stacks, their heights and diameters, construction materials used for the stacks, emission rates (tons/year), and normal and maximum velocity (m/sec)
- A listing of applicable EAD emission standard limits and other known international standards.

6.1.3 Odor

Industrial activities have the potential to cause odor problems, which can be a nuisance and cause negative health impacts. Therefore, the OEMP should take into account the presence of compounds that cause odors and must, at a minimum, accomplish the following:

- Identify and describe the likely source(s) of odor
- Specify the qualities or characteristics of any odors (e.g., fruity, fishy, almond)

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- Determine the concentration by measuring the amount of odor-causing chemicals in an air sample
- Discuss the anticipated odor intensity (e.g., point of detection, faint or distinct odor)
- Identify the relevant maximum allowable limits from EAD or international standards.

6.2 Surface Water Impacts

The Surface Water Impacts section should provide specific impacts related to stormwater. This information should include, but not be limited to, the following:

- A base map that contains boundary lines of the projected industry site and the nearest storm drain
- Identification of EAD or local stormwater standards, rules, and objectives
- An analysis of site limitations and development constraints that includes factors such as slope, soil erodibility, depth to bedrock, depth to seasonal high water, and soil percolation to facilitate the evaluation of site suitability for proposed stormwater and erosion-control facilities in relation to the overall development.

6.3 Soil and Groundwater Impacts

The geology and hydrogeology section of the OEMP should include the following:

- A summary of the site's geology (e.g., physiography, stratigraphy, tectonic structures)
- Soil and groundwater characteristics (e.g., chemical and physical analyses, ground stability, foundation considerations)
- A description of the site hydrogeology, including a description of aquifers, groundwater flow, and groundwater availability and use
- Seismology (e.g., seismic events, seismicity, presence of liquefiable soils).

6.4 Terrestrial Ecology Impacts

The Terrestrial Ecology section should include information on discharges to land and impacts on wildlife and vegetation, as discussed below.

6.4.1 Discharges to Land

This section should describe potential impacts to land on site and in surrounding areas from operation activities including, but not limited to the following:

- The proximity of the event, process, or activity to the marine environment
- A description of discharge point(s) and disposal method(s)
- Information on volumes of discharge
- A list of chemical and physical properties of any discharges, including toxic characteristics
- A description of any flora or fauna in the terrestrial environment—specifically endangered or sensitive species—that are likely to be impacted
- The relevant maximum allowable limits from EAD, Abu Dhabi EHSHS, and other international standards
- A definition of discharge consent limits.

6.4.2 Wildlife (Fauna)

This section should describe potential impacts to habitats of terrestrial wildlife from operation activities, including habitats located on site and off site.

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6.4.3 Vegetation (Flora)

This section should detail potential impacts to vegetation from operation activities, including ecological areas located on site and off site.

6.5 Marine Ecology Impacts

The Marine Ecology section should include information on discharges to marine waters; wildlife; and vegetation, as discussed below

6.5.1 Discharges to Marine Waters

This section should describe potential impacts to marine waters from operation activities, including, but not limited to, the following information:

- The proximity of the event, process, or activity to the marine environment
- A description of discharge point(s) and disposal method(s)
- Information on volumes of discharge
- A list of chemical and physical properties of any marine discharges, including thermal and toxic characteristics
- The relevant maximum allowable water quality limits from EAD, Abu Dhabi EHSMS, and international standards
- A definition of discharge consent limits
- A hydrodynamic and flush modeling study, if required.

6.5.2 Wildlife (Fauna)

This section should describe potential impacts to habitats of marine wildlife from operation activities, including marine wildlife located on site and off site. This section should also identify any endangered or sensitive species that are likely to be impacted by operation activities.

6.5.3 Vegetation (Flora)

This section should describe potential impacts to marine vegetation from operation activities, including both those ecological areas located on-site and off-site. This section should also identify any endangered or sensitive species that are likely to be impacted.

6.6 Noise and Vibration Impacts

The Noise and Vibration Impacts section should provide a description of the noise and vibration produced from the facility. This description should include, but not be limited to, the following information:

- Noise and vibration sources within the facility and expected noise and vibration levels under different scenarios, including both individual and cumulative sources
- Applicable EAD-allowable noise limits, as well as the Abu Dhabi EHSMS Noise standards
- Noise level at the site boundary in decibels during the hours of 7:00 a.m. to 8:00 p.m. and 8:00 p.m. to 7:00 a.m.
- Noise level at identified sensitive areas near the project site
- Noise impact, which should take into account all operational phases (e.g., normal operation, start-up, shutdown, abnormal operation, commissioning)
- List of the acoustic performances of machines and equipment, including occupational noise classifications provided with an accompanying noise contour map
- Modeling or monitoring, if deemed necessary, to demonstrate the noise impact in the surrounding environment, including sensitive areas.

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6.7 Traffic Impacts

The Traffic Impacts section should include a description of the traffic impacts produced from the operating activities, including, but not limited to, potential impacts to traffic from operating activities, such as the closing of streets and increased vehicle usage for equipment, supplies, and disposal activities.

6.8 Waste Management Impacts

The Waste Management Impacts section should provide information on wastes generated from operation activities, including, but not limited to, solid waste, liquid waste, and hazardous waste, as described below.

6.8.1 Solid Waste

This section should provide a detailed description of the anticipated solid and semi-solid wastes that will be generated during the operation phase. This information should include, but not be limited to, the following:

- The sources of solid waste and the average and maximum generation rates
- The type of solid waste (e.g., industrial) and its nature (i.e., hazardous versus non-hazardous)
- A handling plan that includes segregating, storing, transferring, and monitoring information
- The method of solid waste disposal, the point of final disposal (e.g., landfill), and the means of transportation
- Identification of materials to be recycled or composted and methods to do so (e.g., on-site collection by contractor)
- The name of the approved Abu Dhabi Waste Management Center service provider
- The physical, chemical, and biological properties of the solid wastes before and after treatment and a comparison with the concerned party's solid and semi-solid waste disposal limits (Abu Dhabi Municipality).

6.8.2 Liquid Waste (Effluent)

This section should provide detailed information about anticipated liquid industrial wastes during the operation process. This information should include, but not be limited to, the following:

- A process flow diagram that shows all liquid inputs, outputs, and waste (effluents), including the type(s), quantities, and source(s)
- By source, the amount anticipated, the average and maximum discharges rate, and the discharge pipe diameter
- The type of waste (e.g., industrial, cooling, cleaning) and waste risk analyses (i.e., hazardous versus non-hazardous)
- The method of treatment (if present), including attached diagrams that show units, treatment efficiency, country of origin, year of operation, chemical(s) used, design and maximum treatment capacity, and type and quantities of liquid and solid wastes generated
- The methods of liquid waste storage before and after treatment
- The means of discharge, specifying the point of discharge, the final discharge (e.g., sea, sewer network, stormwater network), and the means of transportation (if present)
- A no-objection letter from the concerned parties if the effluent is to be discharged to the sewer system
- The anticipated discharge quantity and quality in all operational phases (e.g., commissioning, normal operation, start-up, shutdown, decommissioning)
- EAD's and concerned parties' discharge consent limits, and a discussion of the process level of compliance.

6.8.3 Hazardous Waste

This section should provide detailed information about anticipated hazardous waste generation during operation. This should include, but not be limited to, the following:

- Identification of all hazardous waste streams and include the type(s), quantities, and source(s)

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- Information on the storage locations of hazardous wastes and associated potential impacts to the environment from spills.

6.9 Other Environmental Condition(s) or System(s) Impacts

The Other Environmental Conditions or Systems section should provide additional information on pertinent environmental conditions, such as process impacts that affect worker health and safety, energy usage, and water usage.

6.9.1 Energy Usage

This section should identify energy sources and estimated usage rates for the operation phase of the project.

6.9.2 Water Usage

This section should identify water sources and estimated usage rates for the operation phase of the project.

7. Environmental Mitigation Measures

As part of the OEMP procedures for managing and mitigating risk for the project, the proponent will prepare and implement control plans, which should include, but not be limited to, the elements described in the following subsections. Mitigation measures are to be based on best management practices and best available technologies as determined by the proponent and the registered consultant (dependent on EAD approval).

The proponent should provide the following management plans in the OEMP:

- Air Quality Control Plan
- Erosion and Sediment Control Plan
- Soil and Groundwater Contamination Control Plan
- Terrestrial Ecology Control Plan
- Water Quality and Marine Ecology Control Plan
- Noise and Vibration Control Plan
- Traffic Control Plan
- Waste Control Plan
- Contingency Plan
- Emergency Control Plan
- Security Plan.

An overview of the mitigation measures included in these control plans is provided below. Where generalized mitigation measures are provided, note that these are only for clarification and are not to be taken as the only measures to be considered.

A table listing all mitigation measures to be implemented for the project (listed by environmental aspect and including those intended to address cumulative impacts) should be included in the main OEMP document.

7.1 Air Quality Control Plan

The Air Quality Control Plan should provide the control measures to be used to minimize air emissions from all operating activities. In each specific control identified below (i.e., dust management, gaseous pollutants management and PM control, and odor management), the plan should discuss procedures for the periodic inspection and routine maintenance of equipment in accordance with the manufacturer's instructions. These procedures should also include documentation requirements for all inspections and maintenance activities.

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7.1.1 Dust Management

This section should provide mitigation measures used to address dust issues arising from sources such as demolition, eroded soil, cleared lands, stockpiles, transportation of materials, machinery, and dirt haul roads. Mitigation measures for dust management also may include those measures taken to prevent erosion and sediment runoff.

7.1.2 Gaseous Pollutants Management and Particulate Matter Control

This section should provide mitigation measures used to minimize the impacts on air quality from the operations. The OEMP should include a description of measures that will achieve the following:

- Ensure that potential air pollutants are contained and, by identifying sources of air pollution and proposing measures to manage and/or mitigate impacts, ensure that events, processes, or activities do not impact the natural environment
- Ensure that particulate emissions, both individually and cumulatively, meet appropriate criteria and, by identifying these emissions sources and estimating the project-wide emissions, ensure that they do not cause an environmental or human health problem
- Propose measures to manage or mitigate impacts whenever EAD's limits are exceeded.

This information should include, but not be limited to, the following:

- A description of control system devices used to control specific pollutants
- Expected efficiency achieved by control systems
- Drawings or diagrams of control systems
- Best management practices and operational controls employed to minimize or eliminate pollution.

7.1.3 Odor Management

This section should provide mitigation measures used to minimize odor impacts associated with the entire operation. The information should include, but not be limited to, the following:

- A description of the odor mitigation methods and management practices that will be used throughout the entire operation to ensure that offensive odor impacts do not occur offsite
- Details about the implementation of industry best practice management measures to ensure that potential odor impacts are managed
- A description of the methods used for monitoring the effectiveness of the odor mitigation methods and management practices for all point and diffuse sources of odor associated with the entire operation
- Drawings or diagrams of control systems
- Details about the proposed contingency measures should odor impacts occur
- A procedure for handling potential odor complaints that includes recording, investigating, reporting, and resolution processes.

7.2 Erosion and Sediment Control and Stormwater Control Plan

The OEMP should provide detailed measures for the mitigation of the discharge of stormwater pollutants. This should include, but not be limited to, the following:

- A base map that contains boundary lines of the industry site and the nearest storm drain.
- A statement that describes how the project or industry will meet any required local stormwater objectives.
- A calculation of the necessary storage volumes, and a description of the proposed stormwater measure(s).
- Best management practices to be implemented to reduce, identify, and eliminate the discharge of stormwater pollutants. Best management practices may include operational procedures, source-control measures, erosion and sediment control practices, and treatment.

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- Designs and calculations for siting and sizing specialized measures, and devices such as filter strips, water quality inlets (oil/grit separator), and forebays, which will be used to remove sediment, oil-based products, and other contaminants found in urban runoff.

7.3 Soil and Groundwater Contamination Control Plan

The OEMP should outline measures to manage and minimize the impact of the project on soil and groundwater. The OEMP should include, but not be limited to, the following:

- Details about baseline soil and groundwater quality before the start of the event, process, or activity
- The events, processes, or activities associated with the project that could potentially impact soil and groundwater quality and how they will be managed to prevent such impacts
- Details about monitoring soil and groundwater quality, including parameters to be monitored and the frequency of monitoring
- Details about how any groundwater-level rises or salinity increases in nearby properties will be monitored and managed
- Details about contingency measures and management options if monitoring of groundwater quality indicates that the project has had, or is having, an adverse effect on groundwater quality
- A description of the relevant EAD limits or international best available standards for soil and groundwater (i.e., Dutch standards) and how they will be achieved.

7.4 Terrestrial Ecology Control Plan

The Terrestrial Ecology Control Plan should provide information on, but not limited to, irrigation and wastewater management and terrestrial ecological management, as described below.

7.4.1 Terrestrial Ecological Management

This section should provide information that, at a minimum, accomplishes the following:

- Describes procedures to control and prevent releases to on-site and surrounding terrestrial ecological systems
- Discusses procedures to help protect wildlife, including endangered species
- References any prior studies performed that address wildlife in the vicinity of the project area
- Discusses the procedures for clearing and cutting activities at the project site and surrounding area
- Identifies buffer zones created to protect undisturbed areas
- Describes the measures to be taken to re-plant or compensate for any removed vegetation.

7.4.2 Irrigation and Wastewater Management

This section should outline measures to manage the soil, surface water, and groundwater impacts associated with wastewater irrigation during the operation phase. This information should include, but not be limited to, the following:

- Details about the baseline soil conditions and quality
- A description of the proposed irrigation and wastewater management systems, associated infrastructure, and location of utilization areas
- Expected efficiency achieved by control and management systems
- Drawings or diagrams of control and management systems
- Details about the measures to manage or mitigate the risk of soil degradation, surface water runoff, erosion, and the accumulation of nutrients and salts in the utilization areas
- Details about the measures to manage irrigation applications within specific limits to prevent overflow
- A demonstration of consistency with the Environmental Guidelines for Use of Effluent for Irrigation

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- Details about contingency measures and management options if monitoring indicates that irrigation of wastewater has had, or is having, an adverse effect on soil or groundwater quality
- Details about how the effectiveness of actions and measures will be monitored over time
- Details about what procedures, if applicable, will be followed to ensure compliance with Municipality of Abu Dhabi standards for irrigation and with international best available standards for soil and groundwater (i.e., Dutch standards), if applicable.

7.5 Water Quality and Marine Ecology Management Plan

The Water Quality and Marine Ecology Control Plan should include, but not be limited to, information regarding wastewater management and marine ecological management, as discussed below.

7.5.1 Wastewater Management

This section should describe measures to be taken for the control, collection, treatment, or removal of wastewater produced during operations. Control measures may include not only technologies, but also the segregation of waste streams, waste minimization, the substitution of chemicals, recycling of wastes, recovery of by-products, and process changes.

7.5.2 Marine Ecological Management

This section should include, but not be limited to, the following information:

- The procedures and mitigation measures that will be used to prevent contamination or damage to stormwater drains and waterways
- A discussion of the measures taken to protect marine ecology that could be impacted by operations.

7.6 Noise and Vibration Control Plan

The Noise and Vibration Control Plan should outline measures to minimize the impacts on local noise levels and vibrations from operation activities and, at a minimum, should accomplish the following:

- Identify procedures for monitoring noise emissions and vibrations
- Outline protocols for minimizing noise emissions and vibrations
- Provide a description of control system devices used to control noise
- Outline the expected efficiency achieved by control systems
- Provide drawings or diagrams of control systems
- Describe the relevant EAD consent limits and how they will be achieved (the Abu Dhabi EHSMS Regulatory Framework – Standards and Guideline Values should be referenced)
- Describe the procedures to be undertaken if any non-compliance issues are detected.

7.7 Traffic Control Plan

A comprehensive Traffic Control Plan must be prepared for the operation phase of the project or industry and should include the promotion of environmentally friendly transport modes and measures to ease congestion and associated emissions.

7.8 Waste Management Control Plan

The Waste Management Control Plan should outline the management of wastes during the operation phase and should meet EAD waste management requirements, including the classification of liquid and non-liquid wastes and a description of how these wastes will be managed. As described below, the Waste Management Control Plan should include information on methods for minimizing or recycling wastes, with specific procedures for solid waste management, liquid waste management,

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hazardous waste management, and the handling or removal of polychlorinated biphenyls (PCBs), asbestos, and ozone-depleting substances (ODS). This plan should also provide information about the selected waste management service provider.

7.8.1 Minimization, Reuse, and Recycling

The section on minimization, reuse, and recycling should discuss measures that will be used to avoid/minimize, reuse, and recycle wastes generated at the project site. Such measures may include technological applications, segregation of waste streams, purchasing decisions, the selection of construction materials, and product substitutions.

7.8.2 Solid Waste Management

The section on solid waste management should include, but not be limited to, information that accomplishes the following:

- Specifies the procedures for solid waste management, including on-site activities related to collection, storage, transportation, processing, and disposal
- If necessary, differentiates between the procedures used for different waste streams, such as cleared vegetation, contaminated materials, glass, metals and plastics, hydrocarbons, and sanitary wastes.

7.8.3 Liquid Wastes (Effluent) Management

The section on liquid waste management should provide on-site mitigation measures for the reduction, collection, and disposal or treatment of liquid wastes from operation activities

7.8.4 Hazardous Waste Management

The discussion of hazardous waste management should include, but not be limited to, the following information:

- The procedures to be used for the reduction, collection, handling, and storage of hazardous wastes from operation activities
- Information on hazardous waste identification processes, along with labeling and documentation requirements for waste-transfer notes.

7.8.5 PCBs, Asbestos, and ODS Management

The section on PCBs, asbestos, and ODS management should establish procedures for the proper identification, handling, and removal of these materials, which may be present in any pre-existing buildings on-site.

7.8.6 Use of Environmental Service Providers

For the identified wastes, provide information about the registered environmental service provider that will be used to handle the collection, transportation, and disposal. It is important to note that only these providers are authorized entities to receive waste. A list of environmental service providers can be obtained from the Abu Dhabi Waste Management Centre.

7.9 Chemical and Hazardous Materials Control Plan

The Chemical and Hazardous Materials Control Plan should provide, but not be limited to, the following information:

- Chemical needs and their carefully targeted uses
- Details on how to avoid the use of environmentally harmful chemicals
- Details on how, where practicable, to minimize the use of corrosion-inhibiting agents and other chemical additives, and how to select process chemicals with the least impact
- An overview of the effects of chemical additives on effluent streams

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- An environmental assessment about contained and segregated chemicals, storage areas, adequate bonding, safe transportation, and packaging options
- A description of mechanical or manual methods versus chemical use for processes, where practicable
- A discussion of the document-control procedures for maintaining material inventories and Material Safety Data Sheets.

7.10 Contingency Plan

A Contingency Plan will be developed after the proposed operation procedures are finalized and prior to the commencement of operations. It is expected that regular reviews of this plan will be undertaken to address any scenarios that were not identified in the original plan, new regulatory requirements that come into force, or better techniques or technologies that become available. Careful planning, design, and management and the use of appropriate technology and materials can minimize the risk of adverse impacts. The Contingency Plan should, at a minimum, accomplish the following:

- Identify sources of risk and develop and implement procedures to minimize risk and potential effects
- Identify sensitive resources and priority-protection areas
- Identify emergency organizations, responsibilities, resources, and call-out details
- Discuss strategies to minimize the environmental impacts of systems failures
- Discuss special circumstances and requirements that may occur during commissioning or testing operations
- List the names and contact information for emergency response personnel and emergency services
- Identify the on-site location of information about hazardous materials, including Material Safety Data Sheets and spill-containment materials
- Provide spill-response and cleanup strategies, including the following:
 - Automated monitoring, alarm, shutdown, and other systems to prevent and minimize oil spillage
 - Oil spill response planning, facilities, and equipment, as appropriate
 - Safe oil and chemical packaging and storage
 - Containment around oil-containing areas and equipment
 - Efficient oil/water separators
 - Safe fuel-transfer procedures.

7.11 Emergency Management Plan

The Emergency Management Plan should outline the procedures established to respond to emergencies during operation activities. This plan should include, but is not limited to, a list of emergency coordinators and emergency procedures, as discussed below.

7.11.1 List of Emergency Coordinators

The Emergency Management Plan should include an up-to-date list of names, addresses, and telephone numbers for emergency coordinators.

7.11.2 Emergency Procedures

The Emergency Management Plan should provide the following information regarding emergency procedures:

- Describe the actions to be taken in response to emergency situations such as fires, explosions, or the unplanned releases of hazardous materials, where such hazards exist
- Provide evacuation plans for buildings and the project site, including procedures and routes
- Describe any arrangements agreed to by local police or fire departments, hospitals, contractors, and emergency response teams to coordinate emergency response services.

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7.12 Energy Efficiency Control Plan

The Energy Efficiency Control Plan should include information on equipment and practices that will be used during the operation of the project to conserve energy, including, but not limited to, the following:

- Process design and selection of equipment and technologies
- Utilization of renewable energy sources
- Structural design and building material selection
- Non-process equipment (e.g., cooling, lighting, water heating, refrigeration, office equipment)
- Best management practices.

7.13 Water Supply and Conservation Control Plan

The Water Supply and Conservation Control Plan should include, but not be limited to, the following information:

- A detailed table that shows the source of water consumption in all facility operations (e.g., well, sea, grid)
- Expected water uses (e.g., process, cooling, potable, fire protection, cleaning)
- The annual consumption rates, maximum consumption rates, and expected usage for units that are in operation
- Water efficiency equipment and practices to be used at the facility and project site, including estimated water-use savings from sources, including, but not limited to, the following:
 - Process equipment
 - Non-process equipment (e.g., toilets, showers, faucets, kitchens, appliances)
 - Irrigation and landscaping
 - Leak detection and repair.

7.14 Landscape Control Plan

The Landscape Control Plan should outline measures to ensure the appropriate development and maintenance of landscaping on the site. This information should include, but not be limited to, the following:

- A description of all proposed landscaping to be undertaken on the site, including details about additional features such as soil and mulch, irrigation, fencing, hard surfaces, and any other landscape elements
- Details of existing and proposed utilities as they relate to the project
- A program to ensure that all landscaped areas on the site are maintained in a tidy and healthy state
- A description of chemical pesticides and fertilizers proposed for use, including their rates and frequency of application; nonchemical control efforts should be used to the maximum extent possible before pesticides are used
- Disposal method for yard wastes.

7.15 Visual Amenity Control Plan

The Visual Amenity Control Plan should discuss actions to protect the visual amenity at the site and surrounding and should include information that accomplishes the following:

- Describes measures to be implemented to provide for visual amenity at the project site during operation
- Discusses potential visual impacts to the surrounding area and measures to be taken to prevent impairment
- Details on-site features (e.g., roadways, pedestrian paths, buffers, vegetation, gardens, fountains) used to enhance the visual amenity.

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8. Monitoring and Auditing

The Monitoring and Auditing section of the OEMP should include information regarding the monitoring and auditing of environmental performance, as well as information on reporting requirements, environmental checklists, and monitoring review, as discussed below.

8.1 Environmental Performance Monitoring

The OEMP should include information about monitoring requirements. At a minimum, the OEMP should accomplish the following:

- Identify monitoring reports that will be collected internally and, if necessary, specify those that will be submitted to EAD
- Detail the frequency and content of any required monitoring reports to be submitted to EAD for review
- Describe all installed units/instruments for monitoring emissions (e.g., gaseous, liquid, solid)
- Provide relevant technical diagrams, as well as methodology, calibration, and location information with illustrative diagrams, and outline monitoring parameters, frequency, and duration
- Provide a schedule of monitoring programs that are required to detect and reassess risk during project life
- Define standards to which the monitoring data must comply. Objective standard emission limits will be those of EAD. If no EAD standard exists for the monitored environmental criteria, best available standard limits will be applied.

This section of the OEMP should explain how environmental management activities and controls will be monitored. A monitoring checklist should be developed that specifies when the environmental control activities must be performed, who is responsible for conducting the activities, and what methods should be used to measure the effectiveness of the activities. The checklist should include space for signoff to verify that the control action was undertaken and is working effectively. The checklist should also specify whether and when follow-up action is required, identify who is responsible for conducting that action, and provide details about how monitoring records should be collated, distributed, and stored.

8.2 Reporting Requirements

The OEMP should outline procedures for reporting requirements, including the frequency and content of required reports, such as the following:

- Pre-operation compliance reports
- Incident reports
- Periodic or annual performance reports
- Auditing reports
- Non-compliance reports
- Corrective action reports
- Complaints management reports
- Any special reports required by government agencies.

The following subsections provide further detail on the types of reporting requirements information that should be included in the OEMP.

8.2.1 Incident Reports

The proponent should notify EAD or other relevant authorities as soon as practicable about any incident with actual or potential significance for impacts on the environment. The OEMP should state that, should an incident occur, the proponent should inform EAD immediately and provide written details of the incident within 3 days. Incidents reports should include, but are not limited to, the following:

- Fuel or chemical spills

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- System failures or malfunctions
- Control failures or malfunctions
- Other emergencies (e.g., natural disasters)
- Other events that led to non-compliance with environmental standards or requirements.

8.2.2 Periodic or Annual Performance Reporting

The OEMP should state that within 12 months of the date of approval of the OEMP and annually thereafter, the proponent should prepare an annual environmental performance report for the project or industry. The report should accomplish the following:

- Identify the standards, performance measures, and statutory requirements that apply to the project or industry
- Assess the environmental performance of the project or industry to determine whether it is complying with these standards, performance measures, and statutory requirements
- Identify any non-compliance with the conditions of this OEMP or any standards, performance measures, or statutory requirements that apply to the project or industry and occurred during the reporting year
- If any non-compliance is identified, describe the actions and measures that have been or are being performed to ensure compliance, clearly indicating who is or will be performing these actions and measures, when they were or will be conducted, and how the effectiveness of these measures will be monitored over time
- Include a copy of complaints for the year, and a description of actions taken or being taken to address registered complaints
- Provide results of all environmental monitoring required by the environmental reports and permits, including interpretations and trends or exceptions in these results.

8.2.3 Monitoring Compliance and Audit Reports

The OEMP should describe the program and procedures for periodic auditing of the OEMP's implementation and effectiveness. The audits should determine whether the OEMP was properly implemented and maintained and should provide information for the OEMP review. The audit program and procedures should cover both internal and external auditing requirements, including scope, frequency, and methods, as well as the responsibilities and requirements for conducting audits and reporting results. The frequency of audits should reflect the level of significance of environmental impacts and the results of previous audits. This section of the OEMP should include information that accomplishes the following:

- Establish a program to monitor environmental compliance of operations in accordance with the established procedures defined in the OEMP, including daily, weekly, or periodic inspections.
- Provide procedures that establish corrective actions for non-compliance with established OEMP procedures and identify the root causes for the issue. These corrective actions should not only provide an immediate "quick fix," but also help ensure that similar non-compliance will not be repeated.
- Identify any required audit or inspection reports to be submitted to EAD for review, including the frequency and content of the reports.
- Audit reports should be prepared by an EAD-approved third-party auditor and submitted periodically for review. These reports should comply with EAD guidelines.

8.2.4 Environmental Checklists

The OEMP should include copies of environmental checklists to be used during site inspections. These checklists must be specific to the mitigation measures that will be used onsite and allow for clear distinction about whether the measures are being implemented effectively.

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8.2.5 Procedures to Review Inspections and Steps to Address Non-Compliance

The Procedures to Review Inspections and Steps to Address Noncompliance section should include information that accomplishes the following:

- Identifies responsible personnel for the review of monitoring audits and compliance inspections
- Establishes procedures, including timelines, for responding to non-compliance findings from these audits and inspections
- Defines when the NOC needs to be renewed, or as necessary, updates the OEMP to reflect changes to work practices or other measures needed to ensure compliance.

9. Documentation

The OEMP should include requirements on maintaining copies of the OEMP; the plans contained within the OEMP; and changes to any of these plans, training records or rosters, audits, monitoring data, and reports submitted to EAD or other agencies (e.g., Preliminary Cultural Review Applications submitted to the Abu Dhabi Authority for Culture and Heritage). These documents should be easily accessible for inspection.

10. Annexes

The OEMP should include annexes detailing the information described in the previous sections. Required annexes of the OEMP should include, but not be limited to, the following:

- References and sources of information that were used to prepare the OEMP (e.g., previous environmental studies for the project, best international practices used)
- Operational procedures
- Material Safety Data Sheets
- Environment policy
- Environment manual
- Large-scale drawings and diagrams (e.g., site layout, machinery and equipment layout, process flow diagrams, piping and instrumentation diagrams, emissions points, sewer and storm water systems)
- Records, checklists, and log templates for inspections, audits, monitoring, maintenance, complaint procedures, and training activities.

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Document Change History

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EAD-EQ-PCE-TG-06	01	14 April 2014	Reformat document and add abbreviations	All	SG
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