

Technical Guidance Document for Construction Environmental Management Plan (CEMP)

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Signature on Original		
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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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Construction Environmental Management Plan (CEMP)

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

Assessment Area—The physical area identified by the consultant and proponent for assessment of potential environmental impacts.

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. The construction phase terminates when the development goes into full operation or use.

Contractor and Subcontractor—Companies employed by the source owner to perform construction or decommissioning activities at the project site. The main contractor and subcontractors are responsible for adhering to the requirements 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 or dismantling) of the proposed project or development. The decommissioning phase follows the operation phase.

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.

Method Statement—A statement that outlines the activities to be performed by the contractor and the methods to be implemented for minimizing environmental impacts and ensuring compliance with environmental regulations.

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Operation—The time period that corresponds to any event, process, or activity that occurs during the operational phase (fully functioning) of the proposed project or development. (The operation phase follows the 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 a project area is defined by a titled property boundary). The project area is equivalent to the project site.

Project Site—Definition is the same as project area.

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

Solid Waste—Rubbish, debris, garbage, and other discarded solid materials resulting from the activity.

Purpose of This Guidance Document

This document outlines the requirements for developing a Construction Environmental Management Plan (CEMP) 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.

Construction Environmental Management Plan (CEMP)

Section I. Background Information

The preparation and implementation of a CEMP helps to ensure that construction development considers aspects of environmental protection and pollution control, 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).

Definition of CEMP

The CEMP is a site-specific plan developed to ensure that appropriate environmental management practices are followed during the construction phase of a project.

Objective of the CEMP

Based on the aspects of the project, EAD will decide whether a proponent is required to submit a CEMP.

The intent of the CEMP is as follows:

- Provide effective, site-specific, and implementable procedures and mitigation measures to monitor and control environmental impacts throughout the construction phase of the project
- Ensure that construction activities do not adversely impact amenity, traffic, or the environment in the surrounding area.

Specifically, the CEMP ensures that the environmental impacts identified during previously performed environmental studies (i.e., the Environment Impact Assessment [EIA] or the Preliminary Environmental Review [PER]) will be properly managed and that activities will comply with all applicable environmental rules and regulations. If no EIA or PER was completed for the project, then the CEMP should describe in further detail the extent to which environmental effects, impacts, and risks exist. Based on the aspects of the project, EAD will decide whether a CEMP is required to be submitted.

The main goals of the CEMP are to specify the roles and responsibilities of personnel involved with all aspects of the construction activities; identify potential environmental impacts and the mitigation measures that will be used to address them; establish procedures for audits, monitoring, and inspections; and specify training, recordkeeping, and documentation requirements.

A CEMP is intended for use by all personnel involved with construction activities; therefore, the use of technical terms and graphics should be clear and understandable to nonspecialists.

Applicability and Approach

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

- Industrial facilities that contain manufacturing processes
- Residential and commercial development projects
- 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 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. The Sector Regulatory Authorities (SRAs) are responsible for implementing EHSMS in each sector within the Emirate. The Abu Dhabi Environment, Health, and Safety Center (AD EHS Center) is the Competent Authority for the EHS Management System, and EAD is the Competent Authority for environmental regulation at Emirate level.

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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 CEMP

The proponent for the proposed project site is responsible for the CEMP, which must be prepared and submitted by an EAD-approved and registered consultant who operates within Abu Dhabi Emirate. A current list of registered consultants can be obtained from EAD. The CEMP should adopt the contractor's method statement; however, if a contractor has not been assigned by the time the CEMP has been submitted, then the chosen contractor must indicate its commitment to the approved CEMP.

The CEMP should include the information provided within this technical guidance document. It is important to note that consulting companies assure that each CEMP is specific to the proponent and the proposed activities at the project site.

When the CEMP is complete, it must be submitted to EAD for approval prior to the scheduled beginning of construction. As stated in Article 4 of Law 24/1999, "no project or establishment shall start an activity before obtaining the license aforementioned in the previous article." A No Objection Certificate (NOC)—or construction permit—is the legal document issued by EAD that allows construction to begin. When the NOC is due to be renewed (required on an annual basis), a revised CEMP should be submitted if new mitigation measures or impacts were adopted over the last year.

If the CEMP proponent is a nominated entity under the EHSMS Regulatory Framework or the project requires notification to the SRA, as defined in COP 04 of the Framework, then the additional requirements defined within COP 04 will be incorporated into the CEMP. If a Principal Contractor has not been appointed at the time of development of the CEMP, then on appointment, the Principal Contractor will adopt the CEMP and incorporate this into the Construction Environment, Health and Safety Plan (CEHSP).

The health and safety elements of the CEHSP will be reviewed and monitored by the SRA. Failure to comply with the requirements outlined within the EHSMS may result in the NOC being revoked.

Review of the CEMP

Following submission of a CEMP, EAD officials will review the plan 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 CEMP from the proponent for the proposed project. Following approval of the CEMP, EAD will issue an NOC (or construction permit) so that construction activities can commence at the project site.

During a review of each CEMP, EAD will evaluate the quality of the CEMP provided by the proponent. This evaluation ensures that the CEMP adheres to this guidance document and provides sufficient detail.

Section II. Required CEMP Content and Recommended Format

The content of a CEMP may vary by project as the size and scope of a construction project varies. To promote familiarity and ease of use, a recommended format for the CEMP is provided in **Table 1**, and an overview of the individual CEMP sections is described below. Where other formats are used, the content of each CEMP must include, at a minimum, all of the sections listed in Table 1. The CEMP also should include a list of acronyms and abbreviations, a glossary of terms, and full references to sources of information. Where a CEHSP is required, suggested contents are included within Appendix A of the EHSMS COP 04. These contents should be incorporated to the CEMP contents outlined in Table 1, below.

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Table 1. Recommended Format for the CEMP

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Section 9	Documentation	
Section 10	Annexes	

1. Project or Industry Title Page

At a minimum, the title page of the CEMP 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
- The contractor's name and contact information.

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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-related issues. The distribution list should identify individuals and organizations that have received or will receive a copy of the CEMP for implementation. Individuals of importance could include the proponent, the environmental consultant, lead contractors, subcontractors, and any appointed environmental managers (or other identifiable titles for the persons in charge of implementing the contents of the CEMP).

3. Introduction

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

- Identify the proponent, the registered environmental consultant, and the location of the proposed development
- Mention any previously performed assessments or reports submitted to EAD (i.e., EIA or PER)
- Include contact information for the proponent and main contractor.

4. Project Description

The Project Description section of the CEMP should include information regarding the location, scope, overall project and planned decommissioning activities, and project schedule and milestones, as discussed below.

4.1 Location

The Location section should include a general description of the location and environment at the project site and surrounding area. It should also provide maps that show the geographic location of the project area and surroundings. Maps should include all necessary information, such as key, scale, north arrow, legend, location of sensitive receptors, and distance to sensitive receptors.

4.2 Scope

The Scope section should include a discussion of the objectives and scope of the construction project. For example, if activities will be conducted in separate phases, and the CEMP 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. Scope activities for discussion may include but are not limited to excavation, demolition, works related to earthworks, infrastructure, dewatering, piling, enabling works, rerouting of pipes, and site remediation, along with typical construction activities.

4.3 Overall Project and Planned Construction Activities

This Overall Project and Planned Construction Activities section should include information on the baseline conditions, identify sensitive receptors, include a method statement describing the planned construction activities, and provide information on any required permits or licenses. It should include the hours when activities 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 CEMP.

4.3.1 Environmental Baseline, Current Conditions, and Sensitive Receptors

This section should include details regarding the current condition of the environment at areas potentially impacted by construction activities at the site and should accomplish the following:

- Briefly describe the existing environment for each environmental component at the site and surrounding areas. Relevant information may include previous or current land use, monitored noise levels, the presence of soil or groundwater contamination, air quality or water quality measurements, the presence of wildlife, marine resources, or vegetation.

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- Reference baseline data taken from the EIA or PER performed for the project or other studies where baseline data adequately represent the condition of the environment on the proposed project site and adjacent surroundings. If EAD previously determined that no baseline data are required, then the CEMP should provide information about this decision, including the date when this decision was made and the EAD staff member(s) involved.
- Identify sensitive receptors located in the vicinity of the proposed project site, including justification for how the sensitive receptors were determined.
- Provide maps that show the relative location of these receptors to the project site, including the distance to sensitive receptors.

4.3.2 Construction Project Description

This section should include a method statement of constructions processes and equipment to be used as outlined in the scope of work. For more complex construction activities, the CEMP should provide more detail the activities that could potentially impact the environment. The CEMP should provide sufficient technical detail to allow for EAD reviewers to determine the potential impacts from these processes and equipment and should detail the hours of the day during which constructions activities will take place.

4.3.3 Environmental Permits

This section should include a list of environmental permits held for the project and describe any enforcement actions taken by EAD to address noncompliance with the conditions of the referenced permits. This section should include, if necessary, information about the status of approval for any additional licenses or permits required to perform construction activities.

4.4 Project Schedule and Milestones

The Project Schedule and Milestones section should include an anticipated schedule for the project, including a proposed completion date for construction and the main anticipated milestones. Should the construction phase include different phases or stages, a proposed schedule for each phase within the overall project must be provided. This information will be useful in determining whether the mitigation and monitoring measures provided in the CEMP are appropriate for the duration of the construction activities.

5. Environmental Management

The Environmental Management section of the CEMP should include information regarding the policy statement, Environmental Management Systems, project personnel roles and responsibilities, EHS regulations and requirements, environmental awareness training, CEMP 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 CEMP.

5.1 Policy Statement

The Policy Statement section should describe the proponent's commitment to environmental protection, health, and safety management and compliance with applicable regulations.

5.2 Environmental Management Systems

The Environmental Management Systems section should discuss the way in which the plan corresponds to the proponent's and/or the main contractor's Environmental Management Systems or the EHSMS Regulatory Framework.

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

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adhere to requirements contained in the approved CEMP and all applicable environmental regulations, and CEMP adherence stipulations should be contained in any contractual documents between the entities. In keeping with this requirement, the CEMP should accomplish the following:

- Provide the names, positions, and contact information of personnel involved with ensuring the proper implementation of the CEMP. For those positions for which personnel have not yet been assigned, the proponent should note this information within the CEMP.
- Clearly discuss the roles and responsibilities of the proponent, contractors, and subcontractors identified and the interrelationships between these entities. Clearly defined roles and responsibilities will help to ensure that the CEMP is an effective document that will be properly implemented by all personnel involved during the construction process.
- Provide organizational flowcharts or other diagrams of key personnel. Such graphics are a useful tool for users of the CEMP in understanding the relationships between the key individuals 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 environment regulations with which the proponent will comply; this list should include local, national, and international rules and standards or agreements.
- A listing of any applicable environmental standards, such as ambient noise levels, air quality or water quality concentrations. The CEMP should also provide sufficient information to clearly define these standards.
- Information about the conditions contained in any additional licenses required to perform construction activities.
- A listing of any voluntary agreements, stakeholder agreements, internal EMS, or procedural requirements that must be adhered to during construction.

5.5 Environmental Awareness and Training

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

- A description of the environmental awareness and training program for personnel, contractors, and subcontractors needed to comply with measures contained within the CEMP.
- Identification of training needs, including general knowledge of the CEMP and activity-specific guidance for different activities (e.g., the handling of hazardous waste, operation of certain equipment).
- Established procedures for maintaining records of all training to be performed, including the name of the person trained, the date of training, the name of the trainer, and a description of the training content.

5.6 Document Review and Updates

The Document Review and Updates section should establish procedures for the periodic review of the CEMP 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 CEMP remains updated to reflect these changes. In this section, the project proponent should accomplish the following:

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

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5.7 Environmental Commitments

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

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

Each CEMP environmental commitment containing the information in the preceding list should be numbered and indexed in the body of the CEMP to allow for quick reference. The CEMP 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 construction 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.

6. Environmental Impacts

The Environmental Impacts section of the CEMP should outline the specific construction activities at the project site on the surrounding environment and note any significant impacts. The plan should also explain the methodology used for determining significant impacts and reference any previously performed environmental studies that provide more extensive assessment of these impacts (e.g., EIA, PER). If an environmental study was performed, the proponent should ensure that the impacts discussed in the study are included in the CEMP. If no prior environmental study was performed, the CEMP 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 decommissioning activities, including demolition, 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 construction, as well as other pertinent information related to these components
- List EAD and Abu Dhabi EHSMS emission standard limits and other known international standards.

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6.1.2 Gaseous Pollutants and Particulate Matter Impacts

Gaseous pollutants, such as nitrous oxides (NO_x), sulfur oxides (SO_x), and volatile organic compounds (VOCs) and PM may be emitted from various decommissioning activities, including the burning of fossil fuel from vehicles and equipment. Therefore, this section should include, but not be limited to, the following information:

- Identification of all types of gaseous emissions and PM, sources, and flow rates present during different phases of construction, as well as other pertinent information related to these components
- A detailed table that shows the fuel consumed for all construction equipment, 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 applicable EAD and AD EHSMS emission standard limits and other known international standards.

6.1.3 Odor

Construction activities have the potential to cause odor problems, which can be a nuisance and cause negative health impacts. Therefore, the CEMP 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)
- 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, Abu Dhabi EHSMS, or international standards.

6.2 Surface Water Impacts

The Surface Water Impacts section should provide detailed surface water 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 storm water and erosion-control facilities in relation to the overall development proposal.

6.3 Soil and Groundwater Impacts

The Soil and Groundwater Impacts section should include, but not be limited to, the following information:

- 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)
- Potential impacts from construction activities to the soil and ground water.

6.4 Terrestrial Ecology Impacts

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

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6.4.1 Discharges to Land

This section should describe potential impacts to land on site and in surrounding areas from construction 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 EHSMS, or 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 construction activities, including habitats located on site and off site.

6.4.3 Vegetation (Flora)

This section should detail potential impacts to vegetation from construction 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 construction 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
- A description of any flora or fauna in the marine environment—specifically endangered or sensitive species—that are likely to be impacted
- The relevant maximum allowable water quality limits from EAD, Abu Dhabi EHSMS, or international standards should be referenced
- 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 construction activities, including marine wildlife located on site and off site.

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6.5.3 *Vegetation (Flora)*

This section should describe potential impacts to marine vegetation from construction activities, including ecological areas located on site and off site.

6.6 **Noise and Vibration Impacts**

The Noise and Vibration Impacts section should provide an overview of the noise and vibration produced from the decommissioning activities that includes the following information:

- Noise and vibration sources from construction equipment and activities
- Expected noise and vibration levels under different scenarios, including both individual and cumulative sources
- Applicable EAD allowable limits (EAD, Abu Dhabi EHSMS, and international standards should be referenced)
- 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
- 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.

6.7 **Traffic Impacts**

The Traffic Impacts section should provide a description of the traffic impacts produced from the construction activities. This information should include, but not be limited to, the following:

- A description of the potential impacts to traffic from construction related activities, including those from the closing of streets and those from increased vehicle usage for construction equipment, supplies, and disposal activities.

6.8 **Waste Management Impacts**

The Waste Management Impacts section should provide information on activities to be conducted during decommissioning, including, but not limited to, activities to manage 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 construction processes. 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)
- 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 wastewater during the construction process. This information should include, but not be limited to, the following:

- The identification of 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)

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- 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 construction phases
- EAD, Abu Dhabi EHSMS, international, and concerned -arty 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 the construction process. This information should include, but not be limited to, the following:

- Identification of all hazardous waste streams and include the type(s), quantities, and source(s)
- 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 Condition(s) or System(s) Impacts section should include information regarding health and safety impacts, as well as other impacts deemed as important to the project.

7. Environmental Mitigation Measures

As part of the CEMP 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. The proponent should thoroughly address site-specific mitigation measures for the applicable environmental components discussed in Sections 7.1 through 7.14 of this guidance. Mitigation strategies should be based on the best available management practices and technologies that will eliminate or minimize adverse impacts to health, safety, amenity, traffic, or the environment in the surrounding area. Note that it is *not* sufficient to solely provide a list of possible measures that will be used at the contractor's or subcontractor's discretion; the CEMP must include measures that will be performed and that can be audited to determine their effectiveness. Considerations for providing environmental mitigation measures include the following:

- Thoroughly address site-specific mitigation measures for the applicable environmental components that are discussed below
- Incorporate mitigation measures identified in any previously performed EIA or PER studies for the identified impacts.

The proponent should provide the following control plans in the CEMP:

- 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 Management Control Plan
- Chemical and Hazardous Materials Control Plan

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- Contingency Plan
- Emergency Management Plan
- Security Plan
- Infrastructure Plan.

An overview of the mitigation measures included in these control plans is provided below. Where generalized mitigation measures are provided in the sections below, note that these are provided only for clarification and are not to be taken as the only measures to be considered. A sample list of mitigation measures for typical construction activities is provided in Annex 1 of this document. This list does not represent all mitigation options, and proponents should choose best available practices and technologies specific to their construction activities and the project site.

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 CEMP 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 construction activities. In each specific control identified below (i.e., dust management, gaseous pollutants management, 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.

7.1.1 Dust Management

The section on dust management 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

The section on gaseous pollutants management should provide mitigation measures used to minimize gaseous pollutant air emissions from all construction activities. Control measures may include, but are not limited to, the use of low-sulfur or alternative fuels, the application of emissions-control equipment, operational controls, or the selection of materials that minimize the emission of gaseous pollutants.

7.1.3 Odor Management

The control plan section on odor management should provide mitigation measures used to minimize odor from all construction activities.

7.2 Erosion and Sediment Control Plan

Large projects usually involve extensive land disturbance, such as removing vegetation and reshaping topography, which make the soil vulnerable to erosion. Soil removed by erosion may become airborne, thereby creating a dust problem, or the soil may be carried by rain water into marine environments, thereby causing physical, chemical, biological, and economic impacts to the waters. To address these issues, the Erosion and Sediment Control Plan should include, but is not limited to, the following information:

- A discussion of the mitigation measures to be used at the project site to address erosion. When considering land disturbance and its potential impacts, the CEMP should give priority to preventative rather than treatment measures. When developing erosion control options, proponents should obtain information about the erosion potential of the site where soil disturbance is planned (erosion potential is determined by the soil type and structure, vegetative cover, topography, and climate) and the nature of the land-clearing to be performed. Erosion will also be affected by the type, nature, and intensity of the earthworks.

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- A statement that describes how the construction activities will meet any required local storm water objectives.
- A calculation of the necessary storage volumes and a description of the proposed storm water measure(s).
- Designs and calculations for siting and sizing specialized measures and devices, such as filter strips, water quality inlets (e.g., 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 Ground Water Contamination Control Plan

The Soil and Groundwater Contamination Control Plan should outline measures to manage and minimize the impact of the project on soil and groundwater. This plan should include, but not be limited to, the following information:

- Documentation of the measures used to ensure that oil and hazardous materials are properly contained to prevent contamination of soil and groundwater
- As necessary, a listing of the measures needed to remove or remediate previously identified contaminated soil onsite from prior industrial activities.

7.4 Terrestrial Ecology Control Plan

The Terrestrial Ecology Control Plan should provide information that accomplishes those aspects outlined below.

7.4.1 Terrestrial Ecological Management

The section on terrestrial ecological management should provide information that accomplishes the following:

- Describes the procedures used 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 construction 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.

7.5 Water Quality and Marine Ecology Control Plan

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

7.5.1 Wastewater Management

The section on wastewater management should include, but not be limited to, the following information:

- A description of the measures to be taken for the control, collection, treatment, or removal of wastewater produced during the construction phase
- Where applicable, a description of the systems and procedures established for wastewater produced at housing camps for construction labor.

7.5.2 Marine Ecological Management

The control plan section on marine ecological management should include, but not be limited to, information regarding the following:

- The procedures and mitigation measures to be used to prevent contamination or damage to storm water drains and waterways

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- A discussion of the measures taken to protect marine ecology, which could be impacted by construction activities.

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 the construction activities and should accomplish the following:

- Identify the suitable noise suppression or abatement measures required to ensure that ambient noise level concentrations do not exceed established limits for both workers on site and for nearby receptors
- Discuss the measures that will be employed to minimize vibration and the procedures that will be used to notify potentially impacted receptors about these operations.

7.7 Traffic Control Plan

The Traffic Control Plan should outline measures to minimize the impacts on local traffic from the construction activities and should accomplish the following:

- Discuss the measures to minimize traffic disturbances and associated impacts from noise
- Describe the procedures for public notification of any anticipated traffic-related concerns, such as street closings
- Identify access roads for construction vehicles and safety measures used for pedestrian access and crossings.

7.8 Waste Management Control Plan

The Waste Management Control Plan should outline the management of wastes during the construction phase and should meet EAD's 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, hazardous waste management, and the handling or removal of polychlorinated biphenyls (PCBs), asbestos, and ozone-depleting substances (ODS). This plan also should include information about the selected waste management service provider.

7.8.1 *Minimization, Reuse, and Recycling*

The section on minimization, reuse, and recycling should discuss the measures that will be used to avoid/minimize, reuse, and recycle wastes generated at the construction site. 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, the following information:

- The procedures for solid waste management, including on-site activities related to collection, storage, transportation, processing, and disposal
- If necessary, a description that differentiates between the procedures used for different waste streams, such as construction debris and litter.

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 construction activities.

7.8.4 *Hazardous Waste Management*

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

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- The procedures to be used for the reduction, collection, handling, and storage of hazardous wastes from construction 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, as encountered during the removal, renovation, or demolition of any buildings on site.

7.8.6 Use of Environmental Service Providers for Waste Management

For the identified wastes, the control plan should provide information about the registered environmental service provider that will be used to handle the collection, transportation, and disposal of wastes. 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 Center.

7.9 Chemical and Hazardous Materials Control Plan

The Chemical and Hazardous Materials Control Plan should provide information that, at a minimum, accomplishes the following:

- Discusses the measures that will be taken to minimize the risks associated with chemical, fuel, and oil spills and accidents; these measures can include, but are not limited to, monitoring purchasing requirements, product substitutions, design features for containment, operational controls, work practices, labeling, and storage requirements.
- Specifies the document-control procedures for maintaining material inventories and Material Safety Data Sheets.

7.10 Contingency Plan

The Contingency Plan should outline the procedures established and equipment available to respond to spills during construction activities and should, at a minimum, achieve the following:

- Establish procedures for responding to spills of oil and hazardous materials
- Identify potential sources of spills and the measures in place to control them
- Provide information about the presence of spill-response equipment throughout the construction site
- Include maps showing the presence of chemical, oil, and hazardous waste storage locations, structures and equipment for diversion and containment of spills, and the location of spill-response equipment
- Define the roles and responsibilities of all personnel involved in responding to spills
- Clearly define immediate actions to be taken to address spills
- Discuss the measures for containment, cleanup, and disposal of contaminated materials and soil
- Clearly describe notification requirements for both internal spill-response teams and outside emergency personnel, and provide contact information for these individuals along with local emergency agencies
- Establish documentation procedures for identifying the root causes, devising corrective and preventative actions, and setting time lines for their implementation. Corrective actions should be developed in accordance with the EAD *Technical Guidance Document for Environmental Action Plan*.

7.11 Emergency Management Plan

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

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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 the construction 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.

7.12 Security Plan

The Security Plan should discuss the control measures to contain and secure the construction site.

7.13 Infrastructure Plan

The Infrastructure Plan should describe the measures taken to ensure protection of infrastructure (e.g., water systems, transmission lines) during the construction phase.

8. Monitoring and Auditing

The Monitoring and Auditing section of the CEMP should include, but not be limited to, 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 CEMP should include information about monitoring requirements for environmental performance. At a minimum, this section should accomplish the following:

- Discuss how identified impacts will be monitored, including the indicators to be measured, the methods to be used, the sampling locations, frequency of measurements, detection limits, the thresholds that trigger corrective actions, and the party who will conduct monitoring
- Provide procedures that indicate corrective actions for non-compliance with monitoring targets, specifying notification requirements to responsible personnel and the time frames for notification and for corrective actions to be performed
- Identify the frequency and content of monitoring reports for internal use and those required to be submitted to EAD for review
- Ensure that the monitoring activities and reports comply with EAD guidelines.

8.2 Reporting Requirements

The CEMP 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

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- 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 CEMP.

For entities nominated under the EHSMS Regulatory Framework, the additional monitoring and reporting requirements, as defined within the Framework, will be incorporated and reported to the relevant authorities.

8.2.1 Incident Reports

A proponent must notify EAD and other relevant authorities as soon as practicable about any environmental incident with actual or potential significance for impacts on the environment. The CEMP should state that, should an incident occur, the proponent must inform EAD and other relevant authorities immediately and provide an incident report to EAD outlining the details of the incident within 3 days of the incident. Incidents reports should be filed with EAD for the following:

- Fuel or chemical spills
- 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 Quarterly Performance Reporting

The CEMP should state that within 3 months of the date of approval of the CEMP and quarterly thereafter, the proponent should prepare a quarterly environmental performance report for the construction project. This report should accomplish the following:

- Identify the standards, performance measures, and statutory requirements that apply to the construction project
- Assess the environmental performance of the construction project to determine whether it is complying with these standards, performance measures, and statutory requirements
- Identify any non-compliance with the conditions of this CEMP or any standards, performance measures, or statutory requirements that apply to the project or industry and occurred during the reporting period
- 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 quarter and a description of actions taken or being taken to address registered complaints
- Provide the 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 Monitoring Compliance and Audit Reports section of the CEMP should include information regarding the following:

- Establish a program to monitor environmental compliance of construction activities in accordance with the established procedures defined in the CEMP. These activities may include daily, weekly, or periodic inspections.
- Provide procedures that establish corrective actions for non-compliance with established CEMP 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.

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- Identify any required audit or inspection reports to be submitted to EAD for review, including the frequency and content of the reports.
- Outline that 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 CEMP should include copies of 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.

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

The Procedures to Review Inspections and Steps to Address Noncompliance section of the CEMP should include, but not be limited to, 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
- When the NOC needs to be renewed, or as necessary, updates the CEMP to reflect changes to work practices or other measures needed to ensure compliance.

9. Documentation

The CEMP should include requirements to maintain copies of the CEMP, the plans contained within the CEMP, changes to any of these plans, and training records or rosters, audits, monitoring data, and reports submitted to EAD, other agencies, or local authorities. These documents should be easily accessible for inspection.

10. Annexes

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

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

References

Abu Dhabi EHSMS Regulatory Framework, including Standards and Guideline Values for Air, Water, Land and Noise and associated Technical Guidelines.

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Annex 1: Example List of Mitigation Measures

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Management Plan	Emission Source	Example Mitigation Measures
Dust	Sitewide	Locate dust-generating activities away from sensitive receptors
		Erect solid barriers at the site boundary
		Re-vegetate cleared areas
	Stockpiles	Limit stockpile height and slope
		Site stockpile where it is protected from wind
		Minimize duration of stockpile usage
		Enclose, cover, or fence stockpiles
		Use dust suppressants on unstabilized stockpiles
	Construction Traffic	Washing of vehicles or wheels before leaving site if route passes sensitive receptor(s)
		Secure covering of loads during transport
		Minimize drop heights for loading and unloading operations
		Use of water or other dust suppressants on transport roads
		Enforce speed limits for vehicles, and limit vehicle movement
		Hard surfacing or paving of haul routes
		Use of low-sulphur fuels
	Equipment	Locate dust-generating equipment away from sensitive receptors
		Use of low-sulphur fuels
		Maintain equipment in accordance with manufacturers specifications
		Perform cutting; grinding; sanding; sawing; and sand, grit, or shot blasting indoors and/or in enclosed areas, if possible

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Management Plan	Emission Source	Example Mitigation Measures
Erosion and Sediment	Sitewide	Use of vegetative practices including, but not limited to buffer zones, stabilization with mulch, sod, permanent or temporary vegetation, erosion-control blankets or soil stabilization matting, or polyacrylamide to promote settling of fine particles in sediment basins
		Use of structural practices, including, but not limited to, the creation of check dams, stabilized construction entrances/exits and roads, sediment basins or traps, diversion channels, storm drain inlet and outlet protection, retaining walls, riprap in culverts, silt fences, slope drains, surface roughening, or terrace or step features along steep or long slopes
		Use of stream alteration practices, including, but not limited to, stream diversion channels, temporary stream crossings for use by construction equipment, or use of readily available native plant materials to maintain or enhance stream banks
		Dust-suppression measures
Noise and Vibration	Sitewide	Install temporary sound barriers or acoustic insulation to fencelines
	Equipment	Limit operating hours for equipment with noise and vibration impacts
		Operate and maintain equipment within the manufacturer's specifications, including regular servicing of equipment
		Locate equipment away from sensitive receptors
		Select equipment to reduce generation of noise and vibration impacts
	Construction Traffic	Operate and maintain vehicles within the manufacturer's specifications, including regular servicing of vehicles
Schedule traffic flows to minimize potential impacts		
Air Emissions	Sitewide	Prohibit open burning on-site
	Construction Traffic	Use of low-sulphur fuels
		Minimize idling of vehicles
		Operate and maintain vehicles within the manufacturer's specifications, including regular servicing of vehicles

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Management Plan	Emission Source	Example Mitigation Measures
Air Emissions (continued)	Equipment	Use of low sulphur fuels
		Maintain equipment in accordance with manufacturers specifications
		Comply with all EAD emission and operational control requirements
		Utilize existing power sources, or use clean fuel generators rather than temporary generators
		Use emission-control equipment where necessary
Chemical, Fuel and Oil Storage and Handling	Chemicals, Fuel and Oil	Clearly label all containers and store in appropriate containers
		Maintain spill kits near storage areas
		Ensure all handlers are trained in spill-response procedures
		Install bunds around temporary storage areas
	Chemicals	Order chemicals in only necessary quantities
		Ensure that incompatible chemicals are not stored together
		Maintain Material Safety Data Sheets and inventories for all chemicals on-site
Fuels	Fit fuel dispensers with automatic cut-off valves	
Waste Management	Sitewide	Ensure materials are ordered on an "as needed" basis to prevent over-supply
		Where possible, reuse materials on site
		Maintain housekeeping, and provide bins for workers and staff to minimize litter
		Segregate and recycle wastes as feasible

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Document Change History

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EAD-EQ-PCE-TG-05	00	01 April 2010	First Issue		SG
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