



**SUPPLEMENTAL LENDER INFORMATION  
PACKAGE**

**Environmental Impact Assessment  
LNG Export Project  
Pampa Melchorita, Peru**

**Document Number:  
02GP/PT/IR/001/D02**

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## **1.0 Introduction**

Peru LNG, S.R.L. (PLNG) has taken a proactive approach to addressing the environmental and social requirements of the regulatory authorities in Peru and other important stakeholders to support the development of the Pampa Melchorita Liquefaction Plant (the project). Since the Environmental Impact Assessments (EIAs) were approved by the Dirección General de Asuntos Ambientales Energéticos (DGAAE), PLNG has conducted a comprehensive review of the Company's environmental and social programs to ensure they align not only with national requirements but also those of the International Financial Institutions (IFIs). This process has assisted the development of a comprehensive Environmental, Social, Health and Safety (ESHS) Management System that will translate regulatory and lender requirements and other project commitments into practical actions for implementation.

PLNG's ESHS Management System recognizes that EIA is an iterative process which continues well after EIAs are approved by the authorities. A number of additional surveys and studies are ongoing to advance the engineering design of the project, augment baseline data, refine mitigation and management plans, and ensure that effective monitoring programs are established to measure our performance.

This document provides updated information about our environmental and social programs and should be read as a supplement to the approved EIAs.

### **1.1 The Source Documents and Commitment Register**

PLNG has collated all commitments made by the project into a Commitment Register for the plant. These commitments are mainly drawn from the following Source Documents:

- Environmental Impact Assessment, Peru LNG Export Project, July 2003, Golder Associates Peru S.A. (Golder) [Plant EIA]. This document also includes:
  - Environmental Impact Assessment of Dredging Operations, July 2003, Monitoreo Ambiental e Investigación de Impactos S.A. (SEHIDRO) [Dredging EIA]

- Environmental Impact Assessment of the Marine Environment for Construction of Marine Terminal and Breakwater, July 2003, SEHIDRO [Marine EIA]
- Responses to General Bureau of Environmental Affairs in the Energy Sector (DGAA) Observations (on Plant EIA), Submitted 2/24/04
- Second Round of Responses to DGAA Observations (on Plant EIA), Submitted 4/23/04
- Plant EIA Amendment, November 2005, Golder
- Plant EIA Amendment Observations and Re-observations. The Plant EIA amendment was approved on September 14th, 2006

In addition, PLNG has introduced internal commitments that may not have been identified in the Plant EIA and related documents. PLNG intends the Commitment Register to be updated in a regular basis, as new documents are finalized and new developments occur during the construction, transition and operations phases of the project. In this manner, the Commitment Register will continue to be a comprehensive summary of the commitments made by the project.

## **2.0 Methodology**

The Plant EIA was submitted to the Peruvian regulators (DGAAE) in July 2003 with the Plant EIA Amendment being submitted in November 2005. Through a series of sequential Observations from the regulator and Responses by PLNG, the project gained approval by the Peruvian regulators. The Plant EIA was approved in June 2004. The Plant EIA Amendment was approved in September 2006.

PLNG recognizes that the methodology employed to determine the significance of impacts can involve an element of professional judgment by the authors of the EIA. However, PLNG has sought to address all potentially significant impacts by developing a comprehensive suite of Contractor Management Plans (CMPs) and PLNG Management Plans. The CMPs are part of the contractual documentation provided to prospective Engineering, Procurement and Construction (EPC) Contractors. All commitments contained within the Plant EIA, Plant Amendment EIA and other source documents are enshrined in these management plans and the successful contractor will be required to produce a set of Environmental and Social Implementation Plans (ESIPs) covering all the commitments and actions they are responsible for delivering during the construction phase of the Project.

The CMPs and PLNG Management Plans are a key component of the Project's ESHS Management System. They will ensure all the environmental and social aspects of the project are addressed without the need to review an impact assessment methodology that has already been approved by the national authorities. Furthermore, the adequacy of avoidance, mitigation and management measures will be constantly monitored during construction by experienced environmental and social professionals to ensure that if any further measures are needed to address impacts that were not fully predicted during the original assessments they will be identified and implemented in a timely manner.

Nevertheless, subsequent sections of this document attempt to clarify some of the questions that have been asked by various project stakeholders with regard to the environmental assessment process.

### **3.0 Project Standards**

Within the published EIA documents, the term “Project Standards” is used loosely to embrace all types of environmental and safety laws, standards, conventions, policies, international treaties, voluntary codes and corporate policies. It drives the direction the project takes and underpins project design, resource requirements, budgets and schedules. Compliance with some standards is mandatory (e.g. national law), whereas some are dependent on financing requirements (project lenders have specific policies), while others are voluntary, often falling under the banner “good practice.”

PLNG conducted a review of all potentially applicable environmental and social standards in order to clarify the standards to be adopted by the Project. Appendix A provides a comprehensive summary of these standards and identifies those that apply to the LNG plant, pipeline and quarry projects.

## 4.0 Environmental, Social, Health and Safety (ESHS) Management System

The PLNG Environmental, Social, Health and Safety (ESHS) Management System (MS) provides a graphical road map of the management system being developed by PLNG to address environmental, social, health and safety issues. Figure 1 is a schematic representation of the ESHS MS.

The management system follows a typical hierarchy:

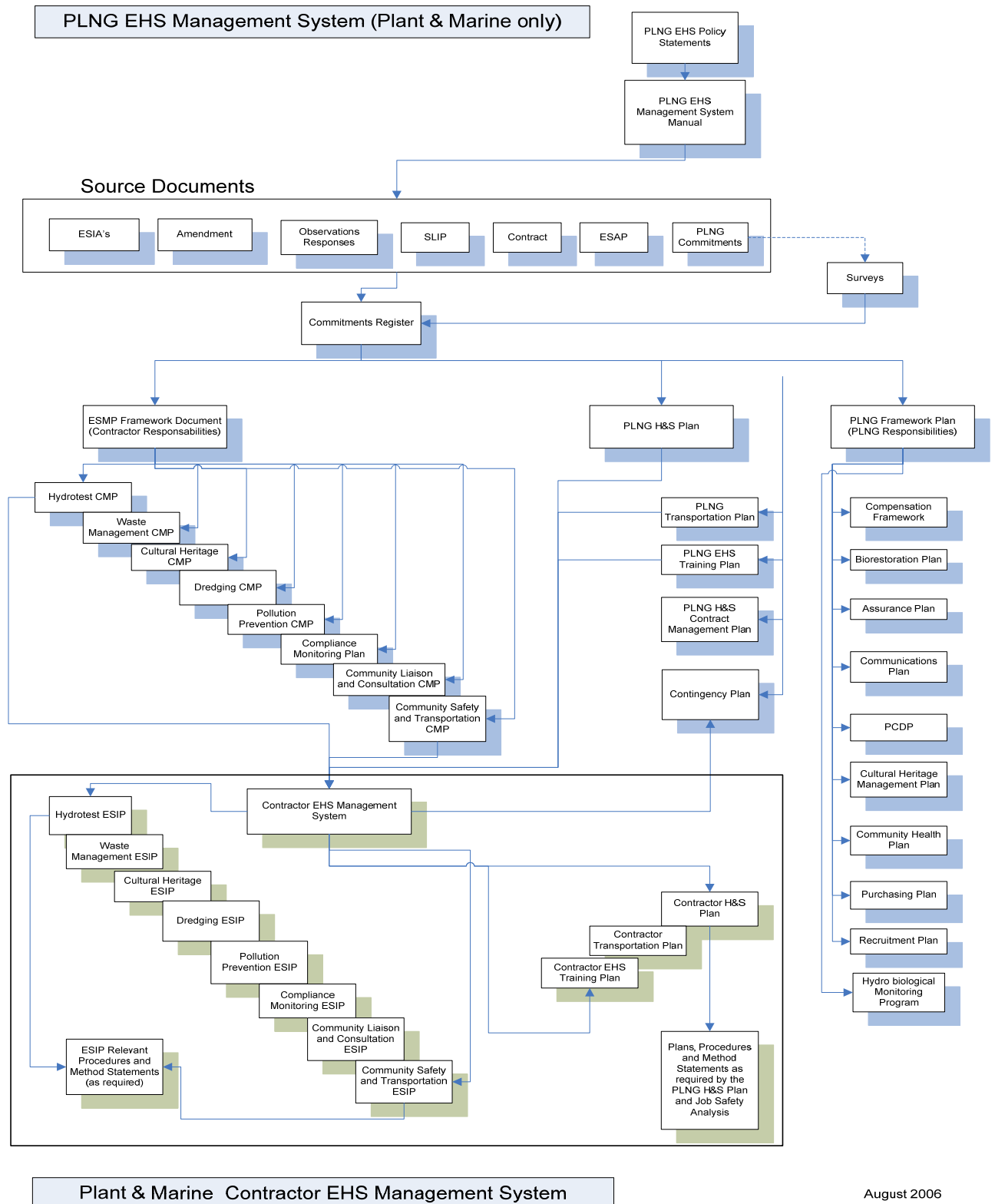
- The ESHS Management System Manual
- The Source documents generating the Commitments Registers
- The PLNG Framework Plan (PLNG responsibilities) and associated plans and procedures
- The ESMP Framework document (contractor responsibilities) and associated Contractor Management Plans

The Contractor will be contractually obligated to provide a corresponding set of Environmental and Social Implementation Plans (ESIPs), plans, procedures and method statements that reflect their understanding and responsibility to adhere to project standards and commitments.

As indicated in Chapter V, Section 4.1.1 of the Plant EIA (2003, Golder) an organization chart of the ESMS organization of the PLNG construction team and the selected EPC contractor for the construction phase was provided. This will be developed and refined ahead of the main construction phase. The management and monitoring functions of this integrated ESMS will be clearly specified with allocated resources from both PLNG and EPC Contractor.

Chapter V, Section 4.2.1.5, bullet 3 and 4 of the Plant EIA (2003, Golder) states that environmental inspectors are able to issue a temporary Stop Work Order for a significant environmental or social non-compliance. EPC Contractors will be contractually obliged to comply with the project environmental and social commitments as detailed in the Contractor Management Plans.

Project environmental and social standards will be stipulated in all contracts with third party providers. If local third party companies are already providing extensive services but do not fully comply with project standards, PLNG will seek to positively influence their performance over time through capacity development.



**Figure 1: Schematic Representation of the Plant ESHS MS**

#### **4.1 The PLNG ESHS Management System Manual**

PLNG prepared an ESHS Management System Manual that serves as a road map for the whole of the management system. Throughout the manual the user is directed to applicable documents via hyperlinks in the reference document sections.

PLNG operates under a common set of ESHS Programs that include:

- Company Policies
- Safe Operating Standards
- Code of Conduct
- Site-Specific Operating Procedures
- Contractor Management Plans
- Occupational Health Operating Procedures
- Environmental Operating Procedures
- Engineering Operating Standards

The primary objective of the EHS Management System is to eliminate or minimize hazards and risks to workers, work sites, equipment, adjacent landowners, communities and the environment.

Other objectives include:

- To help maintain a safe workplace and to protect the environment and the communities in which Company operates.
- To be aligned with OHSAS 18001, an international occupational health and safety specification, and ISO 14001, an internationally recognized environmental standard.
- Ensuring compliance with all Company ESHS policies,
- Ensuring compliance with applicable government regulations and industry standards,
- Maintaining and continuously improving the ESHS Performance,
- Demonstrating compliance to Company Management and others through internal and external audits, and
- Providing a central source for all ESHS management documents (i.e., policies, procedures, reports, industry standards, etc.).

## 4.2 Environmental Management and Monitoring Plan

The Environmental Management and Monitoring Plan (EMMP), as described in Chapter V of the Plant EIA (July 2003, Golder) provides the framework for the development of various environmental and social management and monitoring plans. PLNG's approach to environmental management has been refined since July 2003 when the Plant EIA (July 2003, Golder) was written and commitments from all source documents have been included in Contractor Management Plans (CMPs) under the umbrella of the Environmental and Social Management Plan (ESMP) reflecting contractor responsibilities.

Health and Safety commitments are governed by the PLNG Environment, Social, Health and Safety Plan.

## 4.3 PLNG Management Plans

The PLNG Management Plans are currently in preparation or close to completion. The current status is as follows:

PLNG management plans (PLNG responsibilities)	Target Completion Date
Health and Safety Plan	End of June 2007
Hydro-Biological Monitoring Program	Completed
Local Hiring and Purchasing Plan	June 2007
Environmental and Social Assurance Plan	July 2007
Cultural Heritage Management Plan	May 2007
Transport Management Plan	June 2007
Public Consultation and Disclosure Plan	June 2007
Management of Change Procedure	June 2007
Plant Closure and Abandonment Plan	Not required during construction

### 4.3.1 Health and Safety Plan

PLNG has drafted a Health and Safety (HS) Plan that will be finalized by the end of June 2007. The HS Plan describes a program for ensuring workplace health and safety wherever PLNG operates. It identifies:

- The health and safety responsibilities of PLNG and EPC Contractor workers, and
- PLNG general workplace health and safety practices and procedures for conducting activities that present a potential risk to worker health and safety.

The HS Plan is a core business practice and applies to all employees and contractors, including all affiliated companies and joint ventures in which PLNG or one of its subsidiaries owns a majority interest or is the operator.

The HS Plan identifies the key responsibilities of:

- The PLNG Health and Safety Manager,
- PLNG managers and supervisors,
- PLNG and Contractor Workers,
- The PLNG HS Department, and
- The Contractor managers and supervisors.

It also delineates the responsibilities to be conveyed to visitors and recognizes the worker's right to refuse unsafe work.

The HS Plan includes a summary of legal and regulatory requirements with regards to health and safety, outlines worker training and safety orientation, specifies training and certification, conveys the training policy and includes the provisions for a health and safety training matrix. Furthermore, the HS Plan outlines the procedures for the safety committee and safety meetings. Finally, the HS Plan includes provisions for effective communication of health and safety policies, plans and procedures; for safety performance measurement; a hazard assessment and risk management program; accident reporting and investigation; personal protective equipment; hazardous material controls; traffic safety regulations; workplace violence and harassment; ergonomics; excavations and openings; electrical equipment; an emergency response plan; medical and first aid services; alcohol and drugs; and a fire prevention and protection program.

### 4.3.2 Marine Monitoring Program

PLNG has commenced a Marine Monitoring Program in the coastal waters adjacent to the LNG Plant site. The objective of the program is to (a) characterize the coastal environment and local artisanal fishing activities and (b) allow for the early detection of any potentially significant impacts after construction of the breakwater and loading trestle has commenced.

The Marine Monitoring Program includes the following components:

- Marine sediment sampling of dredging channel
- Marine sediment monitoring
- Marine ecosystem monitoring, which includes:
  - Hydrography
  - Seawater quality
  - Sediments
  - Microbiology and organic contamination
  - Biology (plankton, macrobentos, fish)
- Hydro-biological monitoring which includes:
  - Fish, plankton and selected benthic communities (abundance, diversity, spatial and temporal distribution, chemical contaminants of fish tissue, quarterly ranking of commercial fish species)

The Marine Monitoring Program is conducted on a quarterly basis at sampling stations near Pampa Melchorita and at control stations 2.5 and 5 km to the south and north of the trestle location.

### 4.3.3 Local Hiring and Purchasing Plan

PLNG is currently preparing a Local Hiring and Purchasing Plan, which is expected to be completed by the end of June 2007. The preliminary requirements of contractors and preliminary actions and objectives of this plan regarding local purchasing include:

- The contractor must conduct an analysis of the prices of the products and services it would source locally to form a baseline of the preconstruction conditions in the market place. Subsequently the EPC Contractor will monitor if their procurement activities are impacting the prices paid by other consumers in the local market place so that corrective actions may be taken, if necessary.
- EPC Contractor will purchase local goods and services through one channel in

order to compile a database of products consumed or services used, including data on suppliers, volumes, quantities, amounts and status, etc. The EPC Contractor will report these data on regular basis to PLNG. The database must also be able to satisfy inspections by OSINERGMIN.

- Workers are prohibited from asking for any credit within agrarian communities, either for purchases or services.

The Local Hiring and Purchasing Plan requires the:

- Hiring of unskilled labor be undertaken in accordance with PLNG's criteria and standards.
- EPC Contractor has an officer responsible for community relations who shall coordinate the necessary procedures with PLNG.
- EPC Contractor will be responsible for the recruiting process but in close coordination with PLNG.
- EPC Contractor maintain a record of the process, which shall be reported before, during and upon completion to the PLNG. The record must include information about job applicants including their community, district, and province as well as the status of their applications.
- EPC Contractor will demonstrate best efforts to achieve an equitable balance of the number of workers taken from the project affected communities. No favoritism or inequality shall be permitted.
- Once staff requirements are disclosed to the communities, it will not be possible to amend the number of staff required downwards. If a greater number is required, the communities must be made informed in writing.
- Potential recruits must pass a health inspection prior to being hired.
- The recruitment process must be fair, transparent and auditable.
- Prior to terminating temporary employment contracts, the worker concerned will be notified in writing with a clear explanation about why and when employment will cease. One copy of the document will be given to the worker and another copy will remain on file.

### 4.3.4 Environmental and Social Assurance Plan

PLNG is preparing an Environmental and Social Assurance Plan and expects to finalize it by the end of July 2007. A number of assurance methods will be used to ensure that the

parties involved are implementing their respective environmental and social commitments. These methods include:

- Monitoring
- Inspections
- Audits
- Corrective Action Requests (CARs)
- Non-Compliance Reports (NCRs)
- Incident Reports
- Action Tracking System

The methods to be used will depend on the scope of assurance activity from management review down to checking individual activities, which may be short lived or continuous during the construction phase. Monitoring is considered to be ongoing whereas inspections are more formal and less frequent. Audits will be carried out less frequently than inspections but will be formal and also will aim to identify the adequacy of the management systems.

Monitoring is an important element of the ESHS Management System, encouraging implementation of the agreed measures and providing information on their effectiveness. Where mitigation measures are not effective or appropriate to a given situation, they will be reviewed and alternative strategies put in place. The primary objectives of monitoring will be to:

- Ensure timely completion and review of Contractor Implementation Plans and Procedures, and Contractor Method Statements, as required.
- Verify performance in implementing commitments for effective avoidance or mitigation of impacts.
- Determine whether avoidance controls or mitigation measures are adequate.
- Identify effective corrective actions should avoidance controls or mitigation measures not deliver the anticipated level of performance.
- Identify whether additional avoidance controls or mitigation measures are required to manage unexpected impacts.

Audits will provide a snapshot of the conditions and processes on the construction spread and/or in associated camps, pipeyards, etc., at the time of the Audit. They will provide a useful method of checking housekeeping practices and basic standards of compliance. Audits will be carried out in the form of a site walk round, observing conditions and potential

non-conformances. Inspections will be conducted as part of the routine of the Company and Contractors' field environmental staff. Non-compliances will be itemized on CAR and NCR proformas. The topics to be covered by the inspections will include, but will not be limited to: waste management; pollution prevention and control; erosion control; chemical, and oil and fuel storage; spill response; housekeeping; nuisance (noise and dust); reinstatement, etc.

Audits will provide the Company management with assurance that the Contractor's ESMS and its implementation, conforms to the Project requirements. It will provide assurance of the Company's ESMS, and implementation of commitments. In addition, the audit process will provide a means for corrective actions to be identified and implemented, therefore leading to the continual improvement of both, Company and EPC Contractor's ESHS Management System. The overall ESHS Management System will be broken down into several components and each of these may be audited as individual components or as part of a system audit.

#### **4.3.5 Cultural Heritage Management Plan**

PLNG is preparing a Cultural Heritage Framework Document, and expects to have a draft document by May 15th and a final document by the end of May 2007. This plan aims to capture PLNG's responsibilities and programs related to cultural heritage management. It references other documents that are part of the cultural heritage program, such as the Cultural Heritage Management CMP (discussed in Section 4.3.5), the existing and expected contractor's Cultural Heritage ESIPs, PLNG's Chance Finds Management Plan, and the various applicable national regulatory requirements including the requirement for the Certification of Non-Existence of Archeological Remains (CIRA) prior to start of construction.

The Cultural Heritage Framework Document is a general document that describes the different plans and processes that PLNG will follow, or is already following, with regards to the management of cultural heritage issues. This document also describes the relatively complex national regulations and how actions taken under these Peruvian regulations will interface with PLNG's internal procedures. In short, the Cultural Heritage Framework Document will be a guide that explains the different components of PLNG's program, and how they follow national law, project standards and guidelines and PLNG's corporate policy.

The Chance Finds Management Plan identifies the following:

- the process for reporting and recording chance finds;
- the requirement for stopping work in the area of an archaeological chance find;
- internal and external finds recording and notification procedures to be followed;
- contractor actions that may be required to minimize impacts to the finds; and
- relevant responsibilities of Project personnel.

#### **4.3.6 Transport Management Plan**

PLNG is writing a Transport Management Plan, and expects it to be complete by June 2007. This plan aims to ensure compliance associated with issues such as road transportation, route selection, traffic management and vehicle safety. In addition, the plan contains detailed speed limits to be followed by all contractors and project personnel.

PLNG has instituted requirements which were not initially included in the Plant EIA, such as the requirement for all project vehicles to be equipped with Geo-Positional System (GPS) devices. In addition, a night driving contingency procedure has been incorporated into this plan.

#### **4.3.7 Public Consultation and Disclosure Plan (historical)**

The objectives of the Public Consultation and Disclosure Plan (PCDP) are as follows:

- To ensure the timely and appropriate delivery of information related to the project to the involved stakeholders in the area of influence (direct and indirect); taking into consideration the methodological tools necessary for information dissemination and the cultural context of each area.
- To guarantee effective public participation tools that allow the stakeholders in the area of influence to communicate freely their concerns and suggestions regarding the project activities (before and after); as well as delivering a timely response to these concerns and suggestions.

The PCDP will consolidate the description of what has been conducted before, during and after the Plant EIA approval process. The PCDP will not only include cumulative data, but also numeric indicators and a mechanism for monitoring that will allow for verification of the reached objectives. For example, the number of workshops conducted versus the audience acceptance with respect to the information delivered; this will serve, in part, as feedback to

improve the PCDP procedures and tools. Part of the PCDP will be the preparation of a Communications Plan for future activities, the objectives of which are detailed in the section below.

The following is a short summary of the PCDP related activities that have already been conducted by the project. Workshops and meetings have been conducted to provide updated information about the project to the influence area stakeholders. For the Plant, PLNG has completed a total of 42 workshops for the local population in Chincha and Cañete including fishermen groups with a total of 1926 attendants. In addition, PLNG offices in Chincha and Cañete have provided presentations about the project to a total of 17686 attendants to the office in order to request information.

Press notes and communications through the local newspapers and radio stations have been published since 2005.

#### **4.3.7.1 Communications Plan (Planned)**

The objectives of the Communications Plan are to:

- Implement communication mechanisms to allow delivery of current information about the project to stakeholders and the general public.
- Execute a strategy of communication that allows the decrease in pressure for information, a decrease in uncertainty and the strengthening of trust channels and transparency between the project and its stakeholders (i.e., perception management).

#### **4.3.8 Community and Environmental Investment Program (CEIP)**

PLNG has developed a Community and Environmental Investment Program strategy document, which is currently awaiting approval from PLNG's shareholders, and a final CEIP document is expected to be finalized by the end of the third quarter of 2007 and prior to the commencement of construction work on the plant. The strategy document outlines the aims, objectives and guiding principles under which the CEIP will be implemented. The document also recognizes that community participation and strategic partnerships have been identified as essential to the success of the CEIP. This document reflects the intention of PLNG to the selection of community and environmental investment projects according to international

best practice, i.e., to the selection of long-term projects that build on individual, community and government strengths and capabilities.

PLNG has set aside a specific budget for the implementation of the CEIP. The following is a summary of the key principles being considered by PLNG to underpin the CEIP:

- Distinguishable from mitigation and offset
- Deliver tangible benefits
- Ultimately self-sustaining
- Aid to capacity building
- Linked to existing local and regional priorities
- Avoid duplication
- Leverage existing/additional funding
- Promote partnerships
- Inclusive of third party views
- Promote transparency
- Subject to monitoring and evaluation

Implementation of the CEIP for the LNG plant area began with an evaluation of community needs and resulted in a list of 16 potential projects that would contribute to the sustainable development of the Chíncha and Cañete area. The work was completed in a joint venture effort between Estratego (local marketing research/social marketing firm) and CIED (Center for Investigation, Education, and Development, which is an NGO with government and lender experience). Marketing research techniques were combined with internationally accepted data collection and evaluation techniques in a multi-tiered approach that included desktop research, quantitative data (surveys), qualitative data (interviews, focus groups, workshops, and observations), and stakeholder mapping.

Action plans with project profiles were developed for 2 pilot projects from the list of 16. The 2 pilot projects are Local Purchasing Option and Agricultural Promotion. These projects were selected for implementation at this time to take advantage of current construction contractor needs and to avoid the opportunity loss that would result from deferring their implementation to a later date. Next steps include: consultation with stakeholders (communication regarding plans, cooperation agreements, participatory project design, etc.), arrangements for implementation partners and strategic alliances, and determination of cost-sharing and matching fund mechanisms with local government and/or lenders, as well as any micro-

financing opportunities. Additional projects are anticipated to be implemented during the construction period.

#### **4.3.9 Management of Change Procedure**

The PLNG projects (Plant, Marine, Quarry and Pipeline) are being constructed by a number of different EPC Contractors. PLNG shall develop a Management of Change definition and criteria to ensure all contractors implement a Management of Change process to the same standard. It shall be up to the individual contractors how they implement the Management of Change process within their Management Systems, however, PLNG shall ensure that all contractors Management of Change processes are in accordance with the PLNG requirements.

The objective of this process is to control changes that occur during the construction phase of the PLNG Project. This is to ensure that the risks associated with any change are appropriately evaluated, that they remain at an acceptable level, and that the effects they have are effectively communicated around the project in a systematic manner. This Management of Change Procedure document includes provisions for notification of certain changes to the lender group.

#### **4.3.10 Plant Closure and Abandonment Plan**

Site closure and decommissioning will be treated as a separate project in the event of the closure of the LNG plant. A Closure and Abandonment Plan will be submitted to the national authorities that would include plans for the abandonment of the site, impact assessment and a site restoration plan. As part of the required EIA for plant closure, baseline conditions of the existing environmental conditions will be established to ensure the absence of contamination with a plan to remediate any contamination encountered.

PLNG has committed in the Response to the first and second round of Observations No. 21 that it will remove all contaminated structures and remediate all existing contamination on site but will not re-contour the site to pre-existing conditions. The first and second round of Observations No. 48 and 159 confirm that PLNG will establish a fund to provide for closure of operations.

### 4.4 Contractor Management Plans

Each of the CMPs referred to above are listed below, with a short description of their purpose. The CMPs have been produced under the umbrella of the ESMP Framework Plan.

#### 4.4.1 Plant ESMP Framework Plan

The Project is the subject of various environmental and social requirements that result from the Project's intended compliance with:

- Applicable laws and regulations of Peru
- The corporate objectives of PLNG
- The policies and guidelines of International Finance Institutions that are prospective lenders to the Project and other international standards and guidelines that are referenced in the Source Documents
- Commitments made in the Source Documents

These requirements are being managed by PLNG through the development of an ESHS Management System. PLNG's contractor management is detailed within the Operational Control section of the ESHS Management System. The Environmental and Social Management Plan (ESMP) is the main tool within PLNG's ESMS.

This ESMP addresses environmental and social elements of the EPC Contractor (defined as: Contractor, all Subcontractors, and their Affiliates, and all of their employees, officers, agents and insurers) actions associated with Plant construction (including the quarry) and encompasses the Source Documents<sup>1</sup> listed below.

- The Plant EIA, including the Marine and Dredging EIAs
- Responses to the DGAA Observations on Plant EIA
- Second Round of Responses to DGAA Observations on Plant EIA
- Plant EIA Amendment
- Initial Response to Lender Pre-Application Due Diligence Reviews

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<sup>1</sup> Additional Source Documents exist for the Quarry. These are listed in the Quarry CMP

The Source Documents referenced above are being supplemented by documents such as DGAA Observations on the Plant EIA Amendment; Responses to the Observations on the EIA Amendment; SLIPs; (and possibly others) in respect of Plant construction.

Further elements of the ESMP are also envisaged to respond to:

- Additional requirements in new and amended Source Documents relevant to Contractor actions during Plant construction, and
- Requirements in the Source Documents relevant to PLNG actions in respect of Plant construction.

#### **4.4.2 Plant Pollution Prevention Contractor Management Plan**

The Pollution Prevention Contractor Management Plan identifies the contractor commitments made for the Project in relation to pollution prevention. The Contractor shall ensure that all the commitments identified are managed through the development of a Pollution Prevention ESIP and its associated plans and / or procedures.

This CMP includes requirements for the contractor regarding dust monitoring and control, vehicle emissions, incinerator emissions, generator emissions, water management, water disposal, stormwater management, noise management, vehicle and equipment maintenance and selection, fuel and chemical storage handling, campsite location and river crossings.

This CMP also includes remediation standards for soil and groundwater contamination, if it occurs during project construction.

#### **4.4.3 Plant Waste Management Contractor Management Plan**

The Waste Contractor Management Plan identifies the contractor commitments made for the Project in relation to waste management. The Contractor shall ensure that all the commitments identified are managed through the development of a Waste Management ESIP and its associated plans and / or procedures.

This CMP indicates that it is the Contractor's responsibility to adequately handle and dispose of contractor generated wastes under PLNG supervision and according to the procedures established in this CMP.

This CMP indicates that it is also the Contractor's responsibility to:

- Ensure that the established procedures are complied with.
- Confirm that the removal of waste from temporary storage facilities is conducted by an approved waste services provider.
- Record and document the type and quantity of waste generated.
- Ensure that adequate means for waste disposal are available.
- Ensure that the supply of appropriate containers is sufficient and compatible with the types of waste produced and stored.

#### **4.4.4 Plant Compliance Monitoring Contractor Management Plan**

The Compliance Monitoring Contractor Management Plan identifies the Contractor commitments made for the Project in relation to compliance monitoring. The Contractor shall ensure that all the commitments identified are managed through the development of a Compliance Monitoring ESIP and its associated plans and / or procedures.

This CMP has been compiled from the CMPs that contain specific monitoring commitments that are the responsibility of the Project EPC Contractors during Plant construction. This plan excludes the general inspection and monitoring to address issues such as housekeeping, waste management and archaeology. These shall be addressed in the contractor's Compliance Monitoring ESIP (and can be implemented as part of the assurance provisions of the contractor's Environmental Management System).

This CMP includes design criteria for monitoring, contractor reporting requirements, and analytical standards for monitoring.

#### **4.4.5 Plant Community Liaison and Consultation Contractor Management Plan**

The Community Liaison and Consultation Contractor Management Plan, identifies the Contractor commitments made for the Project in relation to Community Liaison and Consultation. The Contractor shall ensure that all the commitments identified are managed through the development of a Community Liaison and Consultation ESIP and its associated plans and / or procedures.

This CMP includes requirements and procedures for the contractor with respect to:

- Interface with Communities and Other Stakeholders
- PLNG Policies and procedures
- Consultation and Communications
- Compensation
- Socio-Cultural Aspects
- Recruitment
- Recruitment Procedure
- Reporting Requirements
- Recruitment Public Consultation
- Procurement
- Local Purchasing of Resources and Services
- Reporting Requirements

#### **4.4.6 Plant Community Safety and Transportation Contractor Management Plan**

The Community Safety and Transportation Contractor Management Plan, identifies the Contractor commitments made for the Project in relation to community safety and transportation management. The Contractor shall ensure that all the commitments identified are managed through the development of a Community Safety and Transportation Management ESIP and its associated plans and / or procedures.

The CS&T CMP requires contractors to follow the Hazardous Materials Management Guidelines (International Finance Corporation [IFC], December 2001).

The CS&T CMP also requires contractors to identify temporary alternatives, such as the installation of traffic control measures where disruption of normal traffic patterns and pedestrians within the local community is anticipated.

#### **4.4.7 Plant Cultural Heritage Contractor Management Plan**

This Plan, the Cultural Heritage Contractor Management Plan, identifies the contractor commitments made for the Project in relation to Cultural Heritage Management. The Contractor shall ensure that all the commitments identified are managed through the development of a Cultural Heritage ESIP and its associated plans and / or procedures.

This CMP references procedures for the contractor to follow for chance finds, requires the contractor to obtain a Certification of Non-Presence of Archaeological Resources (CIRA for its initials in Spanish) from the Peruvian regulators, and also requires the contractor to include in its training program the topic of archeological discoveries, monitoring and protection.

#### **4.4.8 Plant Hydrostatic Test Water Contractor Management Plan**

The Hydrostatic Test Water Contractor Management Plan identifies the contractor commitments made for the Project in relation to hydrostatic test water. The contractor shall ensure that all the commitments identified are managed through the development of a Hydrostatic Test Water ESIP and its associated plans and / or procedures.

This CMP requires the contractor to consider appropriate internationally accepted hydrotest practices when preparing the Hydrostatic Test Water ESIP and to reference the internationally accepted hydrotest practices that were considered in development of the ESIP.

#### **4.4.9 Plant Dredging Contractor Management Plan**

The Dredging Contractor Management Plan identifies the contractor commitments made for the Project in relation to dredging management. The Contractor (defined as; Contractor, all Subcontractors, and their Affiliates, and all of their employees, officers, agents and insurers) shall ensure that all the commitments identified are managed through the development of a Dredging Management ESIP and its associated plans and / or procedures.

This CMP includes procedures to be followed for waste management related to dredging, fuel and lubricant management during dredging, access restriction during dredging, and emergency response and contingency planning specific to the dredging activities.

## 5.0 Social Baseline and Compensation Process

PLNG published a social baseline in the original EIA for the Liquefaction Plant. However, additional surveys are currently being undertaken and should be completed by June 2007. The results of this survey will be input to a database to manage the large volumes of socio-economic information that has and will be acquired. The database will underpin future social monitoring both during and after construction. Monitoring will determine the effectiveness of the Project's social, mitigation and management measures, which will be refined over time if necessary.

In parallel, a process has been implemented to ensure that any fishermen who are genuinely impacted by the Project receive fair compensation for any losses incurred. The process involves:

- Participatory clarification of the existing social baseline data,
- Negotiation,
- Agreement, and
- Implementation and monitoring.

The objective of the ongoing social survey is to confirm the fishermen who are actually impacted by the project, verify the magnitude of the impacts and to clarify the extent of the social and economic effects. To date, PLNG has held 16 meetings and 3 workshops with fishermen's groups and associations as part of the social survey and compensation framework. Some of the fishermen consulted have requested that a group of third party observers be established which could include OSINERGMIN, Ombudsman, and the IADB, among others. This request is being seriously considered by PLNG.

## **6.0 Dredging**

The trestle and navigational channel lie in a high energy marine environment. The breakwater was designed to alleviate this high energy. It is also expected that the breakwater may reduce the sedimentation rate inside the dredged navigational channel. Regardless, it is difficult to predict the necessary maintenance dredging timeline. A conservative estimate is that maintenance dredging will be necessary every 2 to 5 years. This will be determined based on monitoring of the navigational channel and will also depend upon the availability of the appropriate equipment. Another consideration is that the equipment associated with maintenance dredging will most certainly be smaller and less disturbing than the equipment utilized for the construction of the navigational channel.

Dredging for the creation of the navigation channel is not expected to be undertaken until after the breakwater and trestle are largely complete.

## **7.0 Footprint**

The dredged navigational channel configuration has been adjusted based on ship maneuvering simulations. A single approach line with one turn to the berth has been designed rather than a continuous curve to improve the berth reliability and safety.

The modified channel introduces a larger turning radius to facilitate ship maneuvers during their approach and exit behind the breakwater (see Figure 2.6 on Chapter II of the Plant EIA, page 67).

The EPC Contractor will be obligated to reinstate any temporary facilities that have been used for construction purposes.

## 8.0 Project Description

### 8.1 Consideration of Alternative Sites

The alternative siting studies conducted were provided in responses to the Ministry of Environment and Mines (MEM) during the EIA approval process, specifically the response to MEMs Observation Numbers 23 and 43. The responses to MEM observations are part of the public record and can be found in the following documents:

- First round of responses to observations:  
<http://www.perulng.com/DGAA%20Observation%20Responses%20English%20as%20Submitted%20022504.pdf> See nos. 23 and 43
- Attachments to first round:  
<http://www.perulng.com/PLNG%20EIA%20Observations%20Attachments%20as%20Submitted%20022504.pdf> See nos. 23 and 43
- Second round of responses to observations:  
<http://www.perulng.com/Second%20Round%20of%20Responses%20to%20DGAA%20Observations%20Submitted%20on%20042304.pdf> See no. 43
- Attachments 43a and 43 b of second round:  
<http://www.perulng.com/PLNG%20EIA%20Observations%20Attachments%20as%20Submitted%20022504.pdf>

The criteria used site in selection as presented in Section 1.7 of Chapter 2 of the Plant EIA (July 2003, Golder) is presented below:

- Evaluate potential coastal locations within 200 km south of Lima. Initial site selection criteria required a minimum 100 hectares land space;
- Eliminate all locations in areas with a high degree of environmental sensitivity;
- Eliminate densely populated areas;
- Identify clear areas of land on the coast with a minimum distance from shore to at least 15 m water depth and with a site elevation of at least 20 m to mitigate the effects of a tsunami hazard;
- Exclude areas where site preparation would result in significant difficulties;
- Exclude areas with potential of soil liquefaction from earthquakes, soil instability from soils movement and most importantly, no nearby faulting and seismically unstable soils due to the high seismic (earthquake) zones in Peru;
- Exclude areas where significant dredging and continuous maintenance dredging will

be required;

- Give preference to oceanic conditions suitable for reliable tanker berthing operations;
- Give preference to sites with proximity to commercial centers that can provide raw materials and labor; and
- Give preference to sites with sufficient land area to accommodate expansion

## 8.2 Marine Structures

It is important to note that a “rock dock” was raised during discussions about the options for loading quarry rock and was not part of the original EIA. At one point in time, a rock load-out causeway and jetty were considered, but the desire to avoid potential impacts to coastal processes and beach morphology led to the reinforced trestle concept which is currently planned. The EIA Amendment contemplates and addresses impacts associated with a rock load-out jetty perpendicular to the trestle and parallel to the shoreline. A detailed description of this rock load-out jetty has been included as part of the Plant EIA Amendment document (Section II, Subsection 4.2) (July 2003, Golder).

The horseshoe-shaped navigational channel is described with dimensions in Section 3.1.4 of Chapter II and in Annex 6 of the Plant EIA (July 2003, Golder); this is an area of 250 m average width by 2,700 m total length equating to 675,000 m<sup>2</sup>. The rectangle behind the breakwater or the end of trestle structure represents the berth area or the base of the horseshoe-shaped which is connected to in and out channels, the dimensions provided above correspond to these 3 segments components of the whole navigational channel structure. Updated information on the navigational channel is provided in the Plant EIA Amendment.

## 8.3 Water Abstraction

The exact location and quantities of water withdrawn from the Canete River will be defined by the EPC Contractor depending on their requirements for water between the early stages of construction and when a desalinization plant can be completed.

Water required for dust suppression and other general uses will be managed according to the provisions of the Pollution Prevention CMP. Requirements for testing potable water can be found in the Compliance Monitoring CMP. However, bottled water will be supplied until the desalination plant is commissioned.

### 8.4 Material and Construction Equipment Handling

The Plant Community, Safety and Transportation CMP and Plant Community Liaison and Consultation CMP have been developed specifically to establish project requirements in relation to transportation, hazardous materials, construction equipment and how any associated impacts they may cause on nearby communities will be avoided or mitigated.

## 9.0 Description of Existing Environment

### 9.1 Area of Influence

The regional area of influence is defined in Chapter III, Section 1, Figure 1-1 of the Plant EIA (July 2003, Golder). It was determined by the location of potential receptors in combination with local and regional environmental data such as meteorology and oceanographic conditions.

The precise location of ancillary aspects such as borrow pits will be selected by the EPC Contractor. It is expected that that pre-existing and operational borrow pits will be used for aggregate supply. Such borrow pits must be licensed by the Peruvian regulatory authorities. Should new borrow pits be used, such facilities would be subject to assessment and approval by the authorities prior to development and use.

Chapter III of the EIA describes the physical, biological, socio-economical, and cultural environments within the local and regional areas of influence of the LNG Export Project. Section 3.0 of Chapter III details the biological environment. The table of contents for Chapter III was established to list subheadings up to level four for editorial reasons. The subheadings beyond level four are as follows:

#### 3.2.2.1 Intertidal Zone

- Physical, Chemical and Microbiological Parameters
- Biological Aspects
  - Benthic Community in Autumn
  - Benthic Community in Spring
  - Other Groups Observed During Shoreline Sampling

#### 3.2.2.2 Subtidal Zone

- Hydrographic, Physical-Chemical and Microbiological Parameters
- Biological Aspects
  - Plankton Community in Autumn
  - Plankton Community in Spring
  - Benthic Community in Autumn
  - Benthic Community in Spring
  - Fish

## 9.2 Rationale for Field Investigations Conducted

The rationale behind the field sampling studies was to collect baseline data during two season events (i.e., winter months from 21st June to 23rd September and summer months from 21st December to 23rd March). An initial field deployment to Pampa Clarita was conducted during the summer months of 2002. During that time, Pampa Melchorita was chosen as the project site, and therefore the field deployment was re-started at the new location. Therefore, the sampling events were shifted to correspond to the seasons of autumn and spring (June and October, respectively). It is common for EIAs to not have multiple years of baseline data, thus sampling surrogate parameters are often used to evaluate the variation of certain indicators that can help establish the variation between seasons. This was also undertaken as part of the EIA completed for the PLNG marine facilities.

During more recent studies conducted for the Plant EIA Amendment, satellite data from the years 2002 to 2005 were analyzed. The data indicates that although certain physical parameters such as surface water temperature has a seasonal variability between the winter and summer months there is little variability on biological parameters such as chlorophyll-a

The QA/QC procedures used to validate the physical and chemical parameters collected are provided in Chapter III, Section 4 – Environmental Quality.

The QA/QC procedures used to validate biological data are presented in Section 3.2.2 of Chapter III. Two procedures were considered: (1) maintaining same methodology and same sampling team for intertidal and subtidal and during both sampling periods, and (2) the analysis of data according to a “normal statistic distribution”; or if data were not “normally distributed” then transforming the data by logarithmic methods to allow the construction of the Similarity Matrix based on the Bray-Curtis Index to produce dendograms.

In 2006 PLNG contracted ERT UK to carry out the marine monitoring program at Melchorita. This monitoring program goes beyond the requirements established in the approved EIAs to address the specific interests of project stakeholders including fishermen, local government officials and feedback received from potential project financing institutions.

A participatory approach to marine monitoring has been established. The program has been modified to include the elements described in the table below.

### Additional Monitoring Commitments

Aspect of the program	Requirement according to EMMP	Additional items incorporated	Reason for the additional work
Frequency of field sampling activities	SM-6: Two sampling events per year in spring and autumn	Quarterly sampling for all biological parameters (plankton, macrobenthos and fish) to provide information on seasonal variability.	Requested by stakeholders and subsequently by DGAAE.
Number of areas sampled	SM-6: Sampling stations all located within the vicinity of the LNG plant site (the 'work area')	Four new sampling areas (two areas to the north of the LNG plant site and two to the south), each containing three sampling stations.	The new sampling areas will serve as controls up-current and down-current from the facility. Controls are necessary to put any changes within the work area into context of natural variability.
Number of sampling stations for macrobenthos	SM-6: Fifteen stations in the work area	Twenty one extra stations (further nine stations in the work area and twelve control stations)	Additional stations in the work area will better define the extent of any changes due to construction activities. Controls are necessary to put any changes within the work area into context of natural variability.
Number of sampling stations for plankton and hydrographic measurements	SM-6: Twelve subtidal stations in work area	1) Two extra stations (control stations) 2) Sampling of phytoplankton from bottom waters (as well as surface) at the deepest stations	1) Controls are necessary to put any changes within the work area into context of natural variability. 2) Introduced following comments made at training workshop, September 2006.
Number of sampling stations for sediment chemistry	SM-5: Ten stations in the work area (one of which is intertidal)	Seven extra stations: 1) Four control stations. 2) Three additional intertidal sampling stations in the work area.	1) Proposed by ERT to provide control data 2) Adopted following suggestion from INRENA at stakeholder workshop 18/4/07, to provide better monitoring of intertidal sediments and to allow correlation with intertidal macrofaunal data which is also being collected at these three stations.
Number of sampling stations for	SM-6: Fifteen stations in the work area	Twelve extra stations (control stations)	Proposed by ERT to enhance interpretation of the macrobenthic data at the control

granulometry			stations.
Fish data collection	SM-6: Sampling in the work area for population studies; AC-8R: Survey of artisanal fishing; evaluation of biometric data	1) Representative samples of fish analysed for metals and TPH content of the tissues; 2) Analysis of fish stomach contents of representative fish.	1) Fish tissue analysis is being conducted for chemical parameters which could significantly impact fish populations or could change with construction and operation of the facility. Metals analysis includes arsenic and cadmium as levels of these metals are naturally relatively high in the sediments. TPH is included as there is some risk of spillage of hydrocarbons (fuel) during construction and operation. 2) Fish stomach contents are compared with macrobenthos community data.
Analysis of sediments	SM-6: Granulometric analysis of sediments; analysis for eight metals.	1) Analysis of total organic matter (TOM) content of sediments; 2) Analysis of further 22 metals.	TOM monitoring introduced in response to suggestion from CONAM at stakeholder workshop, 18/4/07. This will provide additional information on the physical nature of the sediments and assist in understanding the distribution of macrobenthic communities. Of particular importance in this area as sediments are known to have high organic content, and at times are anoxic. Concern over disturbing anoxic sediments during dredging was raised at the September 2006 training workshop. 2) The selected laboratory method provides data for a large number of elements.
Analysis of water quality	SM-6: Total suspended solids (TSS), nutrients, BOD, total and faecal coliforms	Total arsenic and total cadmium levels in water	Introduced to address stakeholder concerns about relatively high levels of arsenic and cadmium in the sediments, and the possibility that they may become dissolved in the water column during dredging activities. Request for cadmium monitoring was made by IMARPE at stakeholder workshop, 18/4/07.

ERT commenced the first post EIA marine survey in September 2006. Surveys will be undertaken during each season thus they returned in January/February 2007 and again in April 2007. The next survey is scheduled for July 2007. Marine construction activities at Pampa Melchorita have not yet commenced so this seasonal data will augment existing marine baseline data.

In April 2007, PLNG and ERT carried out a workshop in Chincha to present the findings of the marine survey completed in September 2006. Government officials and representatives from the fishing community now attend the marine surveys and, after some training, have become members of the survey team.

### **9.3 Marine Mammals**

None of the available data, field studies or interviews with fishermen carried out to date indicate that the marine cat is a resident (as opposed to transient) in the project area or that there are any specific feeding or breeding sites important to the marine cat in the project area. Local fishermen report rare sightings of the marine cat passing through the project area. The marine cat is known to occupy a wide geographic range extending down the west coast of South America from Peru to Tierra del Fuego and is most commonly found in inlets near river estuaries with an abundance of seaweed and algae. Such sites are not found within or immediately adjacent to the project area. The evidence does not indicate that there is the potential for significant impacts on the marine cat or any other marine mammal which would justify further detailed studies such as multi-year seasonal or migratory surveys.

It should be noted that the Fractionation Plant, which is located 46 kilometers south of the LNG site, lies in a marine protected area. Studies conducted in the area of the Fractionation Plant have identified a number of marine mammals. The habitat characteristics are radically different at the LNG Plant Site. The project site lies in front of a wide open sea area with no perching structures such as islands, rock platforms or other land mass features. Protected features and perching structures for marine mammals are noted at the Paracas National Reserve, located 46 kilometers south of the LNG Plant site, or at Cerro Azul sound, located 30 kilometers north of the LNG Plant site. The marine fauna occasionally encountered at the project site appears to be related to either the Paracas National Reserve to the south or to the Cerro Azul sound to the north. The project location lies almost at a half-way distance between these two preferred locations for marine habitat and mammals.

Nevertheless, multiyear marine mammal monitoring studies have been proposed for project construction and operations. The Hydro-biological Monitoring Program describes the surveys to be conducted to supplement the baseline data.

#### **9.4 Conclusions of Field Investigations**

Based on the available data, field studies involving direct sampling conducted over three seasons, shoreline surveys and extensive interviews with fishermen, the original EIA found the potential for significant impacts on fish and marine life to be low.

The baseline reported in the original EIA was updated in June 2005 to include a description of the life cycle of the fish, birds and mammals commonly found at project site and surrounding areas. The updated baseline was part of the EIA Amendment submitted to Peruvian authorities in November 2005. The EIA Amendment findings indicate the following:

- There is still no evidence to indicate the residence of any fish or marine life species listed as Rare, Threatened, Endangered or Endemic or the presence of site specific locations important to such species (e.g. key feeding or breeding grounds etc) within the project area.
- All fish and marine life species identified within the project area, through direct sampling and fishermen interviews, are known to have wide geographical ranges, again with no specific feeding or breeding sites within the project area.

Based on the available data there is no evidence to indicate that a potentially significant impact could occur. Coastal and marine pelagics are the predominant fish species found around the location of the marine facilities. These species typically move away from marine construction activities and then return after becoming adjusted to the noise levels.

Additional catch-effort data were provided in Appendix C of the EIA Amendment. It includes information about artisanal fishing methods, descriptions of fishing equipment, catch-effort data and fish species profiles. The EIA Amendment includes updated guidelines for monitoring fish species caught by artisanal fishing during construction and operation of the marine facilities.

These monitoring activities are summarized in the EMMP included in the EIA Amendment. However, as mentioned above, the Marine Monitoring Program has been updated to

incorporate stakeholder interests and internationally accepted methods for monitoring potential impacts in the coastal marine environment.

## 9.5 Fishing Methods

During the fish surveys undertaken for the EIA Amendment, three methods were utilized including a gill net, vertical lines with hooks and visual observations by a diver. These methods were used around the fringes of the study area along transects 1 and 8 and in the footprint of the marine facilities at depths of 8 to 17 m. Each sampling method was utilized two times at each sampling site for a total duration of 3 to 5 hours. The gill nets were left to drift at the sample locations. Strong currents and low visibility were predominant during all sampling periods. A survey of the fish actually caught by artisanal fisherman was also conducted along the shoreline in the area from Playa del Zorro to Punta Auque.

The analysis indicates that the low diversity of species found in the project area is due to natural environmental conditions. The physical, chemical and biological data collected in the intertidal zone revealed no evidence of anthropological factors that would be expected to affect biodiversity. Furthermore, the decrease in diversity index reported in the original EIA correlates with an atypical warming pattern considered to be similar to the “El Niño” condition.

The year 2002 was an atypical year in relation to the El Niño condition according to the *El Niño Southern Oscillation Publication*. This publication forecast the development of a weak to moderate El Niño from late 2002 until early 2003. The water temperatures measured in the second half of 2002 (including the sampling periods of June and October) were comparable to the water temperatures registered during recent El Niño events.

## 10.0 Environmental Assessment

### 10.1 The Leopold Matrix

The Leopold matrix evaluation is one of the most commonly used methods used in evaluating impacts of projects on the environment. It provides a means of utilizing multiple sources of data from baseline studies, field observations, interviews, literature review and synthesizing the information from a mixture of both qualitative and quantitative data into a scoring system. The system allows for an evaluation of proposed activities by assigning a numerical ranking to potential impacts.

The interaction of seven attributes is described in the EIAs. These attributes are one of the key modifications to the original methodology, which only considered magnitude and importance. (*A Procedure for Evaluating Environmental Impact*, Leopold, L. B., Clarke, F. E., Hanshaw, B. B. and Balsley, J. R., 1971, *Geological Survey Circular 645*, Government Printing Office, Washington, D.C.). A discussion of each one of the scored interactions can be found in the EIA (Section 4, Chapter IV and Table 6 and 7, Appendix 3).

## **10.2 Potential Impacts on Fish**

Recent fish abundance surveys during similar pier construction in the pelagic waters of Peru have shown that there are no discernable effects on local fish populations. The surveys used hydro-acoustic sampling techniques to determine the abundance of fish; primarily pilchard, silversides, menhaden and morwong, in coastal waters up to 600 meters from shore prior to, and during pile driving activities. The pelagic fish are highly migratory and their abundance can withstand local, short term changes without threatening the long term viability of the local populations.

The study did not identify any schooling fish kills and actually indicated that once the fish became accustomed to the construction noises levels, they returned to pre-construction numbers.

During construction of the PLNG marine facilities, pile driving, underwater pneumatic tools and above water construction activities have the potential to cause short term localized effects on the abundance of pelagic fish, but there is no evidence to suggest that there will be any impact to fish populations after construction of the breakwater and trestle has been completed. The original EIA concluded that no mitigation measures are required. However, it is good construction practice to gradually increase the power of piling and other significant noise generating activities in order to allow fish and any passing marine mammals to move away from the area and this will be adopted by the project as a precautionary measure.

## **10.3 Social, Economic and Cultural Environment**

Visual assessment of the project has been evaluated based on digital images of the project superimposed on panoramas. The visual assessment considered significant resources in the area of the project along with any potential adverse impacts to those resources from the project. Several design considerations have been incorporated into the project to diminish

the potential adverse visual impacts of the project. The project has been located in an uninhabited area, other than some illegal settlements and the near by Pan-American Highway. The tallest components of the project including the storage tanks, and the liquefaction plant and associated tall structures have been located on the bluff above the beach area and set back from the edge of the bluff to diminish the visual impacts from the shoreline and from the nearest communities of Cañete and Chincha which are located approximately 30 km from the PLNG liquefaction plant location.

Aesthetic and visual impacts arise when detrimental effects on the perceived beauty of the area occur. The selection of the project site was established to avoid not only social impacts of any nearby community but also sited away from any inventoried resource that could be viewed as a significant impact.

#### **10.4 Atmospheric Emissions**

An assessment of the fugitive emissions of VOCs from the PLNG liquefaction plant facilities will be undertaken during detailed design after specific data are obtained from vendors of the equipment.

The potential incremental concentrations of other pollutants at the closest human receptors are expected to be much lower than the maximum pollutant concentrations reported for the project. As reported in the EIA, the maximum nitrogen dioxide (NO<sub>2</sub>), particulate matter (PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), and carbon monoxide (CO) concentrations predicted for the LNG liquefaction facilities comply with the relevant World Bank Guidelines, the Peru Air Quality Standards, and U.S. Ambient Air Quality Standards. The concentrations predicted to occur within 1 km of the site are only 66 % of the ambient air quality limits. For most pollutants, background concentrations contribute the majority of predicted total concentrations. The Project's incremental impacts are <15% of the ambient air quality limits.

The two closest communities are approximately 4 km and 8 km to the south of the project respectively. The potential incremental pollutant concentrations due to the project at the these communities will be minimal and, in most cases, not distinguishable from background concentrations.

An emissions inventory will be finalized once vendor data has been provided. Procurement of equipment will be based on the emission thresholds as detailed in the relevant project standards.

## **10.5 Cumulative Effects Assessment (CEA)**

The CEA is being finalized by an external consultant and is expected by the end of June 2007. The CEA is expected to conclude the following, extracted from the first draft:

- The CEA covered all the PLNG project components, TgP pipeline and third party projects.
- Includes projects within 20 km of PLNG project components.
- Over 2,000 projects and proposed projects were evaluated.
  - 35 projects identified with potential for cumulative effects
  - Of the 35 projects only 4 were likely to have an interaction with PLNG's projects
  - None likely to generate significant medium or long term adverse cumulative impact
  - Existing controls expected to limit any short-term adverse impacts

CEA conclusions state that there are no likely cumulative effects from the Plant or Quarry. There is a greater potential of a cumulative impact from the TgP pipeline than from other projects and there is a net positive impact on a regional / national scale.

# Appendix A Project Standards

# PROJECT ENVIRONMENTAL STANDARDS

## PERU LNG

### Background, Assumptions and Explanatory Notes

#### 1.0 INTRODUCTION

The purpose of this document is to summarise the national and international standards and guidelines that are applicable to the LNG plant, pipeline and quarry projects, specifically as cited in the source documents (see Section 3 below). The tables contained herein (see Appendix) complement a more detailed description of Peruvian Environmental laws and regulations applicable to the plant, pipeline and quarry (*Analysis of Obligations, 2006*, conducted by Estudio Osterling SC), and International Conventions, International Finance Institution (IFI) Guidelines and Requirements, and selective International Best Practices (conducted by IDP, LLP). Estudio Osterling SC provided the National input to the tables<sup>2</sup>. Collectively the tables and supporting documents form the basis for the “Project Standards” although it should be noted that the international material does not constitute a legal opinion and should be used for guidance only.

#### 2.0 PROJECT COMMITMENTS

The Plant and Pipeline EIAs both make the following statement:

*“Peru LNG has committed to comply with industry best practices and the more stringent of limits or standards set by the World Bank Group or Peruvian regulations. According to both of these standards, national and international, PERU LNG will comply with the more strict standards, always maintaining the levels obtained in the baseline analysis as criteria”.* (Plant ESIA, Section 3.6; Pipeline EIA Section 3.6).

In the absence of relevant Peruvian or World Bank Group (WBG) standards or guidelines, the EIAs also commit the projects to best available technology:

*“These segregated wastewater sewer systems will be provided for drainage and collection of wastewater sources to allow necessary treatment to meet Peruvian Effluent Standards and World Bank Effluent Guidelines or best available technology where no guideline exists”* (DGAA Obs 2/24/04, Response 20.5).

Other similar statements are made in relation to other aspects of the projects.

*Appropriate internationally accepted hydrotest practices shall be considered during the development of the Hydrotest Water Management Plan when the proposed test method is known.* (Lender Review 2/11/06, Section 5.22 Environmental Standards)

*The inspectors will verify that during the execution of the project the best environmental protection practices are being applied in accordance with the specifications established during the assessment process.* (Plant EIA Ch. V, 4.2.1.5)

*The EMMP specifically addresses the monitoring that will be employed during the dredging operations in Data Sheet SM-2- Monitoring of Water Quality to ensure compliance with the turbidity standards set by IFC for Port and Harbor Facilities and the Best Management Practices that will be employed.* (Lender Review 2/11/06, 2.14 Dredging).

The following tables therefore attempt to set out the range of numeric standards in order that the governing standards can be determined and subsequently used by the design and procurement teams.

#### 3.0 SOURCE MATERIALS

The source materials for this review were as follows: the EIAs and their amendments, Observations and Responses to Observations, Construction Management Plans, and Commitments Registers. As noted above, the individual Peruvian laws and regulations cited in these documents were reviewed as a separate exercise to derive the National Standards. WBG Pollution Prevention Abatement Handbook (PPAH) is the principal reference cited in the above source documents for the international material, and forms an important source of technical material. This material has been used to confirm the material contained in the source documents and where necessary clarify any ambiguities.

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<sup>2</sup> Some National Standards data not covered by the Estudio Osterling SC review has been included to cover perceived gaps (e.g., Sea water quality).

The WBG Guidelines are arranged by industrial sectors, with the standards varying accordingly. Where the facility in question is not covered by a specific industry guideline, a set of General Environmental Guidelines apply.

Guidelines that are relevant to the three projects listed above are as follows:

- World Bank Pollution Prevention and Abatement Handbook (1998); General Environmental Guideline
- IFC Environmental Health & Safety Guideline-Oil & Gas Development (Onshore)
- IFC Environmental Health & Safety Guideline-Oil & Gas Development (Offshore)
- Thermal Power (Guidelines for New Plants)
- IFC Environmental Health & Safety Guideline-Ports & Harbours
- IFC Oil & Gas (Offshore)
- Environmental Health & Safety Guideline-Waste Management Facilities
- Environmental Health & Safety Guideline-Hazardous Materials Management (2001)
- Environmental Guideline for Liquid Natural Gas (LNG) Liquefaction and Regasification Plants

Since LNG plants and thermal power plants utilize similar equipment that is similar in type and size, the quantitative guidelines on emissions and effluents described in the Thermal Power Guideline are used. This is in line with the approach taken by EXIM and is consistent with the data referenced in the EIA and Contractor Management Plans (CMPs).

It is not always possible to be specific about the governing standard as some depend on plant type and size, power rating, fuel type, etc. In these instances multiple options have been quoted in the tables. Where appropriate a comment is made to clarify conflicts or apparent contradictions, areas of ambiguity or where the governing standard may be difficult to meet if strictly applied. In these instances it is incumbent of the Project to develop a substantiated alternative although it is recognised that the Peruvian authorities are likely to interpret the EIAs and associated source documents strictly and literally.

In addition to the WBG, the standards used by other IFIs and international organisations are quoted for guidance purposes, particularly with respect to gauging best practice. For example, there are no WBG standards for drinking water quality – they refer to WHO. In general, therefore, the 'Project Commitment', as contained in the attached tables, has been determined by comparing the Peruvian regulation or standard with a WBG equivalent, with the stricter of the two defining the project standard (refer to EIA commitment above). The 'source' or 'origin' of the relevant standard is highlighted in the following tables in blue typeface for ease of reference. Only where there is no Peruvian of WBG standard or guideline has it been necessary to revert to an alternative international source.

#### **4.0 NATIONAL VS WBG STANDARDS**

In general the WBG standards are more arduous, but often the difference is small. Where the difference is significant (at least numerically), the parameter concerned is highlighted in red for easy reference. Standards highlighted in blue are the most stringent for the defined parameter or topic.

#### **5.0 POINTS OF CLARIFICATION**

A number of points of clarification concerning the National laws and regulations are noted in the tables.

## **APPENDIX**

### **SUMMARY TABLES**

**Table 1: Emissions to Air**

**Table 2: Environmental Quality Standards for Ambient Air**

**Table 3: Water Discharge Control Standards**

**Table 4: Environmental Quality Standards for Surface Waters**

**Table 5: Noise Emission Control Standards**

**Table 1: Emissions to Air**

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Spec.	Comment/ rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
Emission sources  <50 MWe	None applicable	<p>General Env't Guidelines (Table 1) &amp; Gas Terminal Systems Oil &amp; Gas Development (Onshore) Table 3</p> <p><b>NOx (as NO<sub>2</sub>) :</b></p> <p>Oil: 460 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p>Gas: 320 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p><b>Sulfur dioxide:</b></p> <p>SO<sub>2</sub>: Not to exceed 2,000 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p><b>Hydrogen sulphide</b> 30 mg/Nm<sup>3</sup> Particulate Matter: <b>100 mg/Nm<sup>3</sup></b></p>	<p>Table 6: Thermal, gas turbine, and Diesel Driven Power Plants</p> <p>(Applicable to plant with equivalent heat input &gt;10 million BTU/hr; ca 2.9 MWe)</p> <p><b>NOx (as NO<sub>2</sub>) :</b></p> <p><b>1. Steam power plants</b></p> <p>a. Gas: 320 mg/NM<sup>3</sup></p> <p>b. Oil: 460 mg/NM<sup>3</sup></p> <p><b>2. Combustion Turbine Plants</b></p> <p>a. Gas: 125 mg/NM<sup>3</sup></p> <p>b. Diesel: 165 mg/NM<sup>3</sup></p> <p>c. Fuel oil: 300 mg/NM<sup>3</sup> (460 mg/NM<sup>3</sup> for Onshore oil &amp; gas guideline; Table 5)</p> <p><b>3. Engine driven plant:</b></p> <p>2,000 mg/NM<sup>3</sup></p> <p><b>Sulfur dioxide:</b></p> <p>Per power plant site:</p> <p>0.2 t/day/MWe (first 500 MWe)      0.1 t/day/MWe (ea. additional. MWe &gt; 500 MWe)</p>	<p>LCP Directive (2001/80/EC)</p> <p>NO<sub>x</sub>: 75 mg/Nm<sup>3</sup> (15% O<sub>2</sub>, only above 70% load on the machine)</p> <p>SO<sub>2</sub>: 35 mg/Nm<sup>3</sup> (3% O<sub>2</sub>)</p> <p>PM<sub>10</sub>: 12 mg/Nm<sup>3</sup> (15% O<sub>2</sub>)</p> <p>IPPC Directive (96/61/EC) likely to apply requiring site-specific emission conditions to be defined in IPPC Permit for the Installation.</p>	<p><b>NOx (as NO<sub>2</sub>) :</b></p> <p>Oil: 460 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p>Gas: 320 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p><b>Sulfur dioxide:</b></p> <p>SO<sub>2</sub>: Not to exceed 2,000 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p><b>Hydrogen sulphide</b> 30 mg/Nm<sup>3</sup></p> <p>Particulate Matter: <b>50 mg/Nm<sup>3</sup></b></p>	WBG	<p>Peru has no emission standards except for vehicles (refer EIA Section 3.4.3.2), and while the National review refers to 'Max. allowable limits' p 76, these have not yet been set by MEM (the authority in charge of regulating the Energy Sector in Peru) for liquefaction plants.</p> <p>The LCP Directive is included for reference only, as it applies to units &gt;50 MWe</p> <p>The IPPC Directive relies on BAT in the determination of emission limits, BAT in turn takes account of the technical characteristics of the installation, the geographical location and local environmental conditions.</p>

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Spec.	Comment/ rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
			(1000 mg/NM <sup>3</sup> (max. in the flue pipe; Onshore oil & gas guideline, Table 5) <b>Particulate Matter:</b> PM <sub>10</sub> : 50 mg/NM <sup>3</sup>				

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Spec.	Comment/ rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
Emission sources >50 - 500 MWe	None applicable	<p>Thermal Power Plant Guidelines /LNG Liquefaction Plants</p> <p><b>Maximum emission levels to be achieved for at least 95% of the time that the plant/unit is operating, to be calculated as a proportion of annual operating hours</b></p> <p><b>NO<sub>x</sub> (as NO<sub>2</sub>) :</b></p> <p>1. Combustion Turbine Units</p> <p>Fuel-oil: 300 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p>Diesel: 165 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p>Gas: 125 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p>2. Engine-driven power units</p> <p>NO<sub>x</sub> &lt;2,000 mg/Nm<sup>3</sup></p> <p>3. Furnaces/heaters</p> <p>Gas: 320 mg/Nm<sup>3</sup> (3% oxygen)</p> <p><b>Sulfur dioxide</b></p> <p>SO<sub>2</sub>: Not to exceed 2,000 mg/Nm<sup>3</sup> (3% O<sub>2</sub> dry)</p>	<p>Table 10: LNG plants</p> <p><b>NO<sub>x</sub> (asNO<sub>2</sub>) :</b></p> <p>Combustion turbines, gas fuel: 125 mg/Nm<sup>3</sup> dry at 15% oxygen) Furnaces/heaters, gas fuel: 320 mg/Nm<sup>3</sup> (3% oxygen)</p> <p>Furnace/heaters Gas: 320 mg/NM<sup>3</sup></p> <p><b>Sulfur dioxide:</b></p> <p>When using untreated gas: 2,000 mg/Nm<sup>3</sup> max. level of SO<sub>2</sub> in exhaust gas</p> <p><b>Particulates:</b> PM<sub>10</sub> 50 mg/Nm<sup>3</sup></p>	<p>LCP Directive (2001/80/EC)</p> <p>NO<sub>x</sub>: 120 mg/Nm<sup>3</sup> (15% O<sub>2</sub>, only above 70% load on the machine)</p> <p>Directive 1999/32/EC limiting sulphur content of certain liquid fuels</p> <p>SO<sub>2</sub>:</p> <p>Maximum sulphur content in fuel is limited to 0.2% until January 2008 and then 0.1% thereafter</p> <p>IPPC Directive (96/61/EC) likely to apply requiring site-specific emission conditions to be defined in IPPC Permit for the Installation.</p>	<p><b>NO<sub>x</sub> (as NO<sub>2</sub>) :</b></p> <p>1. Combustion Turbine Units</p> <p>Fuel-oil: 300 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p>Diesel: 165 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p>Gas: 125 mg/Nm<sup>3</sup> (15% O<sub>2</sub> dry)</p> <p>2. Engine-driven power units</p> <p>NO<sub>x</sub> &lt;2,000 mg/Nm<sup>3</sup></p> <p>3. Furnaces/heaters</p> <p>Gas: 320 mg/Nm<sup>3</sup> (3% oxygen)</p> <p><b>Sulfur dioxide</b></p> <p>SO<sub>2</sub>: Not to exceed 2,000 mg/Nm<sup>3</sup> (3% O<sub>2</sub> dry) Particulate Matter:</p> <p>50 mg/Nm</p>	WBG	<p>WBG Thermal Power: Guidelines for New Power Plants assumed as relevant reference source, refer EXIM Guideline Table 10</p> <p>WBG standards applicable in airsheds with moderate air quality. Plants &gt; 500 MWe in airsheds with moderate air quality are subject to site specific requirements</p>

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Spec.	Comment/ rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
		Particulate Matter: 50 mg/Nm <sup>3</sup>					

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group		EU Standards (EBRD, SACE, COFACE, ECGD)			
Incinerator – Construction and Operational Phases	No limits exist	IFC Environmental, Health and Safety Guidelines for Waste Management Facilities		2000/76/EC Directive  Daily average values • Total Dust: 10 mg/m <sup>3</sup>	NO <sub>2</sub> :  Oil fired: 460 mg/Nm <sup>3</sup>	WBG	There are no relevant Peruvian emission standards therefore IFC standards will apply.

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group		EU Standards (EBRD, SACE, COFACE, ECGD)			
		<p>Maximum values:</p> <p>NO<sub>2</sub>:</p> <p>Oil fired: 460 mg/Nm<sup>3</sup></p> <p>Gas fired: 320 mg/Nm<sup>3</sup></p> <p>SO<sub>2</sub>: 2,000 mg/Nm<sup>3</sup></p> <p>Particulates: 100 mg/Nm<sup>3</sup></p> <p>Dioxin: 1 ng/Nm<sup>3</sup></p> <p>Furan: 1 ng/Nm<sup>3</sup></p>		<ul style="list-style-type: none"> <li>Total organic carbon: 10 mg/m<sup>3</sup></li> <li>HCl: 10 mg/m<sup>3</sup></li> <li>HF: 1 mg/m<sup>3</sup></li> <li>SO<sub>2</sub>: 20 mg/m<sup>3</sup></li> <li>NO<sub>2</sub>: 200 mg/m<sup>3</sup></li> </ul> <p><i>Half-hourly average values (100% compliance)</i></p> <ul style="list-style-type: none"> <li>Total Dust: 30 mg/m<sup>3</sup></li> <li>Total organic carbon: 20 mg/m<sup>3</sup></li> <li>HCl: 60 mg/m<sup>3</sup></li> <li>HF: 4 mg/m<sup>3</sup></li> <li>SO<sub>2</sub>: 200 mg/m<sup>3</sup></li> <li>NO<sub>2</sub>: 400 mg/m<sup>3</sup></li> </ul> <p><i>Half-hourly average values (97% compliance)</i></p> <ul style="list-style-type: none"> <li>Total Dust: 10 mg/m<sup>3</sup></li> <li>Total organic carbon: 10 mg/m<sup>3</sup></li> <li>HCl: 10 mg/m<sup>3</sup></li> <li>HF: 2 mg/m<sup>3</sup></li> <li>SO<sub>2</sub>: 50 mg/m<sup>3</sup></li> <li>NO<sub>2</sub>: 200 mg/m<sup>3</sup></li> </ul> <p><i>Average values over sample period of min 30 minutes and max 8 hours (metals and all compounds)</i></p> <ul style="list-style-type: none"> <li>Cd and Tl: total 0.05 mg/m<sup>3</sup></li> <li>Hg: 0.05 mg/m<sup>3</sup></li> <li>Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V: 0.5 mg/m<sup>3</sup></li> </ul> <p><i>Average values measured over sample period of min 6 hours and max 8 hours. Emission limit refers to total concentration of dioxins/furans calculated using concept of toxic equivalent.</i></p> <ul style="list-style-type: none"> <li>Dioxins and Furans:</li> </ul>	<p>Gas fired: 320 mg/Nm<sup>3</sup></p> <p>SO<sub>2</sub>:</p> <p>2,000 mg/Nm<sup>3</sup></p> <p>Particulates:</p> <p>100 mg/Nm<sup>3</sup></p> <p>Dioxin:</p> <p>1 ng/Nm<sup>3</sup></p> <p>Furan:</p> <p>1 ng/Nm<sup>3</sup></p>		<p>The more stringent EU standards for incinerators are included for reference but are unlikely to apply in Peru even with the involvement of an EU-based Lender (Note that IFC quotes maximum values and the EU Directive quotes daily average values). The general EIA commitments to meeting industry best practice might also need to be considered in this context- or at least a case developed to explain why such standards should not apply.</p>

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group		EU Standards (EBRD, SACE, COFACE, ECGD) 0.1 ng/m <sup>3</sup>			

### Table 2: Environmental Quality Standards for Ambient Air

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/Rationale
		World Bank Group	WHO	EU Standards (EBRD, SACE, COFACE, ECGD) <sup>3</sup>			
General Standards	<p><b>AMBIENT AIR ENVIRONMENTAL QUALITY STANDARDS</b></p> <p><b>(Supreme Decree 074-2001-PCM)</b></p> <p>Nitrogen Dioxide</p> <p><b>Annual Average: 100 µg/m<sup>3</sup></b></p> <p><b>1 hour: 200 µg/m<sup>3</sup></b></p> <p><b>Not to be exceeded more than 24 times per year.</b></p> <p>Carbon Monoxide</p> <p><b>8 hours: 10,000 µg/m<sup>3</sup></b></p> <p><b>Promedio Movil</b></p>	<p>PPAH Industry Sector Guidelines: Thermal Power: Guidelines for New Plants Table C1.</p> <p><b>Requires National ambient air quality standards, and in their absence recommends the following 24 hr and Annual Average standards:</b></p> <p><b>PM<sub>10</sub>: 150 / 50 µg/m<sup>3</sup></b></p> <p><b>TSP<sup>a</sup>: 230 / 80 µg/m<sup>3</sup></b></p> <p><b>NO<sub>2</sub>: 150 / 100 µg/m<sup>3</sup></b></p> <p><b>SO<sub>2</sub>: 150/ 80 µg/m<sup>3</sup></b></p> <p><sup>a</sup> Measurement of PM<sub>10</sub> is preferable to measurement of</p>	<p>Guidelines for Air Quality, WHO (1999):</p> <p><b>NO<sub>2</sub>:</b> Annual average: 40 µg/m<sup>3</sup> Hourly average: 200 µg/m<sup>3</sup></p> <p><b>CO:</b> 8-hr average, rolling: 10,000 µg/m<sup>3</sup> 1-hr average: 30,000 µg/m<sup>3</sup> 30-min average: 60,000 µg/m<sup>3</sup> 15-min average: 100,000 µg/m<sup>3</sup></p> <p><b>SO<sub>2</sub>:</b> Annual average: 50 µg/m<sup>3</sup> 24-hr average: 125 µg/m<sup>3</sup></p> <p>1-hr average: 350 µg/m<sup>3</sup></p> <p>10-min average: 500 µg/m<sup>3</sup></p>	<p>96/62/EC Framework Directive on Ambient Air Quality Assessment and Management (and Daughter Directives: 99/30/EC, 00/69/EC)</p> <p><b>NO<sub>2</sub>:</b> Annual average (2010): 40 µg/m<sup>3</sup></p> <p>Hourly average, not to be exceeded more than 18 times per calendar year (pcy) (2010): 200 µg/m<sup>3</sup></p> <p><b>CO:</b> 8-hr average, maximum rolling: 10,000 µg/m<sup>3</sup></p> <p><b>SO<sub>2</sub>:</b> 24-hr average, not to be exceeded more than 3 times pcy (2005): 125 µg/m<sup>3</sup></p> <p>1-hr average, not to be exceeded more than 24 times pcy (2005): 350 µg/m<sup>3</sup></p> <p><b>PM<sub>10</sub>:</b></p>	<p><b>NO<sub>2</sub>:</b></p> <p>Annual average: 100 µg/m<sup>3</sup></p> <p>24 hr 150 µg/m<sup>3</sup></p> <p><b>1 hour: 200 µg/m<sup>3</sup></b></p> <p><b>Not to be exceeded more than 24 times per year.</b></p> <p><b>CO:</b> 8-hr average, maximum rolling: 10,000 µg/m<sup>3</sup></p> <p>1-hr average: 30,000 µg/m<sup>3</sup></p> <p><b>(Not to be exceeded more than one time per year)</b></p> <p><b>SO<sub>2</sub>:</b> Annual average: 80 µg/m<sup>3</sup></p> <p>24-hr average: 150 µg/m<sup>3</sup></p>	<p><b>Combination of National and WBG.</b></p>	<p>WHO and future (2010) EU stricter than WBG and National</p> <p>WBG SO<sub>2</sub> 24-hr average &gt;2x stricter than National std</p> <p><b>Note the EIA and Plant Pollution CMP quotes the stricter WBG General Environmental Guidelines (Table 3 and 2.3 respectively):</b></p> <p><b>PM<sub>10</sub>: 70 µg/m<sup>3</sup> Ann. Av.</b></p> <p><b>SO<sub>2</sub>: 125µg/m<sup>3</sup> 24 hr av, 50 µg/m<sup>3</sup> Ann. Av.</b></p> <p>These are likely to be more relevant for the Quarry as no</p>

<sup>3</sup> Note: Annual averages of NO<sub>x</sub> and SO<sub>2</sub> for the protection of ecosystems are intended to reflect regional background concentrations and do not apply in the vicinity of industry, major roads or population centres.

Quarry	<p><b>1 hour: 30000 µg/m<sup>3</sup></b></p> <p><b>Not to be exceeded more than one time per year</b></p> <p>Sulphur Dioxide</p> <p><b>Annual Mean: 80 µg/m<sup>3</sup></b></p> <p>24 hours: 365 µg/m<sup>3</sup></p> <p><b>Not to be exceeded more than one time per year</b></p> <p>PM – 10</p> <p>Annual Mean: 50 µg/m<sup>3</sup></p> <p>24 hours: 150 µg/m<sup>3</sup></p> <p><b>Not to be exceeded more than three times per year</b></p> <p>Ozone</p> <p><b>8 hours: 120 µg/m<sup>3</sup></b></p> <p><b>Not to be exceeded more than 24 times per year</b></p>	<p><b>TSP.</b></p> <p>Oil &amp; Gas Development (Onshore), Table 3</p> <p>Hydrogen sulphide <b>&lt;5mg/m<sup>3</sup> at property boundary</b></p>	<p><b>PM<sub>10</sub>:</b></p> <p>Annual average: 50 µg/m<sup>3</sup></p> <p>24-hr average: 125 µg/m<sup>3</sup></p> <p>Black smoke:</p> <p>Annual average: 40-60 µg/m<sup>3</sup></p> <p>24-hr average: 120 µg/m<sup>3</sup></p> <p>Total suspended particulates:</p> <p>Annual average: 70 µg/m<sup>3</sup></p> <p>24-hr average: 150-230 µg/m<sup>3</sup></p>	<p>Annual average (2005): 40 µg/m<sup>3</sup></p> <p>24-hr average, not to be exceeded more than 35 times pcy (2005): 50 µg/m<sup>3</sup></p> <p>Annual average (2010): 20 µg/m<sup>3</sup></p> <p>24-hr average, not to be exceeded more than 7 times pcy (2010): 50 µg/m<sup>3</sup></p> <p>Benzene:</p> <p>Annual average: 5 µg/m<sup>3</sup></p>	<p>PM – 10</p> <p>Annual Mean: 50 µg/m<sup>3</sup></p> <p>24 hours: 150 µg/m<sup>3</sup> (Not to be exceeded more than three times per year)</p> <p>Ozone</p> <p><b>8 hours: 120 µg/m<sup>3</sup></b></p> <p><b>Not to be exceeded more than 24 times per year.</b></p> <p>Lead</p> <p><b>Annual : 0.5 µg/m<sup>3</sup></b></p> <p><b>Monthly average</b></p> <p><b>Monthly: 1.5 µg/m<sup>3</sup></b></p> <p><b>Not to be exceeded more than 4 times per year.</b></p> <p><b>Hydrogen sulphide</b></p> <p>&lt;5mg/m<sup>3</sup> at property boundary</p>		sector guidelines apply
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	<p>year.</p> <p>Lead</p> <p>Annual : 0.5 µg/m<sup>3</sup></p> <p>Monthly average</p> <p>Monthly: 1.5 µg/m<sup>3</sup></p> <p>Not to be exceeded more than 4 times per year.</p> <p>Hydrocarbons: 24hr av. 15,000 µg/m<sup>3</sup></p> <hr/> <p>Refer above to AMBIENT AIR ENVIRONMENTAL QUALITY STANDARDS (Supreme Decree 074-2001-PCM)</p>				<p>Refer above to AMBIENT AIR ENVIRONMENTAL QUALITY STANDARDS (Supreme Decree 074-2001-PCM)</p>	<p>National standards</p>	<p>Refer Quarry EIA S 2.4.2, Table 2-2. Note that there are no Maximum Allowed Limits (LMPs) for non- metallic mining, hence the reference to the General Ambient Air Quality Standards. Note also that the Estudio Osterling review makes reference to the following H&amp;S standards:</p> <p>Dust that could be inhaled : <b>10mg/m3</b></p> <p>Dust that could be breathed : <b>3mg/m3</b></p> <p>where inhaled taken to mean 10 micron diameter (i.e., PM 10 and breathed 2.5 micron diameter</p>
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**Table 3: Liquid Effluent Discharge Control Standards**

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment
		World Bank Group / WHO where specifically referenced)	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
Discharges to surface waters and soak-a-ways	<p>MAXIMUM PERMISSIBLE LEVELS FOR LIQUID EFFLUENTS AT LIQUID HYDROCARBON ACTIVITIES (Directorial Resolution 030-96-EM/DGAA)</p> <p><b>APPLICABLE TO PLANT</b></p> <p><b>pH</b> Value at any time: 5.5 - 9 Annual average: 5.5 - 9</p> <p><b>Oil and grease</b> Value at any time: 30 mg/l Annual Average: 20 mg/l</p> <p><b>Barium</b></p>	<p><b>Thermal Power: Guidelines for New Plants, Table 1</b></p> <ul style="list-style-type: none"> <li>pH: 6 – 9</li> <li>Oil &amp; grease 10mg/l</li> <li>TSS 50mg/l</li> </ul> <p><b>Metals:</b></p> <ul style="list-style-type: none"> <li>Cr total: 0.5 mg/l</li> <li>Cu: 0.5 mg/l</li> <li>Fe: 1.0 mg/l</li> <li>Zn: 1.0 mg/l</li> </ul> <p>Total residual chlorine 0.2 mg/l</p> <p>Temperature – at edge of designated mixing zone<sup>5</sup>: Max 3 deg C above ambient temp of receiving waters</p>	<p><b>EXIM Environmental Guidelines - Table 5 Oil and Gas - Onshore Development and Table 6 Thermal, Gas Turbine, and Diesel Driven Power Plants, Table 10 LNG Facilities</b></p> <p>pH 6-9</p> <p>BOD<sub>5</sub> 50 mg/l</p> <p>COD 250 mg/l</p> <p>TSS 50 mg/l</p> <p>Oil and grease 10 mg/l</p>	<p>Directive 91/271/EC on urban wastewater treatment</p> <ul style="list-style-type: none"> <li>BOD: 25 mg/l</li> <li>COD: 125 mg/l</li> <li>Total Suspended Solids: 35 mg/l</li> <li>Total Nitrogen 10-15mg/l</li> <li>Total Phosphorus 1-2mg/l</li> </ul> <p><b>EU Water Policy Framework described in Directive 2000/60/EC. IPPC Directive (96/61/EC) likely to apply requiring site-specific discharge conditions to be</b></p>	<p><b>APPLICABLE TO PLANT/PIPELINE</b></p> <p>pH 6-9 BOD: 50 mg/l COD: 250 mg/l TSS: 50 mg/l</p> <p>Oil &amp; grease: 10 mg/l</p> <p><b>Metals:</b></p> <ul style="list-style-type: none"> <li>Heavy metals, total: 10 mg/l</li> <li>As: 0.1 mg/l</li> <li>Cd: 0.1 mg/l</li> <li>Cr(6): 0.1 mg/l</li> <li>Cr total: 0.5 mg/l</li> <li>Cu: 0.5 mg/l</li> <li>Fe: 1.0 mg/l</li> <li>Pb: Value at any time: 0.4 mg/l; Annual average: 0.1 mg/l</li> <li>Hg: 0.01 mg/l</li> <li>Ni: 0.5 mg/l</li> </ul>	<p>For Plant/pipeline, WBG.</p> <p>For Quarry, National standards</p>	<p>National standards (Directorial Resolution 030-96-EM/DGAA) are virtually the same as WBG (less stringent in the case of oil &amp; grease and Pb).</p> <p>National standards for heavy metals very limited therefore WBG standards prevail</p> <p>EU Standards stricter for BOD, COD, TSS</p> <p><b>The General Environmental Guidelines. Process waters,</b></p>

<sup>4</sup> Equivalent to 0.1 mg/l CNfree and 0.2 mg/l CNwad

<sup>5</sup> A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and beyond which applicable water quality criteria should not be exceeded. In the case of a thermal plume, a mixing zone is generally defined as occupying no more than 25% of the cross section of a waterway channel (river, stream, etc.) so as to allow passage of aquatic life and permit other uses of the water. In the case of an open body of water, the mixing zone will be defined on a case-by-case basis taking into account factors such as the existing ecology and in particular, the presence of coral reefs.

<sup>6</sup> A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and beyond which applicable water quality criteria should not be exceeded. In the case of a thermal plume, a mixing zone is generally defined as occupying no more than 25% of the cross section of a waterway channel (river, stream, etc.) so as to allow passage of aquatic life and permit other uses of the water. In the case of an open body of water, the mixing zone will be defined on a case-by-case basis taking into account factors such as the existing ecology and in particular, the presence of coral reefs.

<sup>7</sup> A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and beyond which applicable water quality criteria should not be exceeded. In the case of a thermal plume, a mixing zone is generally defined as occupying no more than 25% of the cross section of a waterway channel (river, stream, etc.) so as to allow passage of aquatic life and permit other uses of the water. In the case of an open body of water, the mixing zone will be defined on a case-by-case basis taking into account factors such as the existing ecology and in particular, the presence of coral reefs.

<sup>8</sup> Equivalent to 0.1 mg/l CNfree and 0.2 mg/l CNwad

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment
		World Bank Group / WHO where specifically referenced)	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	Value at any time: 5.0 mg/l Annual average: 3.0 mg/l <b>Lead</b> Value at any time: 0.4 mg/l Annual average: 0.2 mg/l	—	Phenols 1.0 mg/l  Total Metals (except Barium) 5 mg/l  Cd 0.1 mg/l  Cr total: 0.5 mg/l  Cu: 0.5 mg/l  Fe: 3.5 mg/l  Hg 0.01 mg/l  Pb: 0.1 mg/l  Residual Cl 0.5 mg/l  Total coliforms <400MPN/100ml  Temperature – at edge of designated mixing zone <sup>6</sup> : Max 3 deg C above ambient temp of receiving waters  —	<b>defined in Discharge Permit for the Installation.</b>	<ul style="list-style-type: none"> <li>Se: 0.1 mg/l</li> <li>Ag: 0.5 mg/l</li> <li>Zn: 1.0 mg/l</li> </ul> <i>Cyanide:</i> <ul style="list-style-type: none"> <li>Free: 0.1 mg/l</li> <li>Total: 1.0 mg/l</li> </ul> <i>Nitrogen:</i> <ul style="list-style-type: none"> <li>NH<sub>3</sub>: 10 mg/l</li> </ul> Fluoride: 20 mg/l  Phosphorus: 2.0 mg/l  Total residual chlorine: 0.2 mg/l  Phenols: 0.5 mg/l  Sulphide: 1.0 mg/l  Coliform bacteria: < 400 MPN/100 ml  Temperature – at edge of designated mixing zone <sup>7</sup> : Max 3 deg C above ambient temp of receiving waters		<b>contaminated storm water and runoff (Table 4) provide a more complete list of parameters than Thermal Power: Guidelines for New Plants, Table 1. Additional parameters are as follows:</b>  All limits 95 <sup>th</sup> percentiles of annual operational hours.  <ul style="list-style-type: none"> <li>BOD: 50 mg/l</li> <li>COD: 250 mg/l</li> </ul> <i>Metals:</i> <ul style="list-style-type: none"> <li>Heavy metals, total: 10 mg/l</li> <li>As: 0.1 mg/l</li> <li>Cd: 0.1 mg/l</li> <li>Cr(6): 0.1 mg/l</li> <li>Pb: 0.1 mg/l</li> <li>Hg: 0.01 mg/l</li> <li>Ni: 0.5 mg/l</li> <li>Se: 0.1 mg/l</li> <li>Ag: 0.5 mg/l</li> </ul> <i>Cyanide:</i> <ul style="list-style-type: none"> <li>Free: 0.1 mg/l</li> <li>Total: 1.0 mg/l</li> </ul> <i>Nitrogen:</i> <ul style="list-style-type: none"> <li>NH<sub>3</sub>: 10 mg/l</li> </ul> Fluoride: 20 mg/l  Total residual chlorine: 0.2 mg/l  Phenols: 0.5 mg/l

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment
		World Bank Group / WHO where specifically referenced)	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
							<p>Phosphorus: 2.0 mg/l</p> <p>Sulphide: 1.0 mg/l</p> <p>Coliform bacteria: &lt; 400 MPN/100 ml</p> <p>Note that the Thermal Power standard for iron and zinc (1.0 mg/l) is more stringent than the equivalent General Standard (3.5 and 2.0 mg/l respectively).</p> <p>No WBG industry sector guidelines for quarries therefore General Environmental Guidelines apply. Only the annual av. WBG standards for Pb and As are stricter than the National equivalents, as noted in parenthesis in Project commitment column.</p> <p>WBG specifies 'surface waters' and doesn't distinguish between freshwater and marine</p>

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment
		World Bank Group / WHO where specifically referenced)	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<hr/> <p>MAXIMUM PERMISSIBLE LEVELS FOR LIQUID EFFLUENTS AT MINING ACTIVITIES (Ministerial Resolution 011-96-EM/VMM)</p> <p><b>APPLICABLE TO THE QUARRY</b></p> <p><b>pH</b> Value at any time: 6 - 9 Annual Average: 6 - 9</p> <p><b>Suspended Solids</b> Value at any time: 60 mg/l Annual Average: 25 mg/l</p> <p><b>Lead</b> Value at any time: 0.4 mg/l Annual average: 0.2 mg/l</p> <p><b>Copper</b> Value at any time: 1.0 mg/l Annual average: 0.3 mg/l</p> <p><b>Zinc</b></p>				<hr/> <p><b>QUARRY</b></p> <p><b>pH</b> Value at any time: 6 - 9 Annual Average: 6 - 9</p> <p><b>Suspended Solids</b> Value at any time: 60 mg/l Annual Average: 25 mg/l</p> <p><b>Lead</b> Value at any time: 0.4 mg/l Annual average: 0.1 mg/l (WBG)</p> <p><b>Copper</b> Value at any time: 1.0 mg/l Annual average: 0.3 mg/l</p> <p><b>Zinc</b> Value at any time: 3.0 mg/l Annual average: 1.0 mg/l</p> <p><b>Iron</b> Value at any time: 2.0 mg/l Annual average: 1.0 mg/l</p> <p><b>Arsenic</b> Value at any time:</p>	<hr/> <hr/>	



Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment
		World Bank Group / WHO where specifically referenced)	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
Wastewater reuse							
Marine Outfalls	<p>MAXIMUM PERMISSIBLE LEVELS FOR LIQUID EFFLUENTS AT LIQUID HYDROCARBON ACTIVITIES (Directorial Resolution 030-96-EM/DGAA)</p> <p><b>APPLICABLE TO PLANT</b></p> <p><b>pH</b> Value at any time: 5.5 - 9 Annual average 5.5 - 9</p> <p><b>Oil and grease</b> Value at any time: 50 mg/l</p>	<p><b>General Environmental Guidelines, Table 4</b></p> <p>All limits are for the 95<sup>th</sup> percentiles of annual operational hours.</p> <ul style="list-style-type: none"> <li>pH: 6 – 9</li> <li>BOD: 50 mg/l</li> <li>COD: 250 mg/l</li> <li>Oil and grease: 10 mg/l</li> <li>Total suspended solids: 50 mg/l</li> </ul> <p><b>Metals:</b></p> <ul style="list-style-type: none"> <li>Heavy metals, total: 10 mg/l</li> <li>As: 0.1 mg/l</li> <li>Cd: 0.1 mg/l</li> <li>Cr(6): 0.1 mg/l</li> </ul>	<p><b>EXIM Environmental Guidelines - Table 5 Oil and Gas - Onshore Development and Table 6 Thermal, Gas Turbine, and Diesel Driven Power Plants, Table 10 LNG Facilities</b></p> <p>pH 6-9</p> <p>BOD<sub>5</sub> 50 mg/l</p> <p>COD 250 mg/l</p> <p>TSS 50 mg/l</p>	<p>Directive 91/271/EC on urban wastewater treatment</p> <ul style="list-style-type: none"> <li>BOD: 25 mg/l</li> <li>COD: 125 mg/l</li> <li>Total Suspended Solids: 35 mg/l</li> <li>Total Nitrogen 10-15mg/l</li> <li>Total Phosphorus 1-2mg/l</li> </ul> <p>EU Water Policy Framework described in Directive 2000/60/EC. IPPC Directive (96/61/EC) likely to apply requiring site-specific discharge conditions</p>	<p><b>APPLICABLE TO PLANT</b></p> <p>pH 6-9 BOD: 50 mg/l COD: 250 mg/l TSS: 50 mg/l <b>Oil &amp; grease: 10mg/l</b></p> <p><b>Metals:</b></p> <ul style="list-style-type: none"> <li>Heavy metals, total: 10 mg/l</li> <li>As: 0.1 mg/l</li> <li>Cd: 0.1 mg/l</li> <li>Cr(6): 0.1 mg/l</li> <li>Cr total: 0.5 mg/l</li> <li>Cu: 0.5 mg/l</li> <li>Fe: 1.0 mg/l</li> <li>Pb: 0.1 mg/l</li> <li>Hg: 0.01 mg/l</li> <li>Ni: 0.5 mg/l</li> <li>Se: 0.1 mg/l</li> </ul>	WBG	WBG std for oil & grease 3 times tighter than National std

<sup>9</sup> A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and beyond which applicable water quality criteria should not be exceeded. In the case of a thermal plume, a mixing zone is generally defined as occupying no more than 25% of the cross section of a waterway channel (river, stream, etc.) so as to allow passage of aquatic life and permit other uses of the water. In the case of an open body of water, the mixing zone will be defined on a case-by-case basis taking into account factors such as the existing ecology and in particular, the presence of coral reefs.

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment
		World Bank Group / WHO where specifically referenced)	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	Annual average: 30 mg/l  <b>Barium</b> Value at any time: 5.0 mg/l Annual average: 3.0 mg/l  <b>Lead</b> Value at any time: 0.4 mg/l Annual average: 0.2 mg/l	<ul style="list-style-type: none"> <li>Cr total: 0.5 mg/l</li> <li>Cu: 0.5 mg/l</li> <li>Fe: 3.5 mg/l</li> <li>Pb: 0.1 mg/l</li> <li>Hg: 0.01 mg/l</li> <li>Ni: 0.5 mg/l</li> <li>Se: 0.1 mg/l</li> <li>Ag: 0.5 mg/l</li> <li>Zn: 2.0 mg/l</li> </ul> <b>Cyanide:</b> <ul style="list-style-type: none"> <li>Free: 0.1 mg/l</li> <li>Total: 1.0 mg/l</li> <li>NH<sub>3</sub>: 10 mg/l</li> <li>Fluoride: 20 mg/l</li> <li>Total residual chlorine: 0.2 mg/l</li> <li>Phenols: 0.5 mg/l</li> <li>Phosphorus: 2.0 mg/l</li> <li>Sulphide: 1.0 mg/l</li> <li>Coliform bacteria: &lt; 400 MPN/100 ml</li> </ul> <b>Thermal Power: Guidelines for New Plants:</b>  Same as above except: <ul style="list-style-type: none"> <li>Fe: 1.0 mg/l</li> <li>Zn: 1.0 mg/l</li> </ul>	Oil and grease 20-40 mg/l  Phenols 1.0 mg/l  Total Metals (except Barium) 5 mg/l  Cd 0.1 mg/l  Cr total: 0.5 mg/l  Cu: 0.5 mg/l  Fe: 3.5 mg/l  Hg 0.01 mg/l  Pb: 0.1 mg/l  Residual Cl 0.5 mg/l  Total coliforms <400MPN/100ml  Temperature – at edge of designated mixing zone <sup>9</sup> : Max 3 deg C above ambient temp of receiving waters.	to be defined in Discharge Permit for the Installations.	<ul style="list-style-type: none"> <li>Ag: 0.5 mg/l</li> <li>Zn: 1.0 mg/l</li> </ul> <b>Cyanide:</b> <ul style="list-style-type: none"> <li>Free: 0.1 mg/l</li> <li>Total: 1.0 mg/l</li> </ul> <b>Nitrogen:</b> <ul style="list-style-type: none"> <li>NH<sub>3</sub>: 10 mg/l</li> <li>Fluoride: 20 mg/l</li> <li>Total residual chlorine: 0.2 mg/l</li> <li>Phenols: 0.5 mg/l</li> <li>Phosphorus: 2.0 mg/l</li> <li>Sulphide: 1.0 mg/l</li> <li>Coliform bacteria: &lt; 400 MPN/100 ml</li> </ul>		
Hydrostatic test water	<b>Amendment EIA:</b> <ul style="list-style-type: none"> <li>pH: 6 – 9</li> <li>BOD: 50 mg/l</li> </ul>	<b>General Environmental Guidelines, Table 4</b>			<ul style="list-style-type: none"> <li>pH: 6 – 9</li> <li>BOD: 50 mg/l</li> <li>COD: 250 mg/l</li> <li>Oil &amp; grease 10mg/l</li> </ul>	<b>Combination of National and WBG</b>	

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment
		World Bank Group / WHO where specifically referenced)	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<ul style="list-style-type: none"> <li>• COD: 250 mg/l</li> <li>• Oil &amp; grease 10mg/l</li> <li>• TSS 50mg/l</li> <li>• Total heavy metals (As, Cr, Pb, Hg, Ni, Zn): 10 mg/l</li> <li>• Nitrogen: (NH<sub>3</sub>): 10 mg/l</li> <li>• Phenols: 0.5 mg/l</li> <li>• Phosphorus: 2.0 mg/l</li> <li>• Temperature increase &lt;3 degrees C</li> </ul>	<ul style="list-style-type: none"> <li>• pH: 6 – 9</li> <li>• BOD: 50 mg/l</li> <li>• COD: 250 mg/l</li> <li>• Oil &amp; grease 10mg/l</li> <li>• TSS 50mg/l</li> <li>• Total heavy metals (As, Cr, Pb, Hg, Ni, Zn): 10 mg/l</li> <li>• Nitrogen: (NH<sub>3</sub>): 10 mg/l</li> <li>• Phenols: 0.5 mg/l</li> <li>• Phosphorus: 2.0 mg/l</li> </ul>			<ul style="list-style-type: none"> <li>• TSS 50mg/l</li> <li>• Total heavy metals (As, Cr, Pb, Hg, Ni, Zn) total: 10 mg/l</li> <li>• Nitrogen: (NH<sub>3</sub>): 10 mg/l</li> <li>• Phenols: 0.5 mg/l</li> <li>• Phosphorus: 2.0 mg/l</li> <li>• Temperature increase &lt;3 degrees C</li> </ul>		

**Table 4: Environmental Quality Standards for Surface Waters (i.e. Ambient)**

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
<b>Freshwater</b>	<p><b>AMBIENT WATER PRESERVATION STANDARDS <sup>10</sup> (REGULATIONS TO THE GENERAL WATER LAW)</b></p> <p><b>BACTERIOLOGICAL LIMITS <sup>11</sup></b></p> <p><b>(Maximum value in 80% of five or more monthly samples)</b></p> <p>Total coliforms</p> <p><b>Class I:</b></p> <p><b>8.8 MPN/100mL</b></p> <p><b>Class II:</b></p> <p><b>20000 MPN/100mL</b></p>	None specified	None specified	<p><b>Directive 78/659/EEC</b></p> <p><b>Salmonid Waters:</b></p> <ul style="list-style-type: none"> <li>pH: 6-9</li> <li>BOD, guide: 3 mg/l</li> <li>Dissolved oxygen, at least 50% of time: 9 mg/l</li> <li>Dissolved oxygen, at least 100% of time: 7 mg/l</li> </ul> <p>Petroleum products must not:</p> <p>Form a visible film on the surface of water or form coatings on the beds of water-courses and lakes</p> <p>Impart a detectable 'hydrocarbon taste to fish'</p> <p>Produce harmful effects in fish</p> <ul style="list-style-type: none"> <li>Total suspended solids: Baseline</li> </ul>	<b>As per National ambient preservation standards (Column 2)</b>	<b>National</b>	<p>Clarify whether Class I includes criteria for drinking water</p> <p>(<i>Class I:</i> Domestic supply water with simple disinfection. <i>Class II:</i> Domestic supply water with treatment equivalent to combined processes involving mixture and coagulation, sedimentation, filtering and chlorination, approved by the Ministry of Health. <i>Class III:</i> Irrigation water for vegetables to be consumed raw and animal drinking water. <i>Class IV:</i> Water of recreational areas of</p>

<sup>10</sup> Each water body –continental or marine- is classified (Classes I-VI) by *Dirección General de Salud Ambiental* –DIGESA (Health Authority), according to the use given to the water body. Please refer to Endnote for a description of each class. Maximum temperatures shall be determined by the Health Authority in terms of short and/or weekly exposition.

<sup>11</sup> Expressed in Most Probable Number (MPN) / 100 ml

<sup>12</sup> Value to be determined. In case of suspecting presence of this substance, values assigned to Class V shall be applied provisionally.

<sup>13</sup> 96 hours LC50 x 0.02 test.

<sup>14</sup> 96 hours LC50 x 0.1 test.

<sup>15</sup> As modified by Supreme Decree No. 003-2003-SA.

<sup>16</sup> Hexane extractable material (grasa principalmente).

<sup>17</sup> Active Substances to Blue Methylene (principally detergent).

<sup>18</sup> Carbon, alcohol extractables (according to *método de flujo lento*).

<sup>19</sup> Carbon, chloroform extractables (according to *método de flujo lento*).

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<p><b>Class III:</b> 5000 MPN/100mL</p> <p><b>Class IV:</b> 5000 MPN/100mL</p> <p><b>Class V:</b> 1000 MPN/100mL</p> <p><b>Class VI:</b> 20000 MPN/100mL</p> <p>Fecal coliforms</p> <p><b>Class I:</b> 0 NPM/100mL</p> <p><b>Class II:</b> 4000 NPM/100mL</p> <p><b>Class III:</b> 1000 NPM/100mL</p> <p><b>Class IV:</b> 1000 NPM/100mL</p> <p><b>Class V:</b> 200 NPM/100mL</p> <p><b>Class VI:</b> 4000 NPM/100mL</p> <p><b>BIOCHEMICAL OXYGEN DEMAND AND DISSOLVED OXYGEN LEVELS</b></p>			<p>conc. 25 mg/l</p> <p><b>Metals:</b></p> <ul style="list-style-type: none"> <li>• Cu (assuming hardness 100 mg/l CaCO<sub>3</sub>): 0.04 mg/l</li> <li>• Zn (assuming hardness 100 mg/l CaCO<sub>3</sub>): 0.3 mg/l</li> <li>• Ammonia (non-ionised), guide: 0.005 mg/l</li> <li>• Ammonia (non-ionised), mandatory: 0.025 mg/l</li> <li>• Ammonia (total) guide: 1 mg/l</li> <li>• Ammonia (total) mandatory: 0.04 mg/l</li> <li>• Chlorine, total residual (HOCl): 0.005 mg/l</li> <li>• Nitrates (guide): 0.1 mg/l</li> </ul> <p>Phenolic compounds must not be present in such concentrations that they adversely affect fish flavour.</p> <p>Temperature measured downstream of a point of thermal discharge (at edge of mixing zone) must not exceed the unaffected temperature by more than: 1.5°C.</p> <p>Thermal discharges</p>			<p>primary contact (toilets and similar). Class V: Water of bivalve seafood fishing areas. Class VI: Water of fauna preservation areas and recreational or commercial fishing.</p> <p><b>Note: EIA quotes DO for Class I as 5 mg/l EIA Section 3, Table 3.2</b></p>

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<p>(Five days, 20° C)</p> <p>Dissolved Oxygen</p> <p><b>Class I: 3 mg/L</b></p> <p><b>Class II: 3 mg/L</b></p> <p><b>Class III: 3 mg/L</b></p> <p><b>Class IV: 3 mg/L</b></p> <p><b>Class V: 5 mg/L</b></p> <p><b>Class VI: 4 mg/L</b></p> <p>BOD</p> <p><b>Class I: 5 mg/L</b></p> <p><b>Class II: 5 mg/L</b></p> <p><b>Class III: 15 mg/L</b></p> <p><b>Class IV: 10 mg/L</b></p> <p><b>Class V: 10 mg/L</b></p> <p><b>Class VI: 10 mg/L</b></p> <p>Oils and Grease</p> <p><b>Class I: 1.5 mg/L</b></p> <p><b>Class II: 1.5 mg/L</b></p> <p><b>Class III: 0.5 mg/L</b></p> <p><b>Class IV: 0.2 mg/L</b></p> <p><b>Class V: 10 mg/L</b></p> <p><b>Class VI: 10 mg/L</b></p>			<p>must not cause the temperature downstream of the point of thermal discharge (at edge of mixing zone) to exceed: 22.5°C (10°C during breeding season).</p> <p><b>Cyprinid Waters:</b></p> <ul style="list-style-type: none"> <li>pH: 6-9</li> <li>BOD (guide): 6 mg/l</li> <li>Dissolved oxygen, at least 50% of time: 7 mg/l</li> <li>Dissolved oxygen, at least 100% of time: 5 mg/l</li> </ul> <p>Petroleum products must not: Form a visible film on the surface of water or form coatings on the beds of water-courses and lakes Impart a detectable 'hydrocarbon taste to fish' Produce harmful effects in fish</p> <ul style="list-style-type: none"> <li>Total suspended solids: Baseline conc. 25 mg/l</li> </ul> <p><b>Metals:</b></p> <ul style="list-style-type: none"> <li>Cu (assuming hardness 100 mg/l CaCO<sub>3</sub>): 0.04 mg/l</li> <li>Zn (assuming hardness 100 mg/l</li> </ul>			

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<p><b>LEVELS OF POTENTIALLY HAZARDOUS SUBSTANCES</b></p> <p>(Not applicable to Class IV use)</p> <p>Selenium</p> <p><i>Class I: 0.01 mg/L</i></p> <p><i>Class II: 0.01 mg/L</i></p> <p><i>Class III: 0.05 mg/L</i></p> <p><i>Class V: 0.005 mg/L</i></p> <p><i>Class VI 0.01 mg/L</i></p> <p>Mercury</p> <p><i>Class I: 0.002 mg/L</i></p> <p><i>Class II: 0.002 mg/L</i></p> <p><i>Class III: 0.01 mg/L</i></p> <p><i>Class V: 0.0001 mg/L</i></p> <p><i>Class VI: 0.0002 mg/L</i></p> <p>PCB</p>			<p>CaCO<sub>3</sub>: 0.1 mg/l</p> <ul style="list-style-type: none"> <li>Ammonia (non-ionised), guide: 0.005 mg/l</li> <li>Ammonia (non-ionised), mandatory: 0.025 mg/l</li> <li>Ammonia (total) guide: 1.0 mg/l</li> <li>Ammonia (total) mandatory: 2.0 mg/l</li> <li>Chlorine, total residual (HOCl): 0.005 mg/l</li> <li>Nitrates (guide): 0.03 mg/l</li> </ul> <p>Phenolic compounds must not be present in such concentrations that they adversely affect fish flavour.</p> <p>Temperature measured downstream of a point of thermal discharge (at edge of mixing zone) must not exceed the unaffected temperature by more than: 3.0°C.</p> <p>Thermal discharges must not cause the temperature downstream of the point of thermal discharge (at edge of mixing zone) to exceed: 28°C (10°C during breeding)</p>			

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<p><i>Class I: 0.001 mg/L</i></p> <p><i>Class II: 0.001 mg/L</i></p> <p><i>Class III<sup>12</sup></i></p> <p><i>Class V: 0.002 mg/L</i></p> <p><i>Class VI: 0.002 mg/L</i></p> <p>Estalate Esters</p> <p><i>Class I: 0.0003 mg/L</i></p> <p><i>Class II: 0.0003 mg/L</i></p> <p><i>Class III: 0.0003 mg/L</i></p> <p><i>Class V: 0.0003 mg/L</i></p> <p><i>Class VI: 0.0003 mg/L</i></p> <p>Cadmium</p> <p><i>Class I: 0.01 mg/L</i></p> <p><i>Class II: 0.01 mg/L</i></p> <p><i>Class III: 0.05 mg/L</i></p> <p><i>Class V: 0.0002 mg/L</i></p> <p><i>Class VI: 0.004 mg/L</i></p> <p>Chromium</p> <p><i>Class I: 0.05 mg/L</i></p> <p><i>Class II: 0.05 mg/L</i></p>			season).			

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<p><i>Class III: 1.00 mg/L</i> <i>Class V: 0.05 mg/L</i> <i>Class VI: 0.05 mg/L</i></p> <p>Nickel</p> <p><i>Class I: 0.002 mg/L</i> <i>Class II: 0.002 mg/L</i> <i>Class III: <sup>6</sup></i> <i>Class V: 0.002 mg/L</i> <i>Class VI: <sup>13</sup></i></p> <p>Copper</p> <p><i>Class I: 1.0 mg/L</i> <i>Class II: 1.0 mg/L</i> <i>Class III: 0.50 mg/L</i> <i>Class V: 0.01 mg/L</i> <i>Class VI: <sup>14</sup></i></p> <p>Lead</p> <p><i>Class I: 0.05 mg/L</i> <i>Class II: 0.05 mg/L</i> <i>Class III: 0.1 mg/L</i> <i>Class V: 0.01 mg/L</i> <i>Class VI: 0.03 mg/L</i></p> <p>Zinc</p>						

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<p><i>Class I:</i> 5.0 mg/L</p> <p><i>Class II:</i> 5.0 mg/L</p> <p><i>Class III:</i> 25.0 mg/L</p> <p><i>Class V:</i> 0.02 mg/L</p> <p><i>Class VI:</i> <sup>7</sup></p> <p>Cyanide (CN)<sup>15</sup></p> <p><i>Class I:</i></p> <p><b>CN WAD 80 mg/l</b></p> <p><i>Class II:</i></p> <p><b>CN WAD 80 mg/L</b></p> <p><i>Class III:</i></p> <p><b>CN WAD 100 mg/L</b></p> <p><i>Class V:</i></p> <p><b>CN Free 22 mg/L</b></p> <p><i>Class VI:</i></p> <p><b>CN Free 22 mg/L</b></p> <p>Phenols</p> <p><i>Class I:</i> 0.0005 mg/L</p> <p><i>Class II:</i> 0.001 mg/L</p> <p><i>Class III:</i> <sup>6</sup></p> <p><i>Class V:</i> 0.001 mg/L</p> <p><i>Class VI:</i> 0.1 mg/L</p> <p>Sulphides</p>						

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<p><i>Class I: 0.001 mg/L</i>  <i>Class II: 0.002 mg/L</i>  <i>Class III: <sup>6</sup></i>  <i>Class V: 0.002 mg/L</i>  <i>Class VI: 0.002 mg/L</i></p> <p>Arsenic</p> <p><i>Class I: 0.1 mg/L</i>  <i>Class II: 0.1 mg/L</i>  <i>Class III: 0.2 mg/L</i>  <i>Class V: 0.01 mg/L</i>  <i>Class VI: 0.05 mg/L</i></p> <p>Nitrates (N)</p> <p><i>Class I: 0.01 mg/L</i>  <i>Class II: 0.01 mg/L</i>  <i>Class III: 0.1 mg/L</i>  <i>Class V: Not applicable</i>  <i>Class VI: Not applicable</i></p> <p>Pesticides: US EPA limits apply.</p> <hr/> <p>LEVELS FOR POTENTIALLY</p>						

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<b>HAZARDOUS PARAMETERS AND SUBSTANCES</b>  HEM <sup>16</sup> <i>Class I: 1.5 mg/L</i> <i>Class II: 1.5 mg/L</i> <i>Class III: 0.5 mg/L</i> <i>Class IV: 0.2 mg/L</i> <i>Class V: -----</i> <i>Class VI:-----</i>  SAAM <sup>17</sup> <i>Class I: 0.5 mg/L</i> <i>Class II: 0.5 mg/L</i> <i>Class III: 1.0 mg/L</i> <i>Class IV: 0.5 mg/L</i> <i>Class V: -----</i> <i>Class VI: -----</i>  CAE <sup>18</sup> <i>Class I: 1.5 mg/L</i> <i>Class II: 1.5 mg/L</i> <i>Class III: 5.0 mg/L</i> <i>Class IV: 5.0 mg/L</i> <i>Class V: -----</i> <i>Class VI: -----</i>						

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	CCE <sup>19</sup> <i>Class I: 0.3 mg/L</i> <i>Class II: 0.3 mg/L</i> <i>Class III: 1.0 mg/L</i> <i>Class IV: 1.0 mg/L</i> <i>Class V: -----</i> <i>Class VI: -----</i>						
Marine	<b>Sulfates 0.002 mg/L</b>  <b>Total cyanide 0.005 mg/l</b>  <b>Hg 0.002 mg/l</b>  <b>Se 0.010 mg/l</b>  <b>As 0.050 mg/l</b>  <b>Cd 0.004 mg/l</b>  <b>Cr 0.050 mg/l</b>  <b>Pb 0.03 mg/l</b>	None specified	None specified	<b>Directive 79/923/EEC on the quality required of shellfish waters:</b> <ul style="list-style-type: none"> <li>pH: 7-9</li> <li>Total suspended solids: Baseline conc. + 30%</li> </ul> <i>Salinity</i> <ul style="list-style-type: none"> <li>≤40%</li> <li>Guide ≤12-38%</li> <li>Must not cause salinity of shellfish waters to increase by 10%.</li> </ul> <i>Colour</i> <ul style="list-style-type: none"> <li>Discharge must not cause colour after filtration to deviate by more than 10 Pt/l from the baseline</li> </ul> <i>Metals (Ag, As, Cd, Cr, Cu, Hg, Ni, Pb, Zn):</i> The concentration of each substance in the shellfish water or in the	<b>Sulfates 0.002 mg/L</b>  <b>Total cyanide 0.005 mg/l</b>  <b>Hg 0.002 mg/l</b>  <b>Se 0.010 mg/l</b>  <b>As 0.050 mg/l</b>  <b>Cd 0.004 mg/l</b>  <b>Cr 0.050 mg/l</b>  <b>Pb 0.03 mg/l</b>	National	National standards not covered by Estudio Osterling SC review. As per Data sheet SM2.5 in the Amendment EIA and Compliance Monitoring CMP, Table 3.4  Note that the National review quotes Standards for Water Classes 1 to V1 (as specified for fresh water) as the applicable standard for marine waters

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<b>Phenols 0.100 mg/l</b> <b>BOD 10 mg/l</b>  <b>DO 4 mg/l</b>  <b>Total Coliforms 20,000 NMP/100 ml</b>  <b>Faecal coliforms 4,000 NMP/100 ml</b>			shellfish flesh must not exceed a level which has harmful effects on the shellfish larvae (mandatory)  Dissolved oxygen: <ul style="list-style-type: none"> <li>Saturation (mandatory): ≥70%</li> <li>Saturation (guide): ≥80%</li> </ul> Petroleum hydrocarbons: Must not be present in waters as to: <ul style="list-style-type: none"> <li>Produce a visible film on the surface of the water and/or a deposit on shellfish</li> <li>Have harmful effects on the shellfish larvae</li> </ul> Faecal coliforms (in shellfish flesh and intervalvular liquid) guide: 300 MPN/100ml  Temp increase in receiving waters (guide): ≤2°C	<b>Phenols 0.100 mg/l</b> <b>BOD 10 mg/l</b>  <b>DO 4 mg/l</b>  <b>Total Coliforms 20,000 NMP/100 ml</b>  <b>Faecal coliforms 4,000 NMP/100 ml</b>		
Drinking water	<b>Total coliforms 8.8 NPW/100 ml</b>  <b>Faecal coliforms 0</b>		WHO	<b>Color 15.0 Pt-Co</b> <b>Turbidity 5 NTU</b> <b>TDS 1000 mg/l</b> <b>Free residual Cl 5 mg/l</b>	<b>Color 15.0 Pt-Co</b> <b>Turbidity 5 NTU</b> <b>TDS 1000 mg/l</b> <b>Free residual Cl 5 mg/l</b> <b>Hardness 300</b>		The WHO Guidelines for Water Quality (2004) have been adopted as the project standard, notwithstanding the Resolución Suprema de 17 Diciembre 1946,

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<p>NPW/100 ml</p> <p>Refer also to Resolucion Suprema de 17 Diciembre 1946, Reglamento de agua potable.</p>		<p>Hardness 300 mg/l CaCo<sub>3</sub></p> <p>Iron 0.3 mg/l</p> <p>pH &lt;8</p> <p>Chlorides 250 mg/l</p> <p>Sulphates 250 mg/l</p> <p>Total coliforms 0 NPW/100 ml</p> <p>Faecal coliforms 0 NPW/100 ml</p>		<p>mg/l CaCo<sub>3</sub></p> <p>Iron 0.3 mg/l</p> <p>pH &lt;8</p> <p>Chlorides 250 mg/l</p> <p>Sulphates 250 mg/l</p> <p>Total coliforms 0 NPW/100 ml</p> <p>Faecal coliforms 0 NPW/100 ml</p>		<p>Reglamento de agua potable. This reflects the advances in public health since the 1946 regulation was formulated and reflects the project commitment to comply with industry best practices (see above).</p> <p><b>For a full list of WHO standards for drinking water refer INT 6 (as amended) of the International Standards Review, prepared for PLNG by IDP July 2006)</b></p>

**Table 5: Noise Emissions Control Standards**

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
General Project Guidelines	<p>Regs of the National Env'tal Quality Standards for Noise (DS No 085-2003-PCM) AMBIENT NOISE ENVIRONMENTAL QUALITY STANDARDS (Supreme Decree 085-2003-PCM)</p> <p>Special Protection Area Sound Level <math>L_{AeqT}</math> Day time: 50 Night time: 40</p> <p>Residential Area Sound Level <math>L_{AeqT}</math> Day time: 60 Night time: 50</p> <p>Commercial Area Sound Level <math>L_{AeqT}</math> Day time: 70 Night time: 60</p> <p>Industrial Area Sound Level <math>L_{AeqT}</math> Day time: 80 Night time: 70</p> <p>-----</p> <p>PERMISSIBLE LEVELS FOR NOISE AT HYDROCARBON PROCESSING PLANTS (Supreme Decree No. 051-93-EM)</p> <p>OSHA 19.10.95 levels applicable within the Plant Facilities: 85db(A)</p> <p>-----</p> <p>PERMISSIBLE</p>	<p><b>Oil &amp; Gas Development (Onshore), p 362</b></p> <p><b>Thermal Power: Guidelines for New Plants: p 419</b></p> <p>Noise abatement measures should achieve either the levels given below or a maximum increase in background levels of 3 decibels:</p> <p>Residential/institutional, educational:</p> <p>0700-22.00 hrs: 55 dBA 22.00-07.00 hrs 45 dBA</p> <p>Commercial / industrial 70 dBA</p>	<p>Table 5: Oil &amp; Gas Development</p> <p>Table 10: LNG Plants</p> <p><b>Steady state noise levels from the project's operation measured outside the project property boundary, should not exceed the following:</b></p> <ul style="list-style-type: none"> <li>Residential , institutional, educational: daytime: 55 dBA night time: 45 dBA</li> <li>Commercial / industrial daytime: 70 dBA; night time: 70 dBA</li> </ul>	<p>No specific limits – although guide published in <b>Commission's Fifth Action Plan on the Environment: Towards Sustainability</b></p> <ul style="list-style-type: none"> <li>Exposure to more than 65 dB(A) should be phased out and at no time should 85 dB(A) be exceeded.</li> <li>Those exposed to levels of between 65 – 55 dB(A), and those currently exposed to less than 55 dB(A) should not suffer any increase.</li> </ul>	<p>Most stringent:</p> <p>Increase in background levels of 3 decibels</p> <p>More realistic:</p> <p>Residential , institutional, educational:</p> <p>0700-22.00 hrs: 55 dBA 22.00-07.00 hrs: 45 dBA</p> <p>Commercial day 70 dBA, night 60 dBA</p> <p>Industrial 70 dBA 24 hrs</p> <p>Special Protection Area Sound Level <math>L_{AeqT}</math> Day time: 50 Night time: 40</p>	<p>Residential , institutional, educational:</p> <p>0700-22.00 hrs: 55 dBA 22.00-07.00 hrs: 45 dBA</p> <p>Commercial day 70 dBA, night 60 dBA</p> <p>Industrial 70 dBA 24 hrs</p> <p>Special Protection Area Sound Level <math>L_{AeqT}</math> Day time: 50 Night time: 40</p>	<p>Most stringent would be difficult to achieve, given the proximity of the new settlements to the plant boundary- refer to subsequent clarification from IFC.</p> <p>National review concludes that regulations for the National Environmental Quality Standards for Noise do not apply to the Quarry (p37).</p> <p>The National review states that PLNG must not exceed current maximum allowed limits (LMPs) but that since MEM has not approved the LMPs as defined under Supreme Decree 085-2003-PCM, PLNG may use other standards while giving consideration to those parameters defined in the National Regulations of Noise, and specifically the Environmental Quality Standards (not defined in the National Review); p 78, but presented here.</p>

Source	National	Representative International Standards & Guidelines			Project commitment (more stringent of National & WBG)	Adopted Project Specification	Comment/ Rationale
		World Bank Group	ExIm	EU Standards (EBRD, SACE, COFACE, ECGD)			
	<p><b>Permissible levels for mine (Mining Health and Safety Regs Supreme Decree 046-2001-EM)</b></p> <p>If noise levels or time of exposure exceed the following limits, the holder should provide workers with ear protection</p> <p><b>Noise levels “A” Scale / Exposition Time :</b>  82 decibels/16hours/d  85 decibels/ 8 hours/d  88 decibels/ 4 hours/d  91 decibels/ 1 hour /d  94 decibels/ 1 hour/d  97 decibels/ 1 hour/d  100 decibels/1 hour/d</p> <p>Employees should not be exposed to constant, intermittent or impact noise above an average of 140 dB.</p>	<p>The WBG Industry Guidelines do not address occupational health issues as they relate to noise</p>			<p><b>Noise levels “A” Scale / Exposition Time :</b>  82 decibels/16hours/d  85 decibels/ 8 hours/d  88 decibels/ 4 hours/d  91 decibels/ 1 hour /d  94 decibels/ 1 hour/d  97 decibels/ 1 hour/d  100 decibels/1 hour/d</p> <p>Employees should not be exposed to constant, intermittent or impact noise above an average of 140 dB.</p>		