

OVERSEAS PRIVATE
INVESTMENT CORPORATION



***ASSESSMENT OF ENVIRONMENTAL IMPACT
AND INDUSTRIAL SAFETY IN
DEVELOPMENT WELLS
PALAGUA – CAIPAL FIELD
PUERTO BOYACA (BOYACA, COLOMBIA)***

JOSHI
TECHNOLOGIES
INTERNATIONAL, INC.



CHAPTER V.

ENVIRONMENTAL MANAGEMENT
SYSTEM



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AND INDUSTRIAL SAFETY IN
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Chapter 5 – Environmental Management System

5.1 INTRODUCTION

For the development Drilling Program of the Project, an Environmental Management System – EMS is necessary to ensure environmentally safe operations..

The Environmental Management System must include aspects that are critical for the project's development, as well as actions necessary to achieve the goals of each of the environmental management plan.

5.2 OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT SYSTEM

- Comply with the obligations as per the Rules and resolutions issued by the Environmental Authority of Colombia.
- Comply with the Environmental Management Plan to meet environmental and social management objectives and obligations.

5.3 ACTIVITIES OF THE ENVIRONMENTAL MANAGEMENT SYSTEM

- Carry out inspections in the areas where the drilling wells are located, using photographic records before, during, and after the intervention. This follows with the activities described in the follow up programs.
- Carry out the programs and actions included in the schedule and follow up methodology of the environmental system.
- Follow up on the corrective actions and the solutions to any non-compliance of environmental and social management through the follow up processes and monitoring, designed by UT-IJP for a permanent control of compliance status.
- If necessary, make corrections during the project's execution or in the procedures for the execution of activities to comply with the environmental obligations and objectives.
- Schedule and develop specialized activities of control and monitoring, such as:
 - Planned inspections of unsafe actions and conditions, and risk scenarios.
 - Inspection of the equipment, machinery, and tools used for the development of the jobs.

5.4 ORGANIZATION OF THE ENVIRONMENTAL MANAGEMENT SYSTEM

The operative structure for the implementation of the Environmental Management Plan falls upon the Management System established by the Company, which in turn presents as one of its components, the field Superintendent – H.S.E. and the Environment engineer. As in every organization, there are corporate guidelines for the management of the environment. Among these, there are universal environment management practices such as:

- Promote it at all levels of the organization.
- Evaluate the impact of the project activities on the environment.
- Adopt the necessary measures for preventing, eliminating or reducing pollution.
- Establishing and applying verification procedures of compliance with the environmental policy.
- Collaborate with local authorities in establishing procedures for emergency response.
- Take steps to ensure that suppliers implement environmental laws.

Among the benefits of implementing the Environmental Management Plan are:

- Maximize the reasonable use of the resources.
- Correct management and manipulation of waste to minimize costs.
- Prioritize prevention instead of correction.
- Increase the quality and productivity in the job.
- Improvement relationship with the community and environment authority.

The design and implementation of an Environmental Management System is framed in the Plan, Do, Check, Act Cycle; as well as within the four fundamental elements of a management system: Organization, Planning, Implementation, Control and Follow up.

Table 5-1 Fundamental elements of a Management system

ORGANIZATION	PLANNING
Organizational Structure Responsibility and functions	Environmental policy and environmental objectives Environmental program planning (Components and Programs)
IMPLEMENTATION	CONTROL AND FOLLOW UP
Environmental aspects and impacts Implementation of the environmental program (Components and Programs) Education and training	Monitoring and measurements Follow up of the environmental program (Components and Programs) Review of the Environmental Management System

The Environmental Management objective is the continuous improvement of industrial safety, occupational health, and environmental protection applicable during the development of the project activities.

5.4.1 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITY

The Figure below presents the organizational structure of the Company to be applied to the Environmental Management System.

ORGANIZATIONAL STRUCTURE FOR THE APPLICATION OF THE ENVIRONMENTAL MANAGEMENT SYSTEM

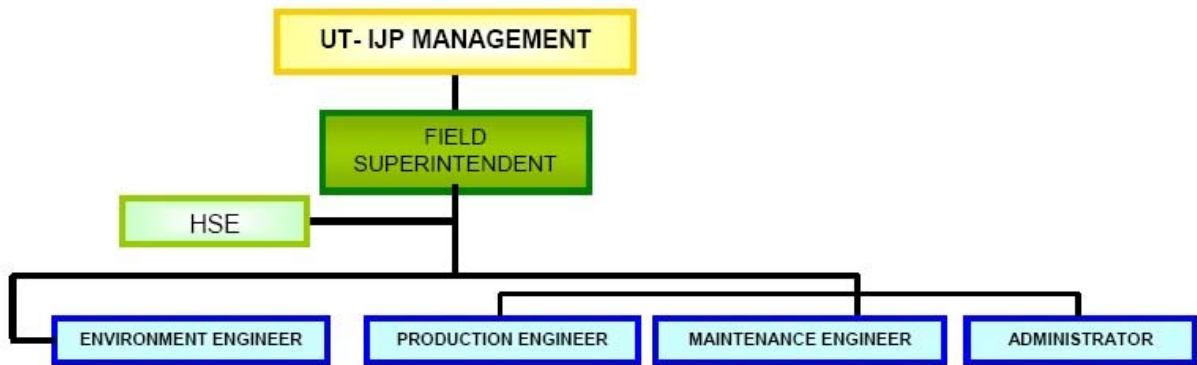


Figure 5-1

The responsibility, authority and interrelation of the personnel that manages, executes and verifies any kind of work or activity that affects the environmental performance, is defined by focusing the positions that require such responsibility. Following are the positions and functions of the UT-IJP’s Environmental Management System (EMS).

Table 5-2 UT-IJP Environmental Management System-Positions and Functions

POSITION	FUNCTIONS
MANAGER UT-IJP	Responsible for establishing and keeping the occupational health, industrial safety and environment programs up to date within the UT-IJP and all its contractors.
FIELD SUPERINTENDENT	<p>Reports to the Manager of the Provisional Joint Venture IJP the compliance and implementation of the Occupational Health, Industrial Safety and Environment program in the operation Palagua and Caipal Fields</p> <p>To comply with the obligations he or she will perform the following functions:</p> <ul style="list-style-type: none"> - Implement and enforce all the staff, policies, standards and procedures issued and released by the company regarding Industrial Health, Safety and Environment. - Lead and support all activities scheduled and carried out by the H.S.E. group and control their execution. - Ensure the proper functioning of the Joint Committee on Occupational Health COPASO. - To lead the organization of Medical Emergencies, Fire Prevention and Environmental Emergencies Brigades and support their training and performance. - Support whomever is in charge of the Preventive Medicine, Industrial Safety and Environment functions with their training, diffusion and motivation programs. - Take part in the updating and continuous improvement of the risk and work procedure scenarios, so that they provide better risk control. - Report to management any type of incident that may occur however slight it may be and take part in the investigations when they are of high potential and deliver the investigation report within 5 days, performing analysis of the reasons for the incident and the corresponding preventive measures.
ENVIRONMENTAL ENGINEER	<p>Reports to the Field Superintendent and information on coordinating the Occupational Health, Industrial Safety and Environment programs and therefore must verify the filling of attendance registry of the scheduled activities.</p> <p>To comply with the obligations he or she will perform the following functions:</p> <ul style="list-style-type: none"> - Comply and monitor compliance by all personnel of Policies, Regulations and Proceedings issued and released by the company with regard to Health, Industrial Safety and Environment. - Organize Medical Emergencies, Fire Prevention and Environmental Emergencies Brigades and support training and operation. - Keep HSE records and statistics and send them to management on the first of the month. - Release HSE policies in accordance with issued instructions and verify compliance by staff. - Check the availability of first aid equipment such as stretchers, first aid kit, brigade members and a Medical Emergency Plan. - Coordinate the manufacturing of signals for the areas, according to the needs of Occupational Health, Industrial Safety and Environment. - Release the content of newsletters, posters and announcements on Industrial Safety and Environment. - Keep personnel in state of alertness and positive attitude with respect to Health, Industrial Safety and Environment. - Schedule and implement actions related to handling and final disposal of solid waste. - Coordinate with environmental authorities (MAVDT "Ministry of the Environment, Housing and Land Development" and CORPOBOYACA) the legal procedures that result from the development of the work.

5.4.2 PLANNING

The environmental planning of the drilling project for development wells begins by carrying out of an environmental management plan that can identify the impacts that may be generated, and design the programs that must be implemented to minimize or compensate the negative effects of the project. During this stage, the environmental permits, necessary for the development of the project, must be obtained.

In addition, the legal requirements related to environmental aspects must be identified:

- General environmental standards issued by the Congress of the Republic or the Government through national institutions or agencies so authorized.
- Regional environmental standards issued by CORPOBOYACÁ or the Department of Boyacá.
- Local environmental standards issued by the municipality of Puerto Boyacá.
- National or international technical standards, to which, UT-IJP submits voluntarily.
- Commitments resulting from the environmental licence and from the permits, concessions, or authorizations in force.

Environmental Aspects and Impacts

As a first step for the design and implementation of an Environmental Management System, it is necessary to identify the environmental aspects and impacts that are generated by the development project activities. So, for instance, environmental issues such as possible gas emissions and waste water disposal of sewage needs to be considered.

➤ **Environmental Policy**

In order to minimize the environmental impacts, prevent contamination, preserve the environment, provide protection and safety to the workers, and keep close relationships with the community, local authorities, and the competent environmental authority, there must be a policy for performing activities, implementing practices and measures of environmental management and industrial safety during the drilling of the wells. For this, it is necessary to involve the Environmental Management actions, with the institutions, and with the community involved, in the area of influence of the project.

The UT-IJP has as one of its priorities, in all its activities (building, assembly, operation and services for the oil industry), the protection of the Environment and the continuous improvement of its environmental performance. To achieve a sustainable development, the company is committed to:

1. Complying with the environmental legislation and with other requirements assumed by the company.
2. Identifying and evaluating the environmental impacts of its activities, in order to establish environmental objectives and goals and developing programs to achieve them.
3. Preventing or minimizing pollution or any type of adverse impact to the environment.
4. Training and motivating the employees, so that they perform all the activities with the environment responsibly.
5. Maintaining adequate internal and external information channels, facilitating communications of the company's environmental activities.



The environmental objectives must be the following:

- Identify and prevent the impacts that the activities of the project can have on the environment.
- Guarantee compliance with Environmental Legislation
- Minimize the use of the primary and secondary resources (soil, water, energy, etc.).
- Reduce the level of contamination caused by the activities of the project.

Planning of the Environmental Program

Within the planning conceptual framework, a formulation of a plan was created, composed of programs and measures of environmental management to be carried out during the development of the project.

5.4.3 IMPLEMENTATION

Training, Knowledge and Competence

The **UT-IJP** will establish the need for training, skill-building and instruction of personnel, as the most important activity to implement and maintain the EMS.

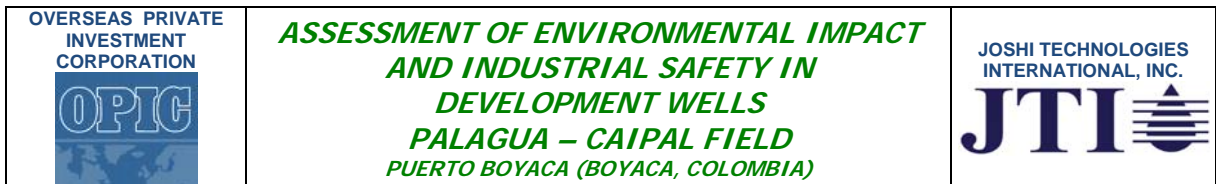
All personnel performing tasks or activities that affect environmental performance or that may jeopardize the area's natural resources must be trained adequately. The assignment of tasks is done based on the capability and suitability of the personnel.

The personnel performing tasks related to EMS as far as training, inspection, tests, verification and administration is qualified based on education, training and experience.

The documents of the personnel related with this requirement are stored and kept. Documents include resumes, courses, training or instruction certificates and grade records.

Implementation of Environmental Program

The object of executing the programs and measures is to comply with existing regulations and Environmental Legislation and also comply with environmental quality standards and parameters required by the environmental authority. Due to constant changes in environmental regulations, the legal requirements must be updated.



EMS implementation is done through the execution of plans designed and presented in the Environmental Management Plan (EMP) to control impacts generated by the project. UT-IJP is responsible of the compliance to the EMP.

Instruction and Training

Environmental Management System instruction and training procedures for operators and workers are of great importance as teaching and disseminating environmental policy, environmental objectives. The programs and activities instill environmental culture, care and management in the operators and workers.

Contingency Plan

Every organization must be prepared for any operational and / or natural risk situation, initially establishing a risk assessment and afterwards the actions to respond to contingencies where responsibilities and roles of people involved are defined. Additionally, one needs to define the resources needed (strategic plan), internal and external means of communication (information plan) and the procedures to be followed in emergency (operative plan).

The UT-IJP as a company engaged in construction, installation, operation and service activities for the oil industry. It has among its priorities to preserve, maintain and improve individual and collective health of its employees and protect the organization from any losses in order to promote welfare of the worker and increase operational productivity.

To accomplish this goal the company constantly develops plans and programs to reach the commitment of the organization, including the following objectives:

1. Implementation, development and continuous improvement of Occupational Health Programs.
2. Maintenance of a healthy and safe work environment, to protect our workers, the subcontractor's workers and the general public through a gradual reduction of occupational hazards that could lead to human and material losses.
3. Comply with all current legal regulations on Occupational Health, as well as other requirements to which the organization subscribes.

According to the commitments described before, all the people working for UT-IJP are responsible of achieving the best performance in Occupational Health, creating self-protection and protection awareness culture. They should also participate to control risks and injuries that may occur.



5.4.4 CONTROL AND FOLLOW UP

Environmental Monitoring Plan

The execution and correct development of the Environmental Management Plan will take place through environmental monitoring and control. The results obtained will be assessed according to the implementation of the programs. It will also establish the problems identified during drilling of development wells, as well as corrective measures to control and correct problems. In the case of drilling of development wells, external environmental inspectors verify the EMS. They are hired to confirm that the measures designed in the environmental management of the project are executed according to the plan.

The objectives of environmental inspection are:

- Ensure compliance with the environmental management.
- Review environmental protection and management commitments and obligations of contractors during the construction and operation of the project.
- Record the environmental procedures developed for waste management.
- Inspect that the monitoring performed to follow up on the environmental quality of the project complies with the requirements of the environmental legislation.
- Ensure adequate maintenance of facilities and equipment.
- Verify compliance of work according to the designs of the environmental management plan.
- Receive complaints or criticisms from the community for any action generated by the project in order to communicate them to **UT-IJP**.

To comply with the outlined objectives the environmental inspectors shall perform the following actions:

- Control and daily follow up on construction processes and environmental management for contractors, according to the environmental management plan.
- Guide the contractor to adequately comply with current environmental legislation.
- Give lectures and workshops on environmental education to the project workers and the community.
- Prepare the progress and compliance report of the EMP to be sent to the Ministry of Environment and CORPOBOYACÁ.

Review and Improvement (Act)

The whole Environmental Management System shall be reviewed to evaluate the satisfaction and needs of the interested parties, for compliance with environmental regulations, to ensure continuous improvement of environmental performance of the company.



During the different stages of the project it is important to review and control the documentation to ensure that both, the UT-IJP and the environmental authority, use updated versions of the components and programs that constitute the Environmental Management Plan.

The **UT-IJP** within its EMS should identify, collect, codify, classify, store, keep up to date to all the environmental records, and ensure that the system meets the requirements of Rule ISO 14001.

The information included in the records is used to determine the performance and to assess the effectiveness of the measures that have already been implemented.

The control of environmental records reaches, without limitation, to the following:

- Review records of the EMS
- Legal requirements
- Record of permits and compliance
- Environmental aspects
- Incident reports
- Communications with interested parties
- Reports on Non-conformance and corrective actions
- Plans to correct deficiencies
- Environmental inspection programs
- Records of personnel training

Progress and Compliance Reports

For the drilling of development wells, the Environmental Compliance Reports must be submitted to the Ministry of Environment, Housing and Land Development and the Environmental Monitoring and Control Report to the Corporation. This report shows the actions carried out during the period in order to demonstrate the effectiveness of the environmental measures in each of the activities described in the programs.

The review of the EMS is done through different reports submitted by the project's environmental inspection team. During this stage, the purpose is to detect the mistakes that may exist in the EMS and to take the necessary corrective measures.

Also the review determines the effectiveness of the measures proposed to manage the impacts, so that experience gained can be used in future drilling projects.