
Offshore Drilling – BM-PAMA-8 Block, Pará- Maranhão Basin

Environmental Education Project for Workers (PEAT) - Annex 3

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Prepared by

Prepared by

ICF Consultoria do Brasil Ltda
Av. das Américas, nº 700, Bloco 6, sala 251
Barra da Tijuca - Rio de Janeiro, RJ
CEP 22640-100
Tel (21) 2117-2550
Fax (21) 2132-7354
icfi.com.br



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CONTENTS

1 - Introduction	1/28
2 - Scheduling	3/28
2.1 - Module I - Integration Activity	3/28
2.2 - Module II – The Activity and the Environment	3/28
2.2.1 - Description of the Activities.....	3/28
2.2.1.1 - Main Environmental Aspects of the Area Around the Activity.....	7/28
2.2.1.2 - Environmental Diagnosis.....	8/28
2.2.1.3 - Environmental Impact and Mitigatory Measures	11/28
2.2.2 - Module II.A – Introduction to Environmental Law	15/28
2.2.2.1 - Environmental Education	17/28
2.3 - Module III – Management of Solid Wastes and Introduction to Environmental Legislation	18/28
2.3.1 - Module III.A – Solid Wastes Management.....	18/28
2.3.2 - Module IV.A – Emergency Plans	21/28
3 - References	28/28
4 - Websites for Consultation	28/28

LIST OF FIGURES

Figure 1 – Location of the 1-PAS-28 and 1-PAS-29 Wells in the BM PAMA-8 Block, Pará-Maranhão Basin.	2/28
Figure 2 - A) At the start of the drilling process and before installing the riser, the fluid and gravel mixture is dumped on the sea floor. B) With the riser installed, this mixture is carried to the rig.....	4/28
Figure 3 – Illustrative example of a drilling system.	5/28
Figure 4 – Illustrative example of the drilling fluids treatment system.....	6/28
Figure 5 - Area of Influence of the Activity.....	8/28
Figure 6 – Matrix 1 – Impacts associated with Drilling Activities.	12/28
Figure 7 – Licenses to be issued by the Environmental Regulator.....	16/28
Figure 8 – Licensing Procedure for Offshore Activities.....	16/28
Figure 9 - Documents Required for Licensing Offshore Exploration Activities.....	17/28
Figure 10 – Solid Wastes Management Scheme.	21/28

Figure 11 - Organization Chart 1 – Organizational Response Structure (EOR) for drilling activities in the PAMA-08 Blocks, in the Foz do Amazonas Basin at the mouth of the Amazon River	23/28
Figure 12 – Flowsheet 1 – Initial Response Actions onboard the Rig.....	25/28

1 - INTRODUCTION

An energy enterprise working with oil and oil products, Petrobras is engaged in exploration, production, refining, sales and transportation activities all over Brazil and elsewhere in the world.

It also a conglomerate with massive social responsibilities, deeply concerned with preserving the environment as well as ensuring the safety and health of its workers. Having declared this commitment through its Health, Safety and Environment. Policy among its main corporate objectives, it is worthwhile stressing the maintenance of harmony between its activities in the quality of life of its employees and the communities where it operates.

The purpose of its offshore drilling activities is to detect the presence of hydrocarbons (gas and or oil) and, should their existence be proven, to measure their production potential. Despite the massive benefits generated for these Areas of Influence – such as job generation and higher tax revenues – these activities impose negative impacts on the environment, with adverse effects the health and safety of the people involved. Consequently, Petrobras is implementing a series of projects designed to enhance these positive effects while preventing and mitigating negative aspects. To do so, it complies with safety rules and procedures, while implementing a wide variety of projects designed to ensure that its activities are performed safely for the community, as well as for workers and the environment.

The *Ocean Clipper* (NS-21) Drilling Rig will be involved in drilling activities for the 1-PAS-28 and 1-PAS-29 wells, in the Pará-Maranhão Basin. Located some 250 kilometers offshore the Salinópolis Municipality in Pará State, these wells reach depths of some 2100 m and 2400 m respectively.

Figure 1 presents the location of the 1-PAS-28 and 1-PAS-29 wells in the Pará-Maranhão Basin.

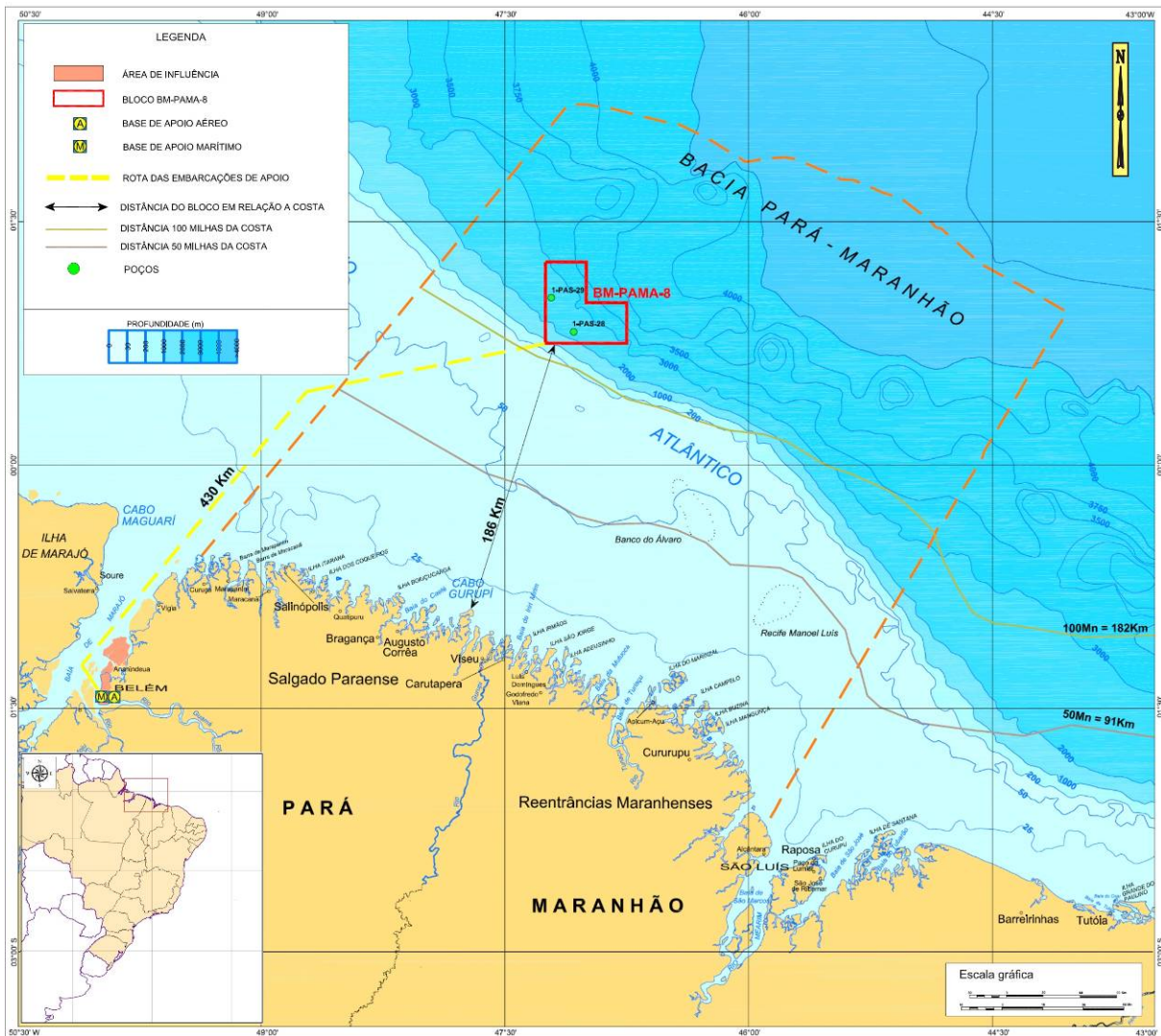


Figure 1 - Location of the 1-PAS-28 and 1-PAS-29 Wells in the BM PAMA-8 Block, Pará-Maranhão Basin.

In addition to Environmental Education Project for Workers (PEAT), the Petrobras/E&P/HSE area is proposing other environmental projects, such as mitigatory and potentiating measures for addressing the impacts caused by its exploration activities in the Pará-Maranhão Basin. These projects are described at the end of this presentation.

2 - SCHEDULING

Table 1 presents the Environmental Education Project (PEAT) scheduling for workers involved in activities conducted in the Pará-Maranhão Basin.

Table 1 – PEAT Schedule for Drilling Rig Workers

Module	Duration	Topics Addressed	Training Method
	30 min	Introduction - Integration Activity	Group dynamics
I	1.5 hours	The Activity and the Environment	Presentation - Discussion
II	2 hours	Legislation – Aspects, Impacts and Mitigatory Measures	Presentation - Activities
-	1 hour	Break - Lunch	-
III	1.5 min	Waste Management	Video and Discussion
IV	1.5 hour	Leak containment and oil spill control procedures.	Presentation - Activity
V	30 min	Energy conservation	Presentation
		Closing - Integration Activity	Group Dynamics

2.1 - MODULE I - INTEGRATION ACTIVITY

The instructor will explain the Ice-Breaking Dynamics procedures to be followed by all the course attendees, which are designed to encourage interaction among the participants, ensuring a multi-directional learning process throughout the training sessions.

2.2 - MODULE II – THE ACTIVITY AND THE ENVIRONMENT

2.2.1 - Description of the Activities

The activities to be conducted by Petrobras consist of drilling two wells (1-PAS-28 and 1-PAS-29), located in the BM PAMA-8 Block in the Pará-Maranhão Basin, using a Drilling Rig (NS-21).

In addition to the Drilling Rig, the activities will also use supply boats that will transport equipment and consumption materials, as well as carrying personnel between the rig and the mainland. These vessels may also support the emergency response activities in case of oil pollution, or may be allocated as dedicated vessels.

The drilling process basically consists of the repeated action of spinning the drill string with a drill-bit at its tip, in order to break the rock into small fragments (gravels) that are removed from the well bottom by pumping the drilling fluids.

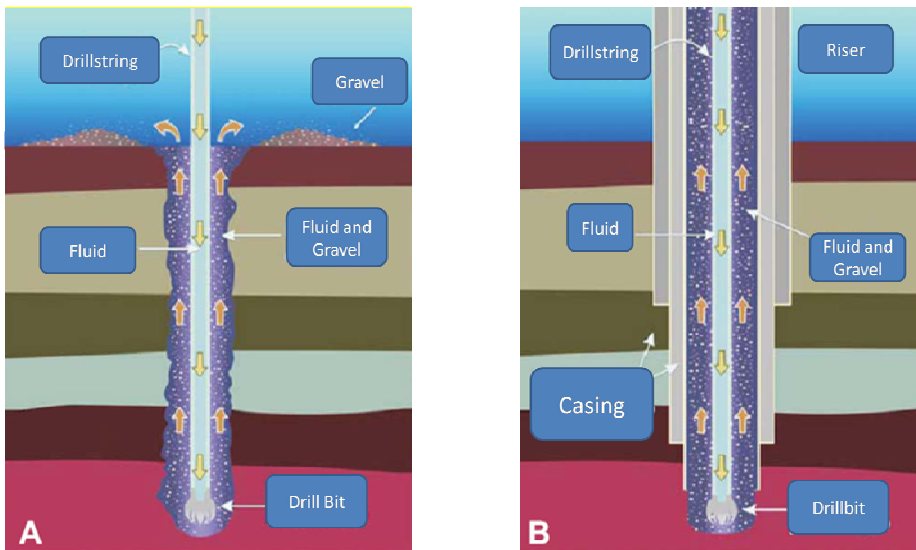


Figure 2 - A) At the start of the drilling process and before installing the riser, the fluid and gravel mixture is dumped on the sea floor. B) With the riser installed, this mixture is carried to the rig.

After drilling a segment of the well, the drill string is raised and a steel casing string is lowered in order to ensure that the well walls are properly supported. Protecting the oil and gas reserves, while ensuring that there are no oil flows between the well walls and the casing string, this space is packed with cement. Once the cementing is completed, the drill string is lowered and the drilling process begins again, entering a new phase.

Figure 3 presents a simplified diagram of the drilling system used by Petrobras.

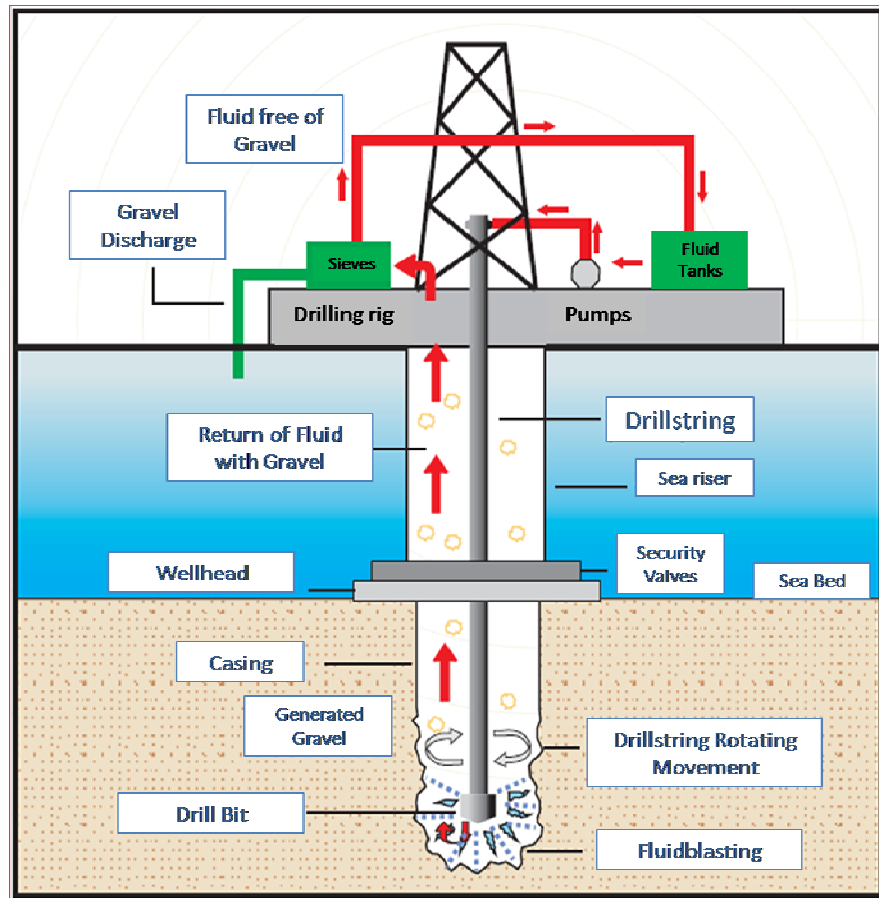


Figure 3 - Illustrative example of a drilling system.

Source: Petrobras, 2005.

The wells will be drilled in several successive phases, with increasingly smaller diameters from the surface down to the sea bed. The number of phases is defined on the basis of the characteristics of the rocks to be drilled and the planned final depth.

In all wells, until the risers are installed (broad pipes that run from the safety equipment installed over the well on the sea floor up to the drilling rig), a water-based drilling fluid will be used, with no gravels flowing back to the drill.

The Drilling Rig is fitted with a specific system for treating the drilling fluids and the gravels returning to the drill, as shown in the illustrative example in **Figure 4**.

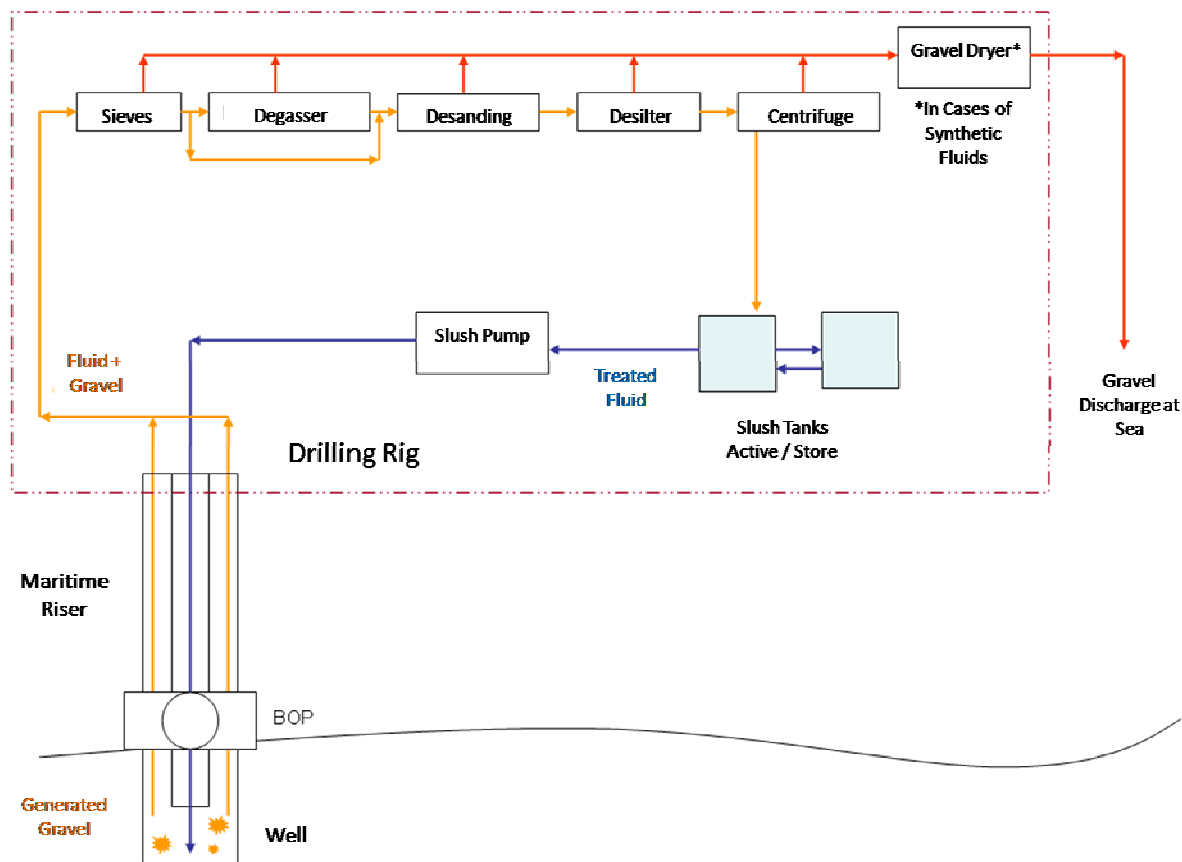


Figure 4 – Illustrative example of the drilling fluids treatment system.

Source: HABTEC, 2005.

It is worthwhile stressing that the drill will be equipped with safety systems designed to ensure compliance with all the directives established by the environmental entity.

Supplementary to the drilling activities, well logging operations will be performed, in addition to formation tests, production gravel, sampling, completion equals topping off and finally, well abandonment.

The well may be abandoned on a temporary or definitive basis, requiring the placement of plugs (mechanical or cement) sealing it off safely, preventing fluids in different formations from blending, and blocking their outflow to the sea floor.

2.2.1.1 - Main Environmental Aspects of the Area Around the Activity

a) Definition of the Area of Influence of the Activity

The Area of Influence of an activity is the area that may be subject to some type of environmental impact (positive or negative) arising from the Activity.

In order to demarcate the Area of Influence of the drilling activities, an analysis was conducted on the impacts caused on the surrounding environment where these activities will take place. These analyses indicated that the vast majority of the impacts arising from drilling activities must occur in the surrounding ocean.

a.1) Areas of Influence of the Activities:

Physical Surroundings and Biota:

- Sea floor area and water column corresponding to the BM PAMA-8 Block.

Social and Economic Aspects:

- Safety area of 500 m around the drilling rig;
- Shipping route for the supply vessels between the drilling rig and the Support Base at the Tapanã Marine Terminal, located in Belém, Pará State;
- The municipality of Belém, Pará State, where the offshore support base is located for the offshore drilling activities in the BM PAMA-8 Block.

Figure 5 presents the Area of Influence of the Activity.

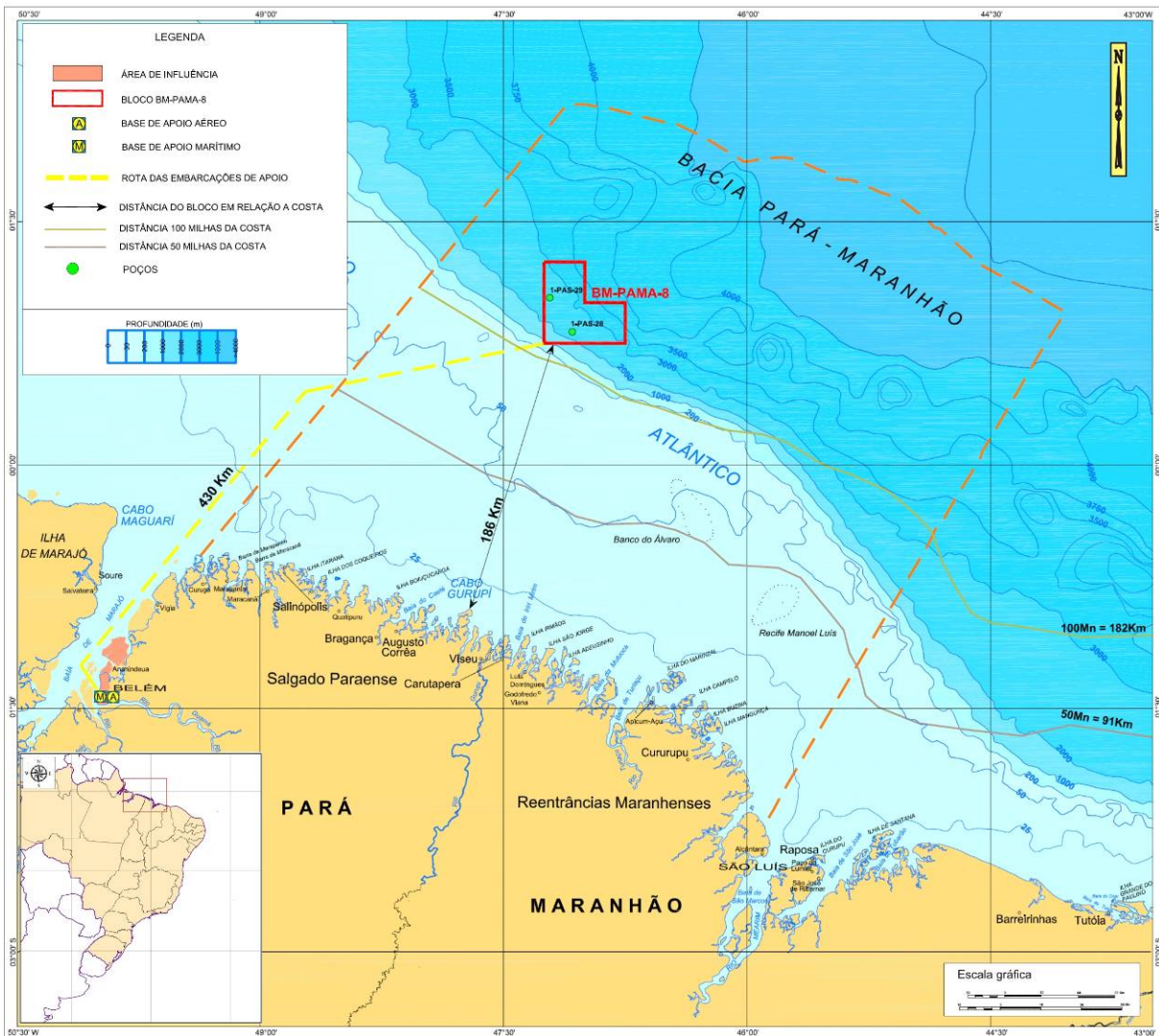


Figure 5 - Area of Influence of the Activity

2.2.1.2 - Environmental Diagnosis

a) Physical Surroundings

The Pará-Maranhão Basin is located on the western part of the equatorial area of Brazil, covering some 96,000 km². In this region, the prevailing winds blow from the East (E) and the Northeast (NE).

The weather in this region is divided into a rainy season (January through July) and a dry season (July through December). With a minimum mean temperature of 25.7°C in July (mid-winter) and a maximum temperature of 27.3°C in November (the hottest month).

In terms of the ocean currents in the BM PAMA-8 Block area, the influence of several currents compositions is noted, but with the North Brazil Current (CNB) prevailing, as well as tidal currents.

b) Local Biota

The shoreline of the area of influence is strongly characterized by the presence of mangrove swamps. The coastal environments in this region encompass Amazon Rainforest, rivers, estuaries and sandspits.

The North region presents a plankton composition that is closely related to the characteristics of its water bodies, due to the influence of the Amazon River and rainfall patterns. Several studies examining the phyto-plankton along the Amazon shoreline indicate greater abundance in the coastal region, becoming sparser in deeper ocean waters.



The distribution of fishing resources in the Pará-Maranhão Basin region is directly related to the higher and lower flows of the Amazon River, due to alterations in salinity.

The most common types of catch found in marine and estuarine environments have been identified, including freshwater shrimp, catfish, porgy and lobster.

The manatee is found along the entire coastline in the Area of Influence of the activity, due to its preference for coastal areas that are lightly populated by human beings, together with estuarine environments and coastal shallows, reefs and the abundant plant life that it requires for food.

There are also records on the Area of Influence of the occurrence of leatherback turtles, green turtles and olive Ridley turtle, according to the TAMAR Sea-Turtle Preservation Project.

c) Social and Economic Aspects

In social and economic terms the Area of Influence consists mainly of the municipality of Belém, the Pará State capital, which is equipped with support facilities underpinning the development of drilling activities in the BM PAMA-8 Block.



The city of Belém has a densely populated urban center, consisting mainly of middle and upper class residents, bustling with people, goods and capital flows. Its beachfront neighborhoods are more highly valued, where residential and commercial uses prevail, with high grade services, in addition to fishing and tourism. Lower class segments live in widely scattered outlying urban areas. The vast territory of Pará State encompasses a b variety of natural environments where many distinct

groups have settled and developed, with their own cultural expressions, forming a rich archeological and architectural heritage.

Local handcrafts feature many references to pre-colonial and even pre-historic days, including marajoara and tapajônica pottery – a traditional attraction for visitors to this State. The folklore of Pará State, such as the Roda de Carimbó dance groups, and other events such as the Juriti Tribes festival attract local visitors. Major religious occasions are also conducted here, such as the Círio de Nazaré Pageant in Belém, and the Festa do Çairé Festival in Santarém, attracting participants from many different parts of Brazil.



The largest industrial hub in Pará State, Belém clusters its industries in the Icoaraci district, close to cargo terminals, logistics support bases and other port activities, with fisheries, brickworks and tileworks employing much of the population, in addition to palm hearts processing and assai

berry growing, extraction and sales. This is the district where the Tapanã Port Terminal is located, used as the offshore support base for the activities of Petrobras in the Pará-Maranhão Basin and at the Mouth of the Amazon River.

2.2.1.3 - Environmental Impact and Mitigatory Measures

The environmental impacts of a specific activity are caused by related aspects and interventions interacting with the environment in the Area of Influence of the Activity.

a) Aspects and Interventions

Temporary or permanent insertions of new elements or factors that can alter physical, physio-chemical, biological, social and economic relationships in the environment.

b) Impacts

Any changes in the environment, whether harmful or beneficial that are fully or partially caused by the activities, products or services of the organization (ISO 14001 Standards).

Figure 6 presents the matrix of impacts related to the Activity, as well as the respective environmental measures and projects addressed by Petrobras.

Surroundings	Nº	Impact	Place of Occurrence	Mitigatory Measure
Physical Surroundings	1	Alteration to water quality due to the discharge of oily and sanitary liquid wastes as well as food wastes	Water Column	Pollution Control Project
	2	Alteration to the quality of the sediment due to the discharge of gravel and adhered drilling fluid	Water Column	Pollution Control Project
	3	Alteration to the quality of the water due to the discharge of gravel and adhered drilling fluid	Water Column	Pollution Control Project
	4	Alteration to air quality due to emission of gases from engines and formation tests	Local Atmosphere	Pollution Control Project
Local Biota	5	Alterations to benthonic communities due to the physical presence of the drilling rig	Wells Area	No steps planned
	6	Alterations to nektonic communities due to the physical presence of the drilling rig	Water Column	No steps planned
	8	Alteration to planktonic and nektonic communities due to the discharge of oily and sanitary waste and food waste	Water Column	Pollution Control Project
	9	Alteration to benthonic communities due to the discharge of gravel and clinging drilling fluid	Wells Area	No steps planned
	10	Interference with nektonic communities due to the operations of the drilling rig (generation of noise and light)	Water Column	Lights positioned to shine onto the rig deck
	11	Interference with nektonic communities due to shipping traffic	Trip between the onshore support base and each drilling rig	Environmental Education Project for Workers
Social & Economic Surroundings	12	Interference with fishing activities due to the establishment of a restricted use area (safety zone)	500m around each of the drilling rigs	No steps planned
	13	Pressure on the final disposal infra-structure due to the generation of solid and oily wastes	Municipalities in the Area of Influence	Pollution Control Project
	14	Increase in commercial activities and services due to demands for input materials and services	Municipalities in the Area of Influence	Use by local trade
	15	Pressure on waterborne, air and road traffic due to the transportation of input materials and wastes	Trips between the support basis and the drilling rigs	Community Communications Project, complying with safety Standards and avoiding peak periods for local traffics
	16	Pressure on the offshore transportation and port logistics infra structure due to the transportation of input materials and wastes	Municipalities in the Area of Influence	No steps planned
	17	Increase in tax revenues and more dynamic economic activities at the local, state and national levels due to the generation of taxes related to trade and services	Municipalities, States and Federal Government	Use of local trade

Figure 6 – Matrix 1 – Impacts associated with Drilling Activities.

c) Environmental Projects

In order to ensure the ongoing environmental feasibility of the activity, based on descriptions and assessments of its environmental impacts, Petrobras has defined the related mitigating and potentiating measures in compliance with the guidelines laid down by Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA), which is the environmental entity analyzing the study.

The mitigatory measures are designed to minimize negative impacts, while potentiating steps are intended to maximize positive impacts.

Thus, mitigatory and potentiating measures have been proposed, including the Environmental Projects. These projects must allow the implementation of Environmental control actions, all focused on a single goal.

A brief description of the goals established with these Projects is presented below:

c.1) Environmental Monitoring Project (PMA)



Plankton Net

The Environmental Monitoring Project proposed for drilling activities in the Pará-Maranhão Basin pursues the general goal of providing inputs for monitoring possible environmental alterations in the Area of Influence of the activities, from the period prior to production activities through to their shutdown.

In order to define the monitoring points for physical and chemical properties of water, the benthonic community and some contaminants, the prevailing direction of local sea currents was taken as a basis.

The purpose of the pre-monitoring phase was to obtain knowledge of local environmental conditions with no intervention from the activity, constituting a database for future evaluations, taking into account

relevant aspects such as water and sediment quality, benthonic macrofauna and meteorological variables.

c.2) Pollution Control Project (PCP)

The goal of the Pollution Control Project is to ensure ongoing maintenance of environmental quality in areas where the drilling activities will be performed in the Pará-Maranhão Basin, mainly through controlling, managing and minimizing sources and processes tagged as potential pollution generators.

c.3) Community Communications Project (PCS)

The Community Communications Project is designed to maintain a direct channel of communication and information between Petrobras and the population in the area of influence, in order to keep it informed about the activity, its environmental consequences, both positive and negative, including social aspects, as well as the mitigatory and control measures adopted.

The target public consists of segments in the Area of Influence of the drilling activities for the BM PAMA-8 Block in the Pará-Maranhão Basin, such as fishing companies, fishermen's associations, business entities and trade associations in the fisheries sector, in addition to Federal and State Government, entities and institutions.

In order to implement this project, two lines of actions were established:

- 1st line of action
 - Placement in a variety of media in the Area of Influence and use of the Shipping Notifications service, with information on the implementation of the Project;
 - Disclosure of the activity to small-scale fishermen through associations, organized villages and the unions representing them;
- 2nd line of action
 - Use of the GreenPhone toll-free hotline (0800-262828) already in place, in order to provide additional information on these operations for communities, in addition to responding to requests for compensation for damaged equipment;
 - Preparation of printed matter (folder) to be disseminated, presenting details of the drilling activities, the location of the blocks and the wells.



c.4) Environmental Education Project for Workers (PEAT)

Petrobras will implement an Environmental Education Project for Workers addressing all employees involved with drilling activities in the Foz do Amazonas Basin, at the mouth of the Amazon River, working for PETROBRAS and its subcontractors.

This Project is justified as a tool for heightening awareness, building up capacities and educating these workers in the environmental issues related to the performance of their tasks, helping prevent and minimize negative impacts, in addition to maximizing the positive impacts of oil exploration and production activities.

2.2.2 - Module II.A – Introduction to Environmental Law

Article Nº 225 of the Brazilian Constitution states:

"Everyone has the right to an ecologically balanced environment, which is an asset for the common use of the people and essential to a healthy quality of life, with the Government and Society being assigned the duty to defend and protect it for presence in future generations".

In order to comply with the Brazilian Constitution, the National Environment Policy was established through Law Nº 6,938/81, whose purpose is the preservation, enhancement and rehabilitation of environmental quality that is propitious for life, in order to ensure the conditions needed for social and economic development, while underpinning the interests of domestic safety and protection of human dignity.

Brazil's National Environment Policy stipulates that activities making use of natural resources or that might cause environmental degradation must be licensed under the aegis of a State Regulator or Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA). An alteration introduced by Law Nº 7,804/90 defines that IBAMA is in charge of licensing activities with significant environmental impact at the national or regional levels.

Resolution Nº 237/97 issued by National Environment Council (CONAMA) defines a regional environmental impact as one that directly affects the territory of two or more States, establishing the procedures and criteria used for the environmental licensing, in order to deploy the licensing system as an environmental management tool. To do so, this Resolution establishes three categories of licenses, presented in **Figure 7**.

Prior License (LP)	<ul style="list-style-type: none"> - Preliminary planning phase for the activity; - Approval of the location and concept - Attests to environmental feasibility; - Establishes the basic requirements and conditions to be complied with during the subsequent implementation phases
Installation License (LI)	Authorizes the installation of the enterprise or activity, in compliance with the specifications set forth in the approved plans programs and projects, including environmental control measures and other conditions
Operating License (LO)	Authorizes the activity or enterprise after ascertaining effective compliance with the stipulations set forth in previous licenses, with the environmental control measures and conditions established for the operation

Figure 7 – Licenses to be issued by the Environmental Regulator.

The licensing process for offshore activities complies with the provisions established through resolution N° 23/94 issued by National Environment Council (CONAMA), requiring the licenses listed in **Figure 8**.

Seismic Prospecting License (LPS)	Authorizes and establishes the constraints and environmental control measures that must be followed by the entrepreneur in order to conduct the seismic data acquisition activities offshore and in transition zones.
Prior Drilling License (LPper)	Authorizes drilling activities
Prior Prospecting Production License (LPpro)	Authorizes production for checking the economic feasibility of the pool (Long Duration Tests – TLD)
Installation License (LI)	Authorizes the installation of the units and systems required for production and export
Operating License (LO)	Authorizes the start-up of operations by the enterprise or the rigs, facilities and systems involved in the activity in the area of interest.

Figure 8 – Licensing Procedure for Offshore Activities.

The procedure for licensing oil exploration activities is complex, requiring the presentation of many documents by the applicants, in addition to the preparation of specific environmental studies that vary according to the license to be issued, as presented in **Figure 9**.



Figure 9 - Documents Required for Licensing Offshore Exploration Activities.

The Environmental Crimes Act (Law Nº 9,605/98) rules on the criminal sanctions and administrative penalties imposed for conduct and activities harmful to the environment, assigning liability to individual persons and corporate entities for crimes against plantlife, wildlife, pollution, urban arrangements and cultural heritage, as well as against the environmental administration.

Among others, the following are considered as crimes:

- Causing direct or indirect damage to conservation unit (parks, environmental protection areas, reserves and others);
- Hampering or preventing the public use of beaches;
- Causing pollution at levels resulting in damage to human health, causing widespread animal deaths or destruction of plant life;
- False or misleading statement issued by a civil servant when issuing a license or authorization for works or activities that fail to comply with the law.

Another important step forward for controlling offshore pollution resulting from oil exploration and production activities was the publication of resolution Nº 398/ 2008 issued by the National Environment Council (CONAMA), which rules on the minimum content of the Individual Emergency Plan for oil pollution incidents originating in organized ports, port facilities or terminals, pipelines, rigs and their respective support facilities, among others, with guidance on its preparation.

2.2.2.1 - Environmental Education

Brazil has a specific Environmental Education Policy established through Law Nº 9,795 / 99. Article 3 of this Law stipulates: "As part of the broader education process, everyone has the right

to Environmental Education, with companies, professional entities, public and private institutions being required to implement programs designed to build up the capacities of workers (in compliance with item V), in order to upgrade and ensure effective control over the work environment, in addition to repercussions on the environment of production processes."

a) Concept

Process that encompasses the social, economic, political, cultural and historic dimensions, necessarily taking into considerations the conditions and development stage of each country, region and community, underpinning and understanding of the interdependence among the various elements constituting the environment, in order to ensure the rational use of local resources.

b) Goals

Making people aware of the importance of social and environmental issues within the contexts where they live and work;

Educate, heighten awareness, mobilize and encourage people to take specific steps designed to upgrade the quality of the environment and their lives;

Encourage a critical sense in terms of the behavioral changes needed for constructing a citizenship committed to sustainability.

2.3 - MODULE III – MANAGEMENT OF SOLID WASTES AND INTRODUCTION TO ENVIRONMENTAL LEGISLATION

2.3.1 - Module III.A – Solid Wastes Management

Pollution control depends on the attitudes of all employees and outsourced workers in a company, particularly with regard to the correct separation of the different categories of wastes generated onboard.

This Management approach is grounded on the three Rs: Reduce, Reuse and Recycle. This three-pronged structure depends on the participation and involvement of all workers.

- Reduce – by lessening the amount of wastes generated, workers will act in a responsible manner, by minimizing the amount of wastes to be managed.

- Reuse – reusing materials before they become wastes also minimizes the amount of wastes to be managed. Through this process, materials may be reused, even for some other purpose, before they are discarded.
- Recycle – recycling wastes consists of ensuring that discarded materials, once properly separated, can be channeled back into the production chain as a source or raw material.
 - Minimizing the generation of wastes, which soon become viewed as raw materials, meaning they develop added value; and
 - Reducing the amount of material to be disposed of in landfills, which are becoming increasingly scarce.

Other alternative measures were adopted in order to ensure effective final disposal of the wastes generated on the drilling rig, particularly:

- Incineration – process through which the wastes are burned, possibly making use of the resulting energy, or not.
- Landfill – area properly prepared for receiving wastes, where they will be discarded and buried. Although this is a solution, there are some associated problems:
 - In order for a landfill to function properly, tight controls over the materials discarded there are required, in addition to gases and liquids that are generated through decomposition. Should these controls be inadequate, massive problems may occur through contamination of the air, the soil and surface water and groundwater resulting in serious problems for neighboring communities and others that previously benefitted from the contaminated water.
 - One of the problems associated with the disposal of solid wastes in landfills in Brazil lies in the fact that most of these facilities are unsuitable for accepting these wastes. The few that are up to standard are reaching the end of their useful lives, due to the huge amounts of material that they have already accepted. Furthermore, establishing new landfills is a difficult task, due to a shortage of suitable areas that are available and resistance from neighboring communities.

Although most of the wastes generated in Brazil are still sent to landfills, it is vital that the entire population become more aware of the importance of minimizing the generation of these wastes in business activities and other actions, as well as their proper separation and disposal.

In 2001, Resolution Nº 275 was issued by National Environment Council (CONAMA), which defines the color code for solid wastes separation, in compliance with international standards.

BLUE	Paper, cardboard
RED	Plastic
GREEN	Glass
YELLOW	Metal
BLACK	Wood
ORANGE	Hazardous wastes
WHITE	Hospital wastes (+ outpatient clinics and healthcare units)
PURPLE	Radioactive wastes
BROWN	Organic wastes
GRAY	General wastes that cannot be recycled, or mixed and contaminated, with no separation possible.

Revised in 2004, the NBR 10.004 standard issued by the Brazilian Technical Standards Association (ABNT) rules on "Solid Wastes - Classification", grading solid wastes in terms of their potential risks to the environment and public health, listing solid wastes that require more strictly controlled handling and disposal.

- Class I Solid Wastes – Hazardous: These wastes offer risks for the public health or the environment (hazardousness) or are inflammable, corrosive, reactive and / or pathogenic.
- Class IIA Solid Wastes - These solid wastes do not fit into the Class I (Hazardous) or Class B (Inert) solid wastes classifications, and may have properties such as biodegradability, combustibility or solubility in water.
- Class IIB Solid Wastes – Inert: The elements in these wastes are not solubilized at concentrations higher than drinking water standards.

a) Management of Solid Wastes on the Drilling Rig

- The solid wastes generated in the drilling rig must be separated into categories, and disposed of in specific recipients that are appropriate for this purpose, clearly identifying their nature.
- Controlled solid wastes (batteries, hospital wastes, inks, oil filters, etc) must be collected in specific areas on the drilling rig, in compliance with their onboard sources.
- Temporary storage prior to the final disposal of these solid wastes must be defined at a specific location that is clearly sign posted and protected from the weather.

- All solid wastes generated must be stored, transported and shipped to their final destinations. They must have a “Solid Wastes Control and Disposal Sheet” (FCDR), that accompanies them throughout this entire trip, with the document providing full information on their characteristics.

Figure 10 presents a simplified outline of the scheme to be adopted for managing solid wastes on the drilling rig.



Figure 10 - Solid Wastes Management Scheme.

Module IV - Procedures for Containing Leaks and Controlling Oil Spills

2.3.2 - Module IV.A – Emergency Plans

All companies with the potential for generating anomalous occurrences whose consequences might harm people or the environment, or damage goods and assets, including those owned by third parties, must draw up an Emergency Plan as a preventive step.

The Emergency Plan is a document that defines responsibilities, in addition to the organization set up to respond to emergencies. This Plan contains detailed information on the characteristics of the area involved, being drawn up in order to train, organize, guide, facilitate, streamline and ensure uniformity in the actions required for effective responses needed to control and contain anomalous occurrences.

This plan establishes the lines of communication for operating accidents and the accidental release of pollutants during oil production and shipping activities.

All oil spill warnings must be transmitted immediately by the observer to the Radio Room, which will notify the Offshore Rig Manager, who will decide on the operating control measures to be taken by the corresponding emergency response teams.

For offshore oil spills, the Offshore Rig Manager will notify the Petrobras Inspector of the incident, who will bring the Organizational Response Structure (EOR) into action in order to implement the control actions addressed in the Plan, tailored to the scope of the incident.

The Official institutions listed below must be notified immediately by the E&P-EXP Executive Manager, regardless of the size of the oil spill, at any time of the day or night, and on any day of the week, by telephone and/ or by fax, with information on the oil pollution incident.

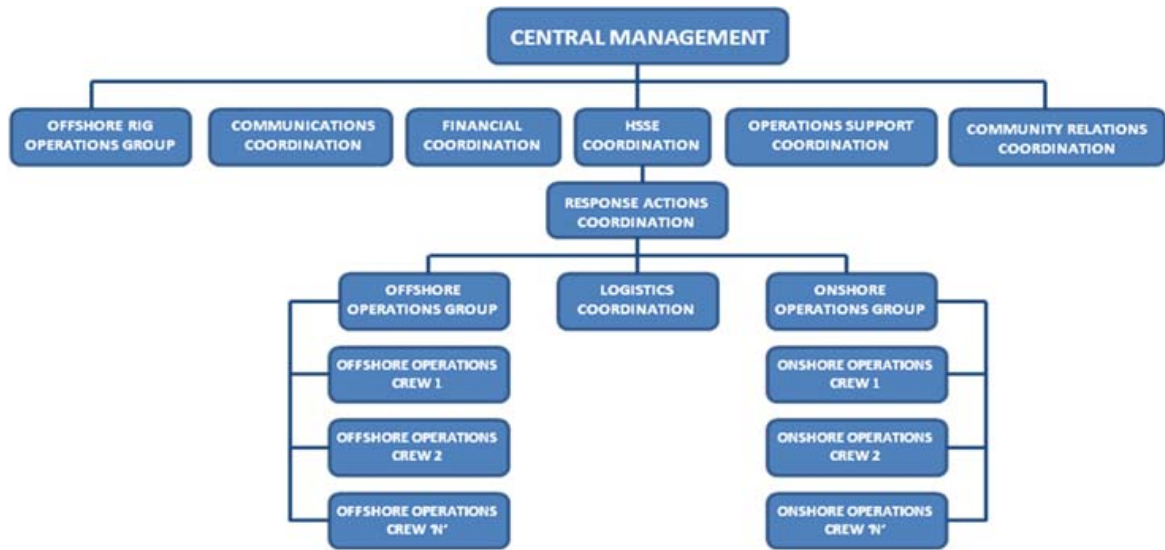
- General Oil and Gas Coordination Unit, Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA);
- the Brazilian Oil, Gas and Biofuels Industry Regulator (ANP);
- Eastern Amazonia Ports Captaincy (CPAOR);
- Port Captaincy Office at Santana.

Press releases and materials for distribution through the Internet are the responsibility of the Communications Coordinator, prepared as required by progress of the incident.

a) Organizational Response Structure (EOR)

Presented below, the organizational response structure is brought fully or partially into actions in order to respond to all accident contexts, depending on the scope of the incident and the progress of the control actions.

Figure 11 presents the organization chart of the Organizational Response Structure (EOR) for incidents, its respective functions and the links between its action groups.



Organization Chart – Offshore Rig Operations Group

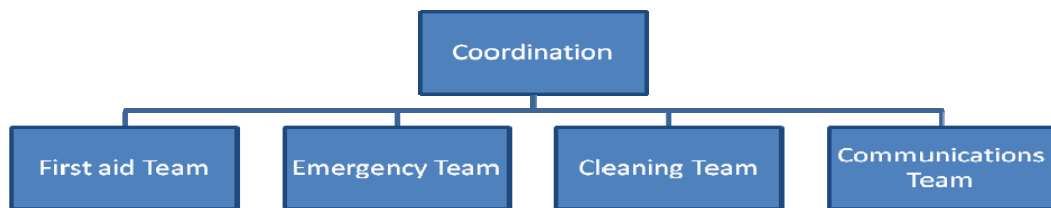
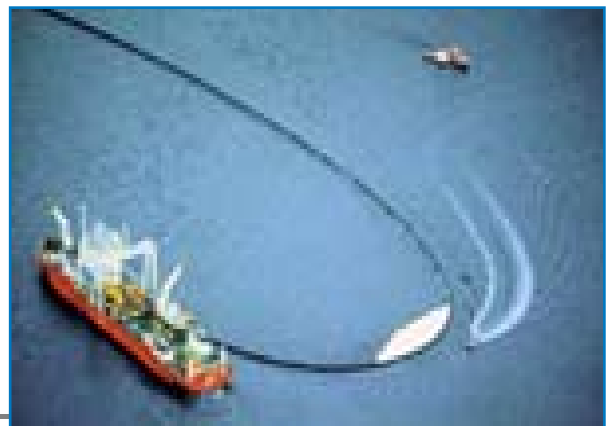


Figure 11 - Organization Chart 1 – Organizational Response Structure (EOR) for drilling activities in the PAMA-08 Blocks, in the Foz do Amazonas Basin at the mouth of the Amazon River

Persons on board with no specific function in the structure presented above will remain at their workposts or must go to a safe place, complying with the orders issued through the public communications system.

a.1) Response Equipment

The drilling rig is fitted with Shipboard Oil Pollution Emergency Plan (SOPEP) kits, whose equipment is defined in the International Convention for the Prevention of Pollution From Ships (MARPOL 73/78), promulgated in Brazil through Decree Nº 2,508, on March 4, 1998. These kits are intended for use in incidents



resulting in oil leaks from the rig, with immediate mobilization.

In case of incidents with oil leaks that extend beyond the boundaries of the drilling rig, Petrobras works with equipment and materials supplied through the Belém Base of the Environment Defense Centers (CDAs) for Amazonia and the Maranhão base in São Luís.

Should additional resources be required, the Environment Defense Centers (CDAs) at Guamaré (Rio Grande do Norte State) and Guarulhos (São Paulo State) will also be brought into action.

a.2) Response Procedures

Flowsheet 1 presents the initial response actions undertaken aboard the rig.

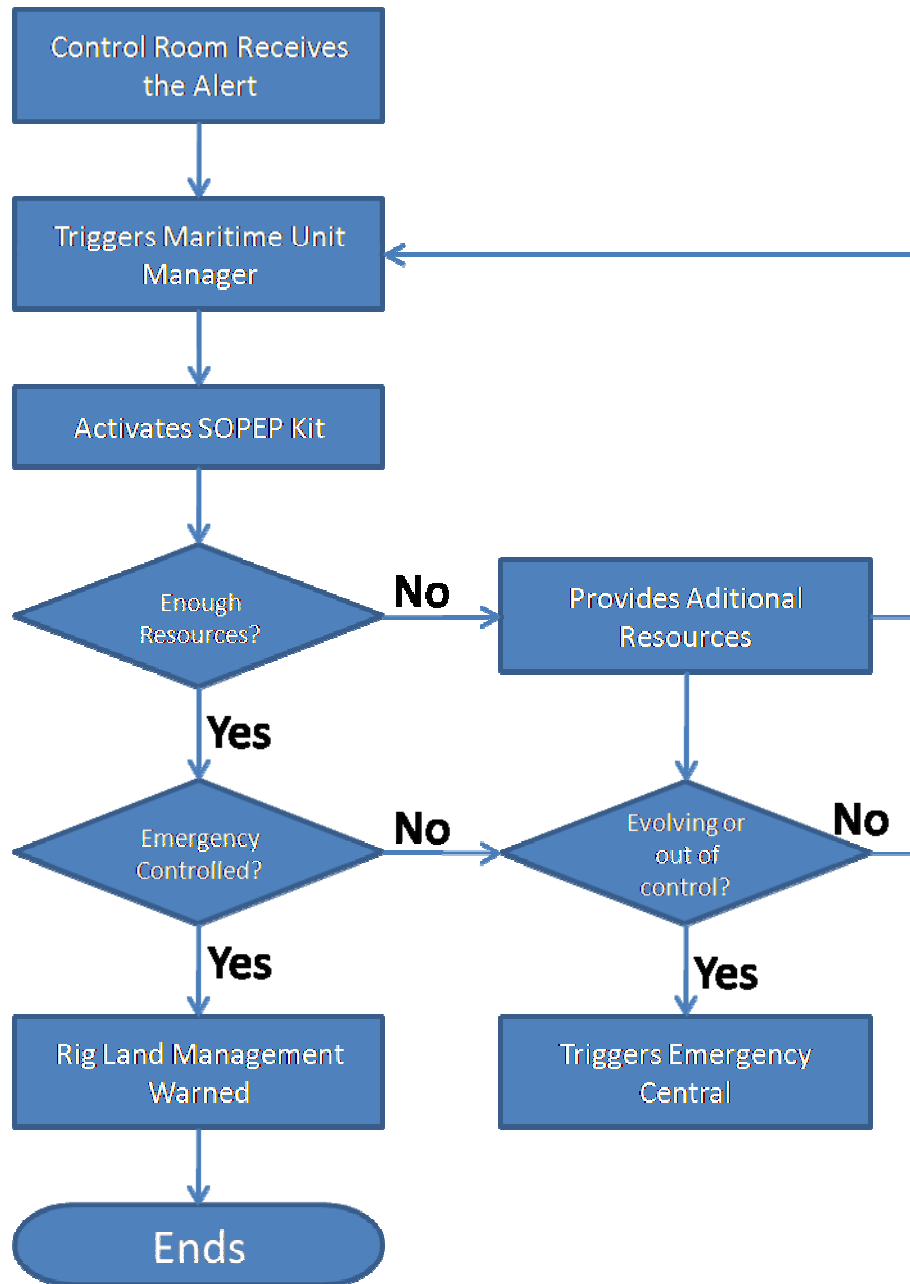


Figure 12 – Flowsheet 1 – Initial Response Actions onboard the Rig.

a.3) Energy Conservation

Conserving electricity results in the rational exploitation of natural resources. It is important to understand that the energy conservation concept means making better use of this resource,

without losing out on the comfort and advantages that it offers. It means reducing consumption and lowering costs, with no loss of efficiency and service quality.

The movement urging rational energy use in Brazil began in mid-1975. Outstanding among the programs established in this field is the National Electricity Conservation Program (PROCEL), introduced in 1985 by Eletrobras. The scope of this Program was extended to some extent by the participation of electricity utilities, mainly through their publication and distribution of handbooks urging energy conservation among many different sectors of society.

In June 1991, a Presidential Decree established the National Program for the Rationalization of Natural Gas and Oil Products (CONPET), coordinated by representatives of the Brazilian Government and the private sector, with technical and administrative support from Petrobras. The main goal of this Program is to step up energy efficiency by 25% (Petrobras, 2000), but it is not endowed with a strong appeal through the communications media, like the PROCEL Program. The sphere of action of CONPET encompasses institutional activities (CONPET at School), transportation (Economize Project) industry (environmental upgrades and more competitive output), homes and stores (use of labels indicating the energy efficiency of appliances), agriculture (use of diesel oil) and power generation (thermo-power plants).

The steps that can be taken by consumers to conserve energy are extremely simple, such as using more efficient appliances and switching off lights and television sets when not in use.

a.4) Sustainable Development and Environmental Management

Sustainable development is a way of dovetailing economic growth and environmental conservation, meeting the needs of the present without undermining the possibility of future generations meeting their own needs.

This concept addresses not only the impacts of economic activities on the environment, but also refers mainly to the consequences of this relationship on the quality of life and the well being of society, today as well as in the future. Economic activities, the environment and the well being of society form the triple bases underpinning the concept of sustainable development.

According to the Brundtland Report, a series of steps must be taken: a) curtailing population growth; b) long term guarantees for food supplies; c) preservation of biodiversity and ecosystems; d) reduction in energy consumption and the development of technologies that allow the use of renewable energy sources; e) increase in industrial output among the non-industrialized countries based on eco-friendly technologies; f) constraints on out-of-control

urban sprawl and integration between the countryside and smaller towns; g) basic needs must be met.

At the international level, the goals proposed by this Report are the following: h) development entities must adopt sustainable development strategies; i) the international community must protect supra-national eco-systems such as Antarctica, the oceans and space; j) wars must be banned; k) the United Nations must implement a sustainable development program.

In order to compatibilize economic activities with environmental conservation, the International Standards Organization (ISO) drew up the ISO 14000 series standards. More specifically, the ISO 14001 standard, issued in 2004, defines environmental management criteria for ecologically correct production systems.

According to this standard, the implementation of an Environmental Management System is based on the following basic requirements:

- Commitment to the Corporate Environment Policy;
- Planning actions designed to underpin environmental quality;
- Implementation and operation of these actions;
- Overseeing the process and implementing corrective actions;
- Critical analysis of what has been done and an ongoing enhancement process.

a.5) Discussion Forum

Why do companies care for the Environment?

Main Pressures.

Environmental Accidents – companies have a goal of minimizing to the greatest possible extent the possibility of the occurrence of any type of environmental accidents, always acting in a preventive manner.

Society - society acts in many different ways to demand meticulous care for the environment: setting up residents' associations, a wide variety of communications media, non-governmental organizations (NGOs) and universities are examples of ways through which society imposes pressures.

Legislation – Brazilian law requires commitment at all levels, caring for the environment.

Market – increasingly competitive markets encourage companies to modernize constantly, seeking certification (ISO 14001, among others), concerned with their marketing and acting with social and environmental responsibility.

What can we do to minimize the negative environmental impacts of the activity?

Within the current context of environmental degradation, is it possible to save the planet?

3 - REFERENCES

BACKER, Paul de, *Gestão Ambiental: A Administração Verde* - Rio de Janeiro: Qualitymark Ed., 2002

LOUREIRO, Carlos Frederico Bernardo, LAYRARGUES, Philippe Pomier & CASTRO, Ronaldo Souza de, (organizadores). *EDUCAÇÃO AMBIENTAL: repensando o espaço da cidadania* – Editora Cortez - São Paulo, 2002

4 - WEBSITES FOR CONSULTATION

www.ibama.gov.br

www.mma.gov.br/port/conama/