Repsol Sinopec Brasil

Environmental Education Project for Workers

Marine Drilling Activity in Block BM-C-33

Campos Basin

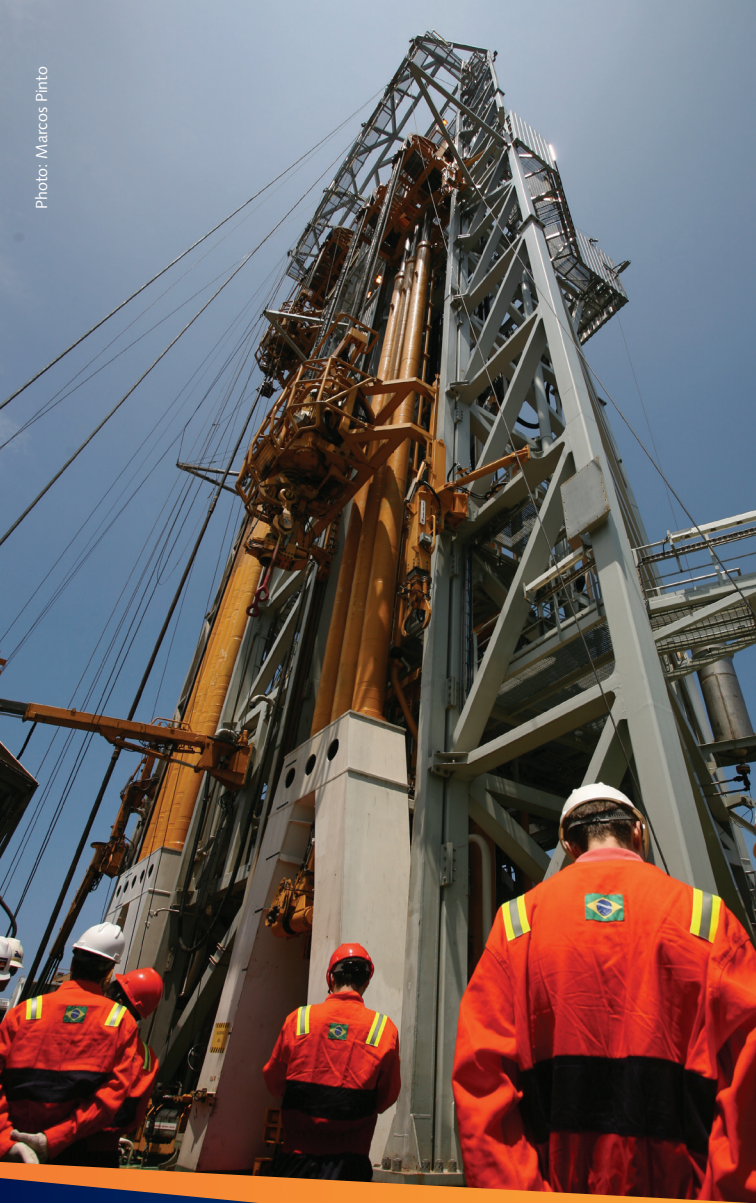


Photo: Marcos Pinto

The Company

Repsol Sinopec Brasil is an energy company that has been present in Brazil for more than 15 years. Currently, the company's activities in the country are concentrated on the **Exploration and Production** of Oil and Gas.

The Material

You are receiving material made especially to help you to understand and participate in drilling ctivities in a conscientious way.

This material, in the format of a notebook, is to be used as a reference to the topics discussed during the presentation of the Environmental Education Project for Workers for the workers involved with Repsol Sinopec Brasil's drilling activity in the Campos Basin. In it you will find various topics and concepts related to environmental issues and the relation between the activities of drilling and environmental conservation. Various topics that have to do with the sedimentary basin where the drilling is to take place will be covered. We hope that it sensitizes workers to carry out their tasks in an environmentally sound and responsible manner.

Companies have the responsibility to "promote programs designed to build the capacities of workers, looking towards the improvement and effective control over their work environment, as well as over the repercussions of the productive process in the environment."

Federal Law 9795/99 – National Policy on Environmental Education

The Environmental Education Project for Workers has the following goals:

- Bring awareness and build capacity, focusing on the interferences of the activity on the environment, as well as the actions necessary to execute each activity with care;
- Stimulate the workers to participate in the corrective and preventative actions to control the forms of pollution and maintain environmental quality;
- Make space for the exchange of experiences between the different professionals involved in the drilling activity;
- Consolidate environmental awareness at all operational levels of the company.

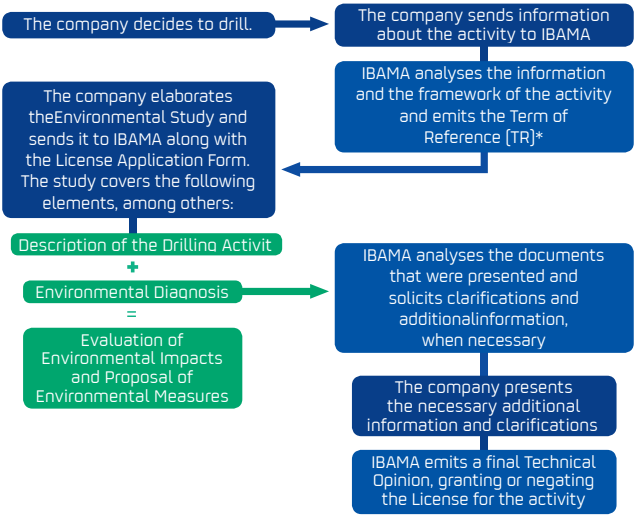
HAPPY READING!

"The implementation of the **Environmental Education Project for Workers** is a mitigation measure required by federal environmental licensing, conducted by IBAMA/CGPEG."

My Notes:

My Notes:

Licensing Process



Understanding the licensing process and some of the legal requirements.

Brazilian environmental legislation is a combination of laws that are geared towards the preservation and conservation of the environment and the regulation and control of activities that use natural resources and can cause environmental degradation.

*TR – a document elaborated by IBAMA that establishes the minimum content of the Environmental Study and orients it´s elaboration.

Do you know what environmental licensing is?

Article 1 of CONAMA (National Environmental Counsel) Resolution num. 237/97, Environmental Licensing, states that environmental licensing is an "administrative procedure whereby the qualified environmental organization licenses the location, installation, amplification and operation of projects and activities that use environmental resources, are considered to have an effect on the environment and/ or are potentially pollutant or those that, in some way, have the potential to cause environmental degradation, considering the legal requirements, regulations and standards applicable in each case."

Licensing depends on the environmental viability of the activity.

For the analysis of the environmental viability of the activity, characteristics of the environment (physical, biotic and social) are observed and the characteristics of the activity that will be implemented, taking into consideration the capacity of the environment to assimilate possible alterations (impacts) provoked by the activity and the control measures and mitigation measures that should be adopted.

Environmental license – authorization given by the competent environmental agency (IBAMA) that authorizes the realization of the activity and establishes the conditions, restrictions and environmental control measures that should be met by the company, in order to protect the collective right to an ecologically balanced environment.

Do you know what Licensing Conditions are?

The licenses are made up of two groups of conditions: (i) general conditions, that comprehend a group of legal requirements related to environmental licensing, and (ii) the specific conditions that comprehend the group of technical restrictions and requirements associated specifically with the licensed activity.

The non-compliance of one of these conditions can lead to losing the license.

Environmental Legislation...

FEDERAL CONSTITUTION, ART. 225 – 1998

"All people have the right to an ecologically balanced environment, a good that is for the common use of the people and is essential to the healthy quality of life; the government and the collective have the obligation of defending it and preserving it for current and future generations."

LAW NUM. 6.938, OF AUGUST 31ST, 1981
NATIONAL POLICY OF THE ENVIRONMENT

Establishes the guidelines and the legal instruments related to the environment for the country.

LAW NUM. 9795, OF APRIL 27TH, 1999
NATIONAL POLICY OF ENVIRONMENTAL EDUCATION

Establishes the guidelines of environmental education in the country, makes clear the role companies should have in environmental education actions.

LAW NUM. 12305 OF AUGUST 2ND, 2010
NATIONAL POLICY OF SOLID WASTE

Institutes the guidelines for management of solid waste in the country and defines the obligations of companies in the process, including the proposal of reverse logistics, among others.

MINISTRY OF THE ENVIRONMENT ORDINANCE
NUM. 422 OF OCTOBER 26TH, 2011

Sets forth the procedures for federal environmental licensing of activities of exploration and production of oil and gas in the marine environment and in the land-ocean transition zone.

CONAMA RESOLUTION NUM. 357, MARCH 17, 2005
CLASSIFICATION OF BODIES OF WATER

Creates a system of classification of bodies of water and environmental guidelines for its care, as well as establishing conditions and standards for discharging of effluents into these waters among other things.

CONAMA RESOLUTION NUM. 275,
APRIL 25, 2001 SEGREGATED WASTE COLLECTION

Establishes a color code for different types of waste to be adopted by collectors and transporters as well as in informative campaigns about segregated waste collection.

DZ.1310.R-7- WASTE MANIFEST

Establishes the methodology of the WASTE MANIFEST SYSTEM as an integral part of the Pollutant Activities Licensing System, as a way to increase the control of waste generated in the State of Rio de Janeiro from its origin to its final destination as well as avoiding such waste being sent to unlicensed locations.

CONAMA RESOLUTION NUM. 313, OCTOBER 29, 2002
NATIONAL INVENTORY OF INDUSTRIAL SOLID WASTE

Regulates the National Inventory of Industrial Solid Waste.

CONAMA RESOLUTION NUM. 23, DECEMBER 7, 1994
LICENSING OF EXPLORATION AND PRODUCTION ACTIVITIES

Institutes specific procedures for the licensing of activities related to exploration and extraction of combustible liquids and natural gas.

CONAMA RESOLUTION NUM. 398, JUNE 11, 2008
OIL SPILL RESPONSE PLAN

Regulates the minimum requirements of the Oil Spill Response Plan for incidents of oil pollution origination from organized ports, port instillations or terminals, ducts and rigs, as well as their respective support instillations, and provides orientation for elaborating the plan.

LAW NUM. 9,996, APRIL 28, 2000
OIL LAW

Regulates the prevention, control and inspection of pollution caused by oil and other dangerous substances released into water that is under national jurisdiction.

DECREE NUM. 2,508/98 - **MARPOL 73/78**

Puts into effect the International Convention for the Prevention of Pollution Caused by Ships (MARPOL). MARPOL 73/78: Annex I- regulates the prevention of pollution caused by oil and Annex IV- regulates prevention of pollution caused by sewage.

My Notes:

Ocean Rig Mylos

Supply boat

Description of the Activity

The goal of the Marine Drilling Activity is to identify and evaluate the potential petroleum reservoirs in the licensed block in the Campos Basin.

The drilling unit that will be used is the Ocean Rig Mylos drill ship, equipped to operate in waters of up to 3,000 m.

During the drilling, supply boats will provide support to the drilling activity during routine operations (refueling, carrying supplies, material and equipment, transporting waste, among other things). Also, there will be a vessel dedicated to the Oil Spill Response Plan, that will act if as oil spill occurs.

My Notes:

Characteristics Of The Activity

The Campos Basin is located between 20.3º and 25.3º South, between the northern coast of the state of Rio de Janeiro and the state of Espírito Santo. The Basin occupies about 160,000 km².

The Offshore Drilling Activity of Repsol Sinopec Brasil in Block BM-C-33, located in the Campos Basin, started in 2009. Four wells were drilled by 2012.

Drilling in the Campos Basin is planned to continue to obtain a better evaluation of the reservoir in this area. Seven more wells are licensed.


ESPÍRITO SANTO
MINAS GERAIS
RIO DE JANEIRO
São Francisco de Itabapoana
São João da Barra
Campos dos Goytacazes
Quissamã
Carapebus
Macaé
Rio das Ostras
Cabo Frio
Armação dos Búzios
Arraial do Cabo
180 km
CAMPOS BASIN
SANTOS BASIN
Pão de Açucar
Seat
Gávea
BM-C-33
ATLANTIC OCEAN
N
200
100
150
250
500
1000
75
50
100
1500
2000
3000
3500
4000
2500
Drilled wells.
0 25 50 100 km
Fonte: IBGE; ANP-BDET.


ESPÍRITO SANTO
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Cabo Frio
Armação dos Búzios
Arraial do Cabo
CAMPOS BASIN
SANTOS BASIN
180 km
Pão de Açucar A1
Seat 2
Seat 3
Gávea 2
Gávea 3
BM-C-33
Pão de Açucar A3
Pão de Açucar A2
N
200
100
150
250
500
1000
75
50
1500
2000
3000
3500
4000
2500
0
25
50
100 km
Planned wells.
ATLANTIC OCEAN
Fonte: IBGE; ANP-BDET.

Block	Wells	Water Depth (m)	Drilling Status
BM-C-33	Seat	2,666	Drilled in 2009/2010
	Seat 2	2,708	Planned
	Seat 3	2,712	Planned
	Gávea	2,710	Drilled in 2010/2012
	Gávea 1C	2,709	Drilled in 2010/2012
	Gávea 2	2,714	Planned
	Gávea 3	2,714	Planned
	Pão de Açúcar	2,788	Drilled in 2010/2012
	Pão de Açúcar A1	2,807	Planned
	Pão de Açúcar A2	2,813	Planned
	Pão de Açúcar A3	2,781	Planned

My Notes:

My Notes:

My Notes:

Enviromental Characteritics

Getting to know the environment around the drilling activity... Characteristics of the Campos Basin.

Now, we are going to get to know a bit about the environmental characteristics of the Sedimentary Basin where the drilling will take place. It is interesting to mention that because of the proximity between basins, there are many similarities between the Campos Basin and those bordering it. These similarities have to do with the plants, animals and physical conditions of the locale.

The socioeconomic activities of the area are strongly related to fishing and tourism. It is important to note that for the majority of Brazilian coastal cities, these activities represent an important source of employment and income for a significant portion of the population.

Before we start this journey through the rich abundance of life found throughout the Brazilian coast (called biodiversity), we need to understand an important concept in order to help in grasping the relationship between the activity and the environment (themes that will be addressed next).

AREA OF INFLUENCE OF THE ACTIVITY:
The real or potential area impacted by the carrying out of the specified activity. This area is divided into Direct Area of Influence (DAI) and Indirect Area of Influence (IAI).

DAI	IAI
Areas impacted directly by the carrying out of the activity (installation of the drilling operation, discharge of cuttings with drilling fluids, location of marine and air support bases).	Areas that are potentially threatened by the indirect impacts of the activity (ex. an oil spill)

The Areas of Influence of this activity are:

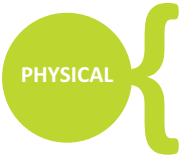
- The area of Block BM-C-33 because it is where the installation of the activity will take place;
- The region where the mathematical simulations show that effects of the cuttings and drilling fluids will be felt;
- The municipalities of Vila Velha, in the state of Espírito Santo and Niterói in the state of Rio de Janeiro, where the marine support bases is located;
- The municipalities of Rio de Janeiro and Macaé in the state of Rio de Janeiro, where the air suppor bases are located.

Getting to know the area of influence well helps to better identify and measure the possible environmental impacts from the drilling activity, a list of the impacts caused can be created by crossing information from the environmental diagnostic of the area of influence with information about actions and/ or aspects of drilling that have the ability to cause change in the environment.

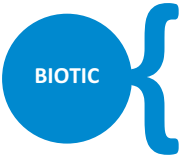
We also know that the type of physical environment reflects the local plants and animals and, consequentially, the economic activities of the region. It is possible that the socioeconomic profile of the area of influence can be changed because of the misuse of natural resources.

It is important to keep in mind that when we talk about the environment, we are talking about a huge concept that englobes diverse aspects that make up the geographic, biological and social space that surrounds us.

The environment has been divided into 3 parts in order to facilitate the study of the area where the drilling activity will be carried out, **remembering that we are just as much a part of the environment as the plants and animals around us.**



Climate
Ocean Floor



Preservation Areas bb
Microscopic Marine Organisms - Plankton
Organisms Linked to the Ocean Floor - Benthos
Fish and Fishing Resources

Land Use
Infrastructure
Education
Leisure, Tourism and Culture
Environmental Control and Management

When we talk about the sedimentary basin, the first thing that comes to mind is the Brazilian coast and the variations in forms, colors and life that are found along it. These coastal environments involve a combination of different landscapes, like bays, coastal lakes, rivers, estuaries, sandbanks, coastal plains and mangroves.

Mangrove

Atafona Estuary, RJ

Araruama Lagoon, RJ

Restinga

Here, we will some interesting points about some of these ecosystems, mainly those that can be directly effected by the our actions as humans, such as; unregulated occupation of land, real estate speculation, pollution from oil spills, domestic and industrial sewage discharge, etc.

Rocky Seashore National Monument, RJ

Sandbanks

Sandbanks with vegetation growing wildly originally existed along a major portion of the coast, but the process of human occupation has contributed greatly to the degradation of this ecosystem in an aggressive and rapid manner. The vegetation that is typical to sandbanks is extremely well adapted to survive in an adverse environment, having mechanisms that can withstand dominating physical factors such as: extreme temperatures, strong sunshine and winds, sandy and unstable soil, lack of freshwater and high salinity. Unfortunately,

people don't tend to give this type of ecosystem its deserved value because they believe that it is just weeds or are more interested in constructing a house on the waterfront or pathways to the beach than noticing that it is this vegetation that keeps the ground firm and stops the movement of the dunes and sand in the area. The sandbanks form a natural barrier that controls the movement of the dunes, helping to avoid losses in coastal cities.

Mangroves

Mangroves are considered to be true nurseries of nature. A large part of marine species grow in this environment, it is known to be one of the most productive ecosystems on the planet.

Mangroves are found along the Brazilian coast, taking root where freshwater from rivers and salt water from oceans meet. Because of this encounter, the soil of mangroves is swampy and filled with rich organic compounds, causing them to be considered nature's supermarket. The vegetation of the mangroves consists of trees that are adapted to live in swampy areas, with anchoring and tabular roots, that form important shelter from various species, causing them to be considered nature's nursery as well.

Mangroves have been systematically destroyed, usually for landfills, for many of the same reason as sandbanks: they are found in areas of high commercial interest, and therefor the lives of the marine communities that depend on the mangroves in order to survive are severely endangered.

Rocky Seashores

This is the name given to the coastal ecosystem located on the line between the ocean and the continent. This ecosystem is influenced by the tides, the crashing waves and the strong sunshine, obligating its lifeforms to adapt to these particular conditions. In this rich ecosystem, communities of algae and innumerable marine animals that fix themselves to the rocks as well as that live in the water coexist in harmony. Some examples are: muscles, crustaceans, fish and turtles. This ecosystem holds an essential role, serving as a location for feeding, growth and reproduction of a large number of species.

In the Campos Basin, the action of the winds, principally northeasterly, associated with the alignment and the bathymetry of the coast causes the occurrence of a phenomenon called **upwelling**, the oceanographic phenomenon that consists in the rise of deep ocean waters, normally cold and rich in nutrients, to shallower regions of the ocean. These regions normally have high primary productivity and commercial importance for fishing activities.

There are various species of fish, marine mammals and sea turtles found in the Campos Basin.

Fish

The ichthyofauna is made up of species of fish that are economically and ecologically important, contributing to the production chain of many fishing communities in Brazil.

According to research in the area, there is a large variety of fish species in the influence area of the activity, including the whitemouth croaker, true sardine, mullet, bluefish, striped bonito, and the common dolphin fish (corvina, sardinha-verdadeira, tainha, enchova, bonito listrado and dourado in Portuguese).

Sea Turtles

Five species of sea turtles can be found along the Brazilian coast: loggerhead, green, leatherback, hawksbill and olive ridely.

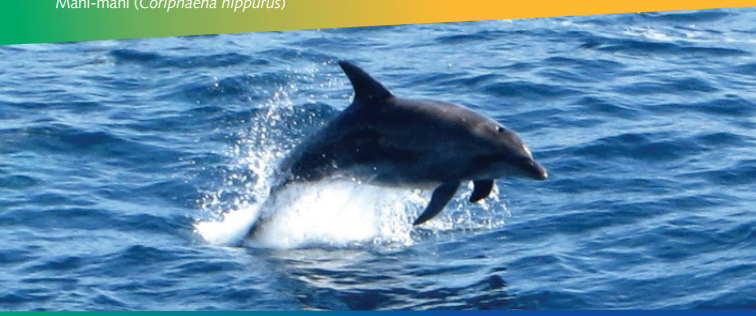
These turtles migrate along our coast for egg-laying, feeding and reproduction.

The loggerhead turtle is the sea turtle species that has the most number of nests along the Brazilian coast. The species with the greatest number of sightings not related to reproduction is the green turtle, often juveniles. The most commonly sighted sea turtles nationally are the leatherback and the olive ridely.

Marine Mammals

Marine mammals in the Campos Basin are represented by whales and dolphins, where the southern right whale and the humpback whale are most common. These species migrate from their feeding area, in the cold waters of the Antarctic region, to the warm waters of the south and northeast of Brazil (Santa Catarina and Abrolhos), to feed their offspring, moving through the Campos Basin between the months of July and November.

Mahi-mahi (*Coriphaena hippurus*)



Bottlenose dolphin *(Tursiops truncatus)*

Logerhead sea turtle *(Caretta caretta)*

Bottlenose dolphin *(Tursiops truncatus)*

My Notes:

My Notes:

Environmental Impacts and Mitigation Measures

Identifying Aspects
and Minimizing Impacts

Is it possible to have development without environmental degradation?

We know that drilling requires a high degree of devotion and awareness on the part of those who carry out the work, and keeping in mind that there are a number of environmental impacts associated with such work, it is essential that each individual is extremely attentive to their daily tasks and the procedures involved in their operations, the possible environmental impacts associated with that phase of the work and the measures that exist to diminish those impacts.

Each person should be ready to react immediately if a misconduct or failure to follow procedure were to occur.

ENVIRONMENTAL ASPECT

According to ISO 14001, environmental aspects are "features or characteristics of an activity, product, or service that can affect the environment." They can be anything from an element, like the drill bit, to an activity, like noise generation, that can cause some kind of effect on the environment.

Cause

ENVIRONMENTAL IMPACT

According to the CONAMA Resolution num. 001/86, an environmental impact is whatever alteration of the physical, chemical and biological properties of the environment, caused by some form of material or energy that results from human activities and that effect, directly or indirectly: I – health, safety and well-being of the population; II- social and economic activities; III – biota; IV – esthetic and sanitary conditions of the environment; V – the quality of the environmental resources.

Effect

MITIGATION MEASURES

Measures that are taken to mitigate, meaning reduce the magnitude of the negative impacts on the environment.

Mitigation measures can be subdivided, depending on the scope of the action, into:

PREVENTATIVE MEASURES

Results in the prevention of the occurrence of a negative environmental impact (in whole or in part).

CORRECTIVE MEASURES

Results in the correction of a negative environmental impact that has already occurred (in whole or in part).

Examples:

1º Aspect: Atmospheric Emissions
Impact: Alteration of the quality of the air

2º Aspect: Generation of effluents
Impact: Alteration of the quality of the water, interference with the marine biotics

Mitigation Measures:

1º Carrying out of Preventative Maintenance; Emissions Monitoring

2º Effluent Management; Pre-Discharge Treatment, Bringing to land

Notice that, for each activity carried out on board, there are environmental aspects, impacts and associated mitigation and control measures.

The adoption of mitigation measures is carried out mainly through Environmental Projects that are required by IBAMA for the licensing of the marine drilling activity.

In this way, Repsol Sinopec Brasil will implement the Environmental Projects described below during the drilling activity.

My Notes:

My Notes:

My Notes:

Environmental Projects

Environmental Monitoring Project

Has the goal of monitoring and evaluating the possible environmental alterations generated by the drilling activity. Contemplates the collection of water and sediment samples, observation of marine mammals (ex. whales), monitoring of the discharge of mud and evaluation of the toxicity of the drilling fluids.

Pollution Control Project

Looks to guarantee the maintenance of environmental quality in the areas that will be involved in the drilling activities, mainly through the management of the sources and processes identified as potentially polluting. Contemplates the management of the production of effluents and solid waste so that they are treated, stored and sent to the correct destination in the right way, attending Brazilian and international legislation.

Public Relations Communication Project

Clarifies the characteristics of the activity, its environmental impacts and the adopted mitigation measures for the population. It also establishes a channel of direct communication and information between Repsol Sinopec Brasil and the communities that make up the area of influence.

Environmental Education Project for Workers

Develops knowledge and discussions amongst the workers that enable individual and collective attitudes of preservation, as well as respect towards the natural and social environment in their professional and social activities.

Oil Spill Response Plan

Do you know what it is?

Developed in accordance with CONAMA Resolution 398/08, this plan defines the attributions and responsibilities of the Emergency Response Structure of Repsol Sinopec Brasil, the material resources necessary for the execution of the response structure, as well as the procedures for control and clean-up of oil spills in the ocean.

The goal of the plan is to contain and remove the oil in the quickest and most efficient way possible, minimizing the environmental impacts.

Awareness about protecting the environment has deepened with time across the world. In the specific case of oil spills, not only governments but also companies and society in general have been mobilizing in order to establish preventative and control measures that minimize the harm caused by these kinds of accidents.

An oil spill can cause a huge impact on marine environments, affecting the organisms that live on the surface of the water as well as beneath it. The oil can affect parts of the food chain, including those that we as humans eat. Recreation areas, beaches, fishing areas and wildlife preservation areas can also be affected, creating harm to the environment, natural, social and economical included. Therefore, in an emergency situation, an oil spill response must be immediate, consisting of a group of actions that will be carried out in order to minimize the effects of such an accident.

The Oil Spill Response Plan is a legal requirement and is part of the studies that are necessary to obtain the environmental licenses for exploration and production of petroleum.

REMEMBER:
YOU TOO HAVE A RESPONSIBILITY IN THIS PROCESS!

The Structure

The Organizational Response Structure of Repsol Sinopec Brasil for incidents of oil pollution in the ocean that could occur during the drilling activity is responsible for providing resources, communicating to government agencies and taking care of logistics, etc.

It is made up of these basic teams:

To decide what kind of response and control actions should be carried out, it is important to pay attention to:

- Oceanographic, meteorological conditions and local temperature
- Volume of spill
- Kind of oil spill
- Oil spill scenario
- Source of spill

Understand these specifics in order to act more effectively!

RESPONSE PROCEDURES

The predetermined response procedures to control and clean oil spills are presented in the logical order of execution of the main response actions:

Communicate

Interrupt the source of the spill

Monitor

Obtain and update relevant information

Obtain necessary resources

Contain and recover the spilled oil

Mechanically and chemically disperse the spilled oil

Protect vulnerable areas (in terms of population or wildlife)

Clean affected areas

Collect and dispose of generated waste

Register actions taken

Conclude operations

For each response option, the following factor should be carefully evaluated: safety issues, environmental risk, consent and operational limitations of its use.

PAY ATTENTION TO PROCEDURES!

Remember that effective communication greatly influences the quality of the response to an oil spill. Communication is necessary and should be quick and efficient.

Do you know what the response equipment and materials are?

The drillship has resources on board for the containment and clean-up of whatever oil or chemical spill that occurs on board. These Kits contain at least the following materials: absorbent barriers, absorbent blankets, absorbent pillows, absorbent material (ex. sawdust), collection shovel, bags and seals.

Make sure you know where to find them!

My Notes:

My Notes:

Pollution Control Project

The marine drilling activity follows the guidelines put forth by IBAMA for the control and management of waste, effluents and atmospheric emissions generated during the drilling activity, so as to minimize the impacts of the activity, as shown below:

Solid Waste Management

Solid waste is generated after the production, use, or transformation of consumer goods (mainly packaging, but also used household items).

Solid Waste is Classified by its potential environmental risks

In accordance with NBR/ABNT 10.004 (2004), waste should be classified as either Class I, hazardous, or Class II, non-hazardous. These are then divided further into Class IIA, waste that is not inert (that is biodegradable, soluble or combustible, like food waste and paper) and Class IIB, waste that is inert (does not decompose easily, like plastic and rubber).

The color code is used for correct segregated waste collection on board.

Kind of Waste	Examples of Allowed Materials
Paper	Journals and magazines, cards and cardboard, printer paper
Plastic	Plastic cups, containers, PVC
Glass	Cups and bottles, pots, lamps
Metal	Metal sheets, aluminum, wire, nails, scap metal
Wood	Pallets, non-contaminated wood
Infirmary waste*	Bandages, surgical gloves
Food waste	Leftover food
Common waste	Non-recyclable, cigarette butts, dirty napkins, adhesive tape
Tetra Pak	Milk and juice packages

* Sharp objects should be placed in a specific container (Descartex).

Waste contaminated with oil
Fluorescent light bulbs
Aerosol
Print cartridges
Batteries
Electronic devices
Cooking oil

Waste that is generated during the operation will be controlled in accordance with applicable law and Repsol Sinopec Brasil's procedures, that follow the guidelines of the NT 01/11 (CGPEG/DILIC/IBAMA Technical Note Num. 01/11), containing orientations about the correct conditioning, temporary storage, final disposal, quantification and registration.

Remember that the quality of waste control depends on the collective attitudes of all employees and independent contractors of the company.

YOUR ATTITUDE MAKES A DIFFERENCE!

HAVE A SUSTAINABLE ATTITUDE.

We can all contribute to minimize the problems associated with small day-to-day actions. Here are some tips:

- Buy only what's necessary for your consumption, avoiding waste
- Buy durable and resistant products, avoiding buying disposables
- Buy recycled products, paying attention to packaging as well
- Choose to buy products from certified companies that involve themselves in social-environmental programs and/or that take responsibility for their products post-consumption
- Avoid buying products that contain toxic or hazardous elements

Treatment of Food Waste

All food waste produced on board is separated and sent to a treatment system made up of grinders. The final particles generated must be smaller than 25 mm, meeting the specifications determined by the MARPOL Convention (73/78), after which they can be discarded into the ocean.

AVOID WASTING FOOD.

Liquid Effluents

The structure of the drainage system was created as a way to ensure that the drips, discharges and spills of fluids on board are collected.

Oily effluents should be treated in the oil and water separator, guaranteeing that the water sent into the ocean only contains less than 15 ppm, in accordance with the specifications of the MARPOL Convention (73/78).

Atmospheric Emissions

The main atmospheric emissions generated aboard are associated with the burning of diesel for fuel and formation tests. The main pollutants are nitrogen oxides (NOx), sulfur dioxides (SO2) carbon monoxide and dioxide (CO and CO2) and particulate matter (PM), in addition to other volatile organic compounds (VOCs). All of the equipment passes through preventative maintenance as a way to ensure that they function well within the required quality standards.

My Notes:

My Notes:

Energy Conservation, Natural Resource Conservation And Concious Consumption

Electricity has become one of the most fundamental consumer goods for our society. We use energy to provide light, move machines and equipment, control tempe-rature by producing heat or cold, speed communication, etc. We depend on energy for our production, locomotion, efficiency, security, comfort and various other factors involved in quality of life.

With that said, all of our daily activities create some kind of impact on the environment. Increased population and personal consumption created environmental problems whose solution is the biggest challenge of the century.

According to estimations by the energy sector, every consumer wastes, on average, 10% of the energy that is provided, if because of acquired bad habits or inefficient use of electrical appliances. This must improve, economizing energy contributes to decreased extraction of natural resources and its associated environmental impacts.

In his or her day to day, a domestic consumer may adopt a series of simple measures that contribute to an economization of energy and resources. Here are some tips to help reduce consumption:

- At the time of purchase, give preference to fluorescent, compact or circular light bulbs that are more economical;
- Don't leave chargers plugged into outlets when not in use, they consume energy even when not turned on;
- Don't leave your cell phone charging over night, charge it as necessary and then remove the charger from the outlet;
- The energy consumed by an appliance in stand-by mode can represent 12% of domestic energy consumption;
- When you aren't using the computer, turn off the monitor and disconnect the stabilizer from the outlet;

- Don't use the toilet bowl as a ash tray nor trash can, don't flush without necessity;
- Brush your teeth with the water turned off, brushing your teeth for 5 minutes with the water turned on uses about 12 liters of water, with the water turned off, that number can be reduced to 5 liters;
- Turn your electric shower to the "summer" setting when possible, it uses 30% less energy than the "winter" setting;
- Don't leave the TV on if no one is watching it, nor fall asleep with it on;
- When buying an electric appliance, look for a PROCEL or CONPET seal, they are guarantees of low energy consumption.

BE A CONSCIOUS CONSUMER!

My Notes:

Global Changes and Environmental Health

Environmental Health and Climate Change...
How does environmental degradation affect your health?

We are going to talk in a very simple way about environmental health, establishing the relationship between environmental impacts and sickness caused by consuming resources in poor condition. We hope that you understand the importance and contribute to the maintenance of the quality of our environment. **After all, small actions make a huge difference!**

What is the connection between the environment and the sicknesses that affect us?

We start with the principle that the human's health depends directly on the health of the environment. Environmental Health can be defined as:

A part of public health that covers problems resulting from the effects the environment has over our physical and mental well being, as one part of the whole of a community. This means that there exists an interaction between human health and natural and anthropic environmental factors that determine condition and influence that health.

We need, now, to understand some important concepts that can easily be confused: **environmental contamination** and **environmental pollution.** Here we see the differences:

ENVIRONMENTAL CONTAMINATION	ENVIRONMENTAL POLLUTION
Is the presence in the environment of elements or pathogens in concentrations higher than found in the natural environment, caused by human beings.	Is when the contamination results in an undesired ecological alteration that causes problems, directly or indirectly, for human life and the natural balance.

But, how does this influence the quality of the environment in which we live?

Since the Industrial Revolution, the environment has been changed intensely by the activities of humans. Even though it has greatly improved living conditions by the constant advances in technology, we see that there are a great number of negative factors that come into play such as population explosion, lower quality of life, increase in consumption and extraction of resources, amongst others.

Because of the increase of urban and industrial activities, pollution has become more serious, affecting all elements of the environment.

This means that everything that we do or don't do in our day-to-day can cause changes in the environment, be they big or small.

Our environment can be divided into elements, so that we can better understand it: **soil, water and air**. We will see in what ways pollution and contamination influence these three elements.

We should remember that the elements of the environment act in a way that can be thought of as a large web. Everything is directly linked, meaning that if there is contamination in the soil it directly influences the quality of the groundwater and depending, on the pollutant, the air quality. Consequently, the life of all beings that inhabit this environment, including humans, is affected.

How is the quality of the environment in your city? And the quality of life of its inhabitants?

What is the impact of pesticides in the soil? And of landfills?

The Soil

Pollution in the soil is caused by substances that provoke significant alterations in the natural structure, such as: **trash, sewage, pesticides** and other types of pollutants that are produced by humans.

Soil, also called earth, is composed of four parts: air, water, organic material and minerals. These parts all mix with each other and influence what grows in the soil. It's like a circle: **we plant, care for and pick the vegetables that are used to feed us**. If the soil is polluted, the vegetables will be contaminated, which could cause many risks to our health.

It is necessary that we become aware! **We must start with the health of the environment, so that we, in turn, can be healthy. Let's take care of the environment.**

The Earth is composed, in great part, of water, but 97% is saltwater and can't be consumed by humans, by animals or used for irrigation. This means that only 3% is freshwater. However, of this, only about 8% is available for use and a part of this 8% is either polluted or frozen at the poles.

The Water

We can already have an idea of the importance of this resource because of its scarcity. Therefore, it is necessary to avoid waste in your home, neighborhood and community, motivating conscious consumption. Within this scenario, we must remember that pollution and contamination contribute to diminishing the availability of this resource even more, as well as spreading diseases. **Millions of people die per year because of diseases that come from drinking contaminated water** (hepatitis, rotavirus, amebiasis).

Water pollution has various sources. The main ones are:

- **Agricultural runoff:** during agricultural activities, various pesticides and fertilizers are used, that not only kill pests and nourish the soil, but also contain chemical elements that contaminate the groundwater and can cause health problems.
- **Industrial pollution:** Most industries don't treat their waste that is let into nature without any precautions. It is normally directed into rivers and lakes, and since it contains chemical products, leaves a path of environmental destruction in it's wake.

- **Domestic Sewage:** This type of pollution usually occurs because of the lack of initiative on the part of the State to make sewage treatment plants available to its population. Because of this, human waste is sent directly into lakes and rivers. Upon receiving a large amount of sewage the groundwater looses its life and becomes concentrated with many diseases.

The Air

Today, pollution that is generated in large city centers is mainly a result of the burning of fossil fuels, like coal and petroleum derivatives (gasoline and diesel). The burning of these products has created a high level of carbon monoxide and dioxide in the Earth's atmosphere.

On one hand these fuels are responsible for the generation of energy that feed the industrial, energy and transportation sectors of a big part of the world's economies, but on the other hand, the associated pollution causes serious problems in big cities.

Human health is most affected by atmospheric pollution. Many respiratory diseases like bronchitis, rhinitis and asthma bring millions of adults and children to seek medical help each year.

And the harm doesn't just affect our health! Pollution also affects ecosystems and historical and cultural heritage. One result of this kind of pollution is acid rain, which kills plants, animals and corrodes – over time – historical monuments (buildings, churches, museums, etc).

The planet's climate can also be affected by atmospheric pollution; there exists a natural climate regulating phenomenon called the **greenhouse effect**. It is a process that lets a part of the solar radiation reach the planet and causes what is reflected from the surface to be absorbed by specific gasses found in the atmosphere. As a result, the heat is held close to the earth, not being let out into space.

The greenhouse effect, within a certain level, is a vitally important process, because, without it life as we know it would not exist. The phenomenon guarantees that the planet stays warm and maintains life.

What can cause unwanted and unknown consequences is an increase in the **greenhouse effect** because of an exaggerated increase in the gasses responsible for retaining heat (some of these gasses are the same that are emitted by cars and industries, such as: carbon dioxide, methanol, and nitrous oxide), destabilizing the planet's balance. This is a phenomenon that is very widely discussed these days: **global warming**.

My Notes:

My Notes:

Environmental Calendar

JANUARY	
01	World Peace Day
11	Fertilizer Pollution Control Day
FEBRUARY	
02	World Humid Zone Day
06	Agent of Environmental Defense Day
22	IBAMA Creation Day
MARCH	
01	Ecological Tourism Day
21	World Forest Day
22	World Water Day
APRIL	
07	World Health Day
15	National Soil Conservation Day
19	Indian Day
22	Earth Day
28	Education Day

MAY	
03	Soil Day
03	Brazil Wood Day
05	World Field Day
08	World Migratory Bird Day
18	Indigenous People's Day
22	International Biodiversity Day
25	Rural Worker Day
27	National Atlantic Forrest Day
JUNE	
31/05 a 05/06	National Environment Week
05	World Environment Day
05	Ecology Day
17	World Day of the Fight Against Draught
29	Fishermen's Day
JULY	
08	National Science Day
25	Agricultural Day
AUGUST	
05	National Health Day
06	Hiroshima Day
09	National Day of Indian People
09	National Air Quality Day
11	Students' Day
14	Day of the Fight Against Pollution

SEPTEMBER	
05	Day of the Amazon
16	International Ozone Protection Day
16	International Natural Disaster Prevention Day
18	World Coast Clean-up Day
19	World Water Clean-up Day
21	Day of the Tree
22	Plant Defense Day
22	Day in the City without Cars
OCTOBER	
04 a 10	Plant Protection Week
04	World Animal Day
04	World Nature Day
05	World Habitat Day
05	Day of the Bird
12	Ocean Day
15	Environmental Educator Day
NOVEMBER	
05	Science and Culture Day
20	Black Consciousness Day
24	River Day
DECEMBER	
31	Day of Hope

Source: www.ambientebrasil.org.br

My Notes:

My Notes:

Glossary

Sedimentary Basin - The sedimentary basins are depressions on the ocean floor that, with time, have been filled with sediments (substances that are deposited in these depressions).

Segregated Waste Collection - The term used to describe the process of recovering waste that can be recycled and the separation of such waste at the source of its generation. Within these recyclable materials, there exist the many types of paper, plastic, metal and glass.

Biodiversity - The diversity of natural life. Refers to the variety of life on Earth, including the genetic variety within populations and species, the variety of plants and animals, microscopic fungus, and microorganisms, the variety of ecological functions carried out by organisms within ecosystems, and the variety of communities, habitats and ecosystems formed by these organisms.

Compost - A process where organic material (food leftovers and cuttings) are biologically degraded, obtaining a product that can be used as fertilizer. Compost takes advantage of organic waste that composes more than half of domestic waste.

Sustainability - The capacity to maintain something constant or stable over a long period of time. It refers to the use of natural resources in a rational manner, conserving them for future generations.

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My Notes:

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"All have the right to an environment that is ecologically balanced, the environment is for the common use of the people and essential to a healthy quality of life, giving the public power and the collective the duty to defend it for present and future generations." (Art. 225 of the Brazilian Constitution)

Repsol Sinopec Brazil believes that commitment to the environment is a challenge that should be assumed by each and every one of us.

Habtec
Mott MacDonald

MMA

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