MINISTRY OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

DRAFT V1
ENVIRONMENTAL GUIDELINES FOR MARINE SEISMIC PROGRAMS THAT DEVELOP IN THE COLOMBIAN MARITIME TERRITORY

BOGOTA, DC, 2014

GLOSSARY

Buoys tail (tail buoys) are instruments keepers buoyancy and hold the elements of the registry system; These buoys are located at the tip of seismic or "streamers" receptors, maintaining its flotation and location through a Geo Satellite positioning (GPS) and acoustic transponders. In most cases, they also serve as a mechanism for maritime signaling, alerting nearby vessels of the work carried out by the seismic vessel.

Marine seismic acquisition vessels: Vessels seismic acquisition are the main vessels containing, display and drag the seismic acquisition equipment and contain the recording equipment inside. In these vessels is the main crew includes personal navigation, operation and maintenance of the vessel and the staff responsible for the seismic acquisition.

Air compressors: compressed air required by the power source, is provided for compressors that are installed within the seismic vessel.

DAMCRA: Directorate of Marine Affairs, Coastal and Aquatic Resources of the Ministry of Environment, Housing and Territorial Development. Responsible for issuing concepts related to scientific research in marine seismic activities in accordance with Decree 644 of 1990.
Support vessels (supply vessels) vessels that provide support to the vessel's activity seismic acquisition. These boats are characterized by much lower draft vessels and the vessel capacity simian acquisition condition which allows them to achieve higher speed and have maneuverability. Support vessels have the function of supplying fuel, food, water and other inputs, as well as communicate with other vessels.

Due to the low seismic vessel maneuverability in coastal areas is particularly important type of support vessel boat called "fly" or chase boat, which can be positioned several kilometers before the seismic vessel, in order to identify potential vessels are in the same line of travel of the vessel and alert them early enough so that they have time to move while the seismic vessel moves on the line of study, given its low maneuverability.

Power source: The source of energy is generated by the acoustic wave traveling through the ground. The most commonly used are the so-called air guns (air guns).

Birds (birds): In order to control and record the depth at which are the streamers when they are pulled by the seismic vessel, each of them is installing several drivers called deep birds (birds), spaced about about 300 m away. The birds have a hydrostatic pressure sensor that measures the depth so as to ensure correct positioning and control of each streamer.

Paravenes: Devices arrangements accompanying air guns, used to maintain the distance between them.

Air guns: metal cylindrical elements are hosting compressed air when released produces the sound energy that generates seismic waves. Is composed of: two air chambers, called solenoid valve and the firing piston. The latter is responsible for compressing the air in compartments with a pressure ranging between 2000-2500 psi and a frequency1 between 100-1500 Hz.

Once the pistons are loaded air, are activated by means of an electric pulse to the solenoid valve, opening the gates of the cylinder and immediately releasing the air content. This released air forms a bubble around the gun. After the doors closed, the piston air recharges in about 25

seconds, so often an additional air compressor which is required for firing can be performed at intervals of 12 seconds.

To perform a seismic acquisition are used usually three arrangements guns lines 15-25 m wide and 15-20 m long; each of the lines is between 8 and 10 guns distributed in pairs (eg if there are three guns arrangements with 10 guns 30 would submerged). The guns are at an average distance of 270 m from the stern of the vessel, are positioned at a depth of 5 to 10 m and a distance of 1 m from each other that maintained through devices called paravenes.

Each array accumulates a volume of air between 3,000 to 4,500 when operating in3 (ie when they are collected inside the vessel without any pressure).

Seismic receivers (Streamers): Seismic sensors receptors are receiving the acoustic wave after traveling the seabed. The streamers are the most commonly used receivers. Wires are floating along and within which installed receiving hydrophones are sound waves. The streamers are deployed from the stern of the boat to be dragged by the ship. This length can vary from 3 -12 km, and positioned at a depth of 4-10 m. The streamers, are divided into sections of 50-100 m in length, making it easy to replace any components that may deteriorate.

The streamers are difficult to control depending on the currents and winds for which the birds are used (birds).

Gross Register Tonnage (RTB): Gross tonnage is a measure of volume, not weight. This is the total enclosed volume of the vessel. This includes the volume of the holds, tanks, engine room, accommodation, bridge, lockers, everything that goes closed, almost all the boat unless the chimney flue.

Seismic marina: Marine Seismic is a geophysical method used in the initial stage of offshore hydrocarbon exploration, which is based on the application of principles of physics for details of the rock layers into the subsoil and specifically identify to hydrocarbon traps.

The marine seismic is the emission of a sound wave into the seabed through a power source (ie air pistons) which is received by sound receivers sea surface (ie hydrophones installed cables registration - streamers) to measure the velocity of propagation and arrival time of sound waves.

Once the wave penetrates the layers beneath the seabed that is reflected or refracted depending on the elastic properties of the rock layer, which may lead to changes in the propagation direction, speed and arrival time of the wave surface hydrophones. The signals picked up by the hydrophones are recorded by recording equipment found on board the seismic vessel (Kearey et.al., 2002).

2D Seismic: marine seismic type that provides a two-dimensional image of the seabed (ie horizontal and vertical), thus requiring a single cable for registration or streamer for the acquisition of data. The streamer is dragged along with airgun while browsing on a series of parallel lines separated by approximately 1 km away, crossing a line at a time. The 2D seismic is useful for covering large lengths.

3D Seismic: seismic type that is designed to generate three-dimensional images from a set of two-dimensional images separated (IAGC, 2002). It differs from 2D seismic in an arrangement of several streamers, usually between 8 and 10, separated from each about 1 km, which run parallel to each other lines is used.

Umbilical: are cylindrical tubes of flexible material (similar to hoses), responsible for driving the air from the compressor to the guns, as well as necessary for firing electrical signals. Umbilical may have different diameters, according to the type and number of airguns in the array. Streamer buoyancy is provided by an oily fluid located inside and tail buoys are installing in the cable end.

1. INTRODUCTION

The Ministry of Environment, Housing and Territorial Development and the National Hydrocarbons Agency, have developed Environmental Basic Guide to Marine Seismic Program which aims to provide guidelines for the implementation of the activities of 2D and 3D seismic survey that is conducted in the territorial seas Colombians (not subject to environmental license) in order to prevent and mitigate potential environmental and social impacts associated with the activity, especially in the area of disturbance to marine wildlife and artisanal fishing activities.

This guide has been prepared at different international standards especially the Guidelines for Minimising the Risk of Injury and Disturbance to Marine Mammals from Seismic Acquisition, the Kingdom of Nature Conservation Committee (JNCC Joint Nature Conservation Committee-) (JNCC, 2010) guides that have been implemented in various countries for mitigation of impacts to marine fauna. Also reference Requirements used to mitigate noise nuisance activities offshore seismic acquisition on marine life in Trinidad and Tobago (Environmental Management Authority, 2014).

The Guide likewise includes information that may be provided to the Department of Marine Affairs, Coastal and Aquatic Resources (hereinafter DAMCRA) of the Ministry of Environment, Housing and Territorial Development, as part of the application process to conduct marine scientific or technological research Colombian jurisdictional maritime spaces, which is established in Decree 644 of 1990 of the Ministry of Defence.

The Guide is a tool for self-regulation and self-control that although it is not mandatory, can be incorporated into the environmental management systems of both operating companies and contracting companies who will engage in seismic acquisition in the maritime territory Colombian. Likewise, this guide will serve environmental authorities and the Directorate General Maritime (hereinafter DIMAR) to track the planning and execution of the activity.

In the event that ethnic communities are identified based on the certification issued by the Ministry of Interior should advance the process of prior consultation in accordance with current regulations.

While the Guide will provide the basic guidelines on good practices associated with the activity, the implementation of an environmental management system, through which you can establish a corporate policy that seeks to do the activities with the best available technology is recommended, the greatest environmental responsibility, with updated scientific information and seeking continuous improvement in procedures.

Also, the information that is collected during seismic acquisition activity regarding sightings of marine fauna for example, has an additional value to the environmental authorities and research institutes in Colombia and the Ministry of Environment, Housing and Territorial Development (MADS) as part of the process of implementing the National Action Plan for the Conservation of Marine Mammals of Colombia (Trujillo et al, 2014), which may be used in future research;

therefore, the Guide provides guidelines for delivery of such information to these entities.

2. REGULATORY FRAMEWORK OF MARINE SEISMIC ACTIVITY

Marine seismic activity is subject to the following regulations:

- Decree 1874 of 1979
- Decree 1875 of 1979
- Decree 2324 of 1984
- Law 12 of 1981 and its 1978 Protocol MARPOL 73/78
- Decree 644 1990
- Decree 321 1999
- Act 885 2004
- 2005 295 Resolution
- Decree 2820 of 2010
- Law 1450 of 2011 (National Development Plan 2010-2014)
- Decree 1120 of 2013
- Resolution 022 of 2013

The general aspects and applicability to marine activity of each of these regulations may be revised seismic acquisition in Annex No.2 of this Guide.

3. INFORMATION TO BE ABLE TO SEND THE MINISTRY OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT WITHIN THE PERMIT FOR SCIENTIFIC RESEARCH OR DEVELOPMENT OF MARINE TECHNOLOGY IN COLOMBIA IS SPACE MARINE COURT (ACT 644 OF 1990)

Decree 644 of 1990 of the General Maritime Directorate (DIMAR), establishes the requirements for the processing of applications for marine scientific or technological research in Colombian jurisdictional maritime spaces, which must be done before the DIMAR.

Given mentioned in Article 5. "Following application within the period stipulated in Article 3o., The Ministry of Foreign Affairs shall within ten (10) business days to study the research project aspects of their competition and fix your position, sending the documentation together with its recommendations, simultaneously, to entities should hear it as well:

a) Ministry of National Defense.
b) Ministry of Mine and Energy and related bodies or affiliates that have direct bearing on the type of research being planned and implemented (The National Research Institute of Geological and Mining Weber County, The Institute of Nuclear-IAN Affairs, Empresa Colombiana de Minas ECOMINAS and Empresa Colombiana de Petroleos -ECOPETROL).
c) Institute of Hydrology, Meteorology and Land HIMAT. (Today IDEAM)
d) National Institute of Renewable Natural Resources and Environmental INDERENA.
e) Directorate General Maritime and Port-DIMAR.

If the Ministry of Defence considered from the realization of the planned scientific or technological research and communicate it to DIMAR to continue the procedure established in the present decree.

Prior to the issuance of the concept of Ministry of Environment, Housing and Territorial Development (MADS) is required to permit the applicant carriers, provide the Directorate of Marine Affairs, Coastal and Aquatic Resources (DAMCRA) MADS minimum the following information:

- Objective of the project
- Overview of the project and its activities including:

or location area seismic acquisition project and dimensions.
o Location of port facilities used for activities.
or Schedule of activities
or type of technology to use and boats

- Description of the ecosystems in the project area where further identify the presence of:

or Coral
or Seagrass
or Corales depth
or mangroves and estuaries
or Called "Significant Biodiversity Areas" identified by the INVEMAR and / or the Regional Autonomous Corporations.
or areas of SINAP and other complementary conservation strategies (Biosphere reserves, AICAS, RAMSAR).

- Description of the fauna present in the area of seismic acquisition

or Species (scientific name) of marine mammals and sea turtles have been sighted in the area of seismic acquisition and / or block and its degree of threat under Resolution 0192, 2014 or amending or replacing and / or IUCN red Books.
or nesting sites of sea turtles
o Information on aquatic fauna identified in the area including benthic and pelagic fauna that has not been included in the above information.
o Information on migration routes of marine mammals and sea turtles have been sighted in the area.
Points or watching wildlife and sea turtles

- Socioeconomic characterization of marine-coastal activities:

or tourism, recreation and tele communications Areas
Fisheries and artisanal fishing and hiking industrial fishing
o Information on artisanal zones, types of boats used by fishermen, fishing gear used and landing sites in the project area.

- environmental management strategies submitted by the project on prevention, correction and mitigation:

or acoustic impacts on reproductive and migratory behavior of marine mammals and turtles
or wastewater management, waste management and potential sites downloads (avoiding possible effects on nearby sensitive ecosystems and priority conservation sites).
o Impacts to the activity of artisanal fisheries
o Impacts to sensitive ecosystems, SINAP and other complementary conservation strategies.

Risk management or unplanned events that could have social and / or environmental adverse effects.

The favorable opinion by the DAMCRA may include requirements, some of which may be consistent with recommendations of the Guide. However compliance with the Guide not be

mandatory; the above is because the Guide has been made by way of recommendations for the implementation of best practices that can be implemented within the operator.

In order to provide clarity on the recommendations DAMCRA case to case might require using the concept to DIMAR, these will be highlighted in gray throughout the document.

Based on the provisions of Decree 644 of 1990, once the DIMAR for favorable concepts of the respective entities, issue resolution resolving the application for scientific or technological research.

3 GUIDELINES FOR PLANNING

As part of the planning activities offshore seismic acquisition is recommended:

3.1 SELECTION OF EQUIPMENT AND DESIGN OF SEISMIC LINES

The seismic acquisition project may use the least possible noise levels (in order to use it less shocking possible) to achieve the objectives of geophysical information you require and seek methods to reduce unnecessary high frequency noise produced by the air guns.

May consider using alternative energy sources and marine vibroseis using narrower sound frequencies or as the marine controlled-source electromagnetic surveying (CSEM, electromagnetic pulses controlled remote sensing as a tool for mapping hydrocarbon reservoirs in deep water in coastal areas outside).

Likewise vessels may prefer having low emission of noise generated by the propulsion systems and motors. It is recommended that the design of the arrangements of air guns and streamers will consider reducing the density point shot (shot point density) for example by broadening the gap between the seismic lines.

In the case where the seismic vessel is equipped with equipment acoustic monitoring (PAM) may be considered as those teams have the following characteristics (EMA, 2014):

- Arrangements calibrated hydrophones that are connected with appropriate hardware and software systems that allow the operator PAM acoustic and visually monitor marine mammals.
- Ability to detect marine mammals at a distance of 1.5 km and a frequency range of 180kHz 1Hz-.
- Equipped with a GPS system, calibrated with a depth sensor and a system to filter out unwanted noise.

Adjustments to the tail buoy: in some cases it has been found that the tail buoy at the height of the harness, which is towed, presents a space in the front where they can be caught sea turtles, therefore it is recommended that tail buoys have an Exclusion Device Sea Turtles.

3.2 ESTIMATE OF ENVIRONMENTAL IMPACT

As part of project planning and prior to the definition of the times and the delineation of marine seismic, you can make an estimate of the environmental impact that includes at least:

3.2.1 Environmental Baseline

Conduct a survey of the environmental baseline with primary or secondary (expanding the information presented to the DAMCRA), especially in relation to:

- Migration routes of marine mammals and turtles and migration periods.
- Relevant information about the life cycle of marine mammals, such places and periods of mating and reproduction.
- Spatiotemporal distribution of marine mammals and sea turtles considering daily and annual

variations.

- Audiograms (ie hearing sensitivity at different frequencies) for each species of marine mammals and turtles and classification of species according to their hearing at different frequencies.
- The species can be classified by Functional Group Hearing, according to the following table (adapted from NOAA, 2013):

Functional Group	**Functional Auditory Range**
Cetaceans Low Frequency (Mysticetes)	7 Hz- 30 kHz
Cetacean Frequency Media (Odontocetos)	150 Hz- 160 kHz
High Frequency Cetaceans: true porpoises, *Kogia*, *Cephalorynchus*.	200 Hz-180 kHz
Phocids pinnipeds (true seals)	75 Hz- 100 kHz
Otariids pinnipeds (sea lions)	100 Hz- 40 KHz
Sirenia	< 20 Hz
Sea Turtles	250 – 1000 Hz

- For each species of marine mammals and turtles can be identified:

or population dynamics
or ecological importance of the species
or behavioral ecology

- Identification of migratory birds migration routes and periods
- Identification of fish species present in the area of marine seismic acquisition, breeding sites and sites congregation of species, ecological importance and economic importance of each species.
- For each of the groups of fish, we can determine their vulnerability to sound based on their physiological characteristics, so that it can be classified as follows:

or high vulnerability to sound: the presence of specialized hearing aids (eg prootic bulla)
or half Vulnerability sound: species swim bladder
or low vulnerability to sound: species without swimbladder

- In the case of sessile species must make an estimate of vulnerability according to the available primary or secondary information.

3.2.2 Socioeconomic Baseline

You can perform a survey of artisanal fisheries based on secondary data and primary for the period (if possible) in which it is intended to develop seismic acquisition line, considering:

- Arts and artisanal fishing boats used by artisanal fishermen.
- type species caught
- Kg / day average catch per fisherman
- average size by species caught
- Census fishermen, including monthly income and socioeconomic activities for periods during the year.
- Characterization of socio-economic activities of coastal populations

3.2.3 Model of sound propagation

In order to determine the area that may be affected by the project acoustically, the operator can make a model of sound propagation to determine the levels of sound pressure and sound exposure levels in the area of seismic acquisition.
Based on the model, you can adjust the exclusion zone depending on the project.
For the realization of the model may be considered

- Include all sources of noise disturbance generating project, including noise emissions support vessels.
- Use the maximum noise emission, ie all air guns running.
- Use the best information available on noise emissions from the emission source has been selected specifically for seismic acquisition.
- Include all areas where seismic activity is performed
- Use bathymetric information area
- Use appropriate to the season in which it intends to perform seismic data acquisition.

The model can be made so as to determine the emission levels received at different distances from the source.
As a result of the model you can get a map with isopleth (a curve connecting the points at which the function has the same constant value) which can determine the area affected by seismic activity.
The information provided by the model will be used to determine the radius of mitigation and the exclusion zone.

3.2.4 Estimation of environmental impacts and environmental management strategies

According to the environmental and social base and model of sound propagation line, assess the potential impacts of the activity so that they can implement measures that can be incorporated into project schedules and definition of seismic lines and Arrangements seismic.
Within impacts and measures associated management may be deemed that the acquisition avoid periods when there is increased likelihood of marine mammals and turtles, especially species that are classified by IUCN as Vulnerable (VU), At Risk (EN) and Critically Endangered (CR). Also the seismic lines may prevent mating or breeding areas of marine fauna and traditional fishing grounds or spend a sufficient distance thereof can be determined based on the results of monitoring of sound propagation.

The estimated impacts may consider the cumulative or synergistic impacts that may arise from acoustic emissions generated by both the project as other activities that are happening in the area.

3.3 ESTABLISHMENT OF RADIO MITIGATION

As part of measures to prevent acoustic involvement in marine mammals and turtles, can be estimated within mitigation is the radius which is equal to or exceeds the change threshold Temporal (Temporary Threshold Shift - TTS) (See NOA, 2013).
Whereas the effects of seismic correspond to a classified as impulsive by NOA (NOA, 2013), the values of the TTS sound, have two types of acoustic metrics:

- Cumulative Exposure Level Sound (SELcum) considers the level of the power source and the duration of exposure of the individual (EMA, 2014).
- peak pressure (dBpico) considered the greatest extent to which the individual is exposed (T & T, 2014).

The TTS for each of the Hearing Functional Groups are established in Table No. 2 (Amended NOA, 2013).

Auditory Functional Group	**Changing Temporary Threshold (TTS)**
Cetaceans Low Frequency (Mysticetes)	224 dBpico & 172 dBSELcum
Cetaceans Mid Frequency (Odontoceti)	224 dBpico & 172 dBSELcum
High Frequency Cetaceans: true porpoises, *Kogia*, *Cephalorynchus*	195 dBpico & 146 dBSELcum
Phocids pinnipeds (true seals)	229 dBpico &177 dBSELcum
Otariids pinnipeds (sea lions)	229 dBpico & 200 dBSELcum
Sirenia	186 dBpico &160 dBpico cum
Sea Turtles	186 dBpico &160 dBpico cum

In the case of the areas of seismic acquisition where they have not reported endangered species (VU, EN or CR) in accordance with Resolution 0192 of 2014 or the red book of IUCN, it may provide a fixed radius mitigation 500 m.

In case they have been reported in the area of seismic acquisition endangered species (VU, EN or CR) in accordance with Resolution 0192 of 2014 or the red book of IUCN can follow the following procedure to determine the radius of mitigation (EMA, 2014):

1. For each acoustic metric Auditory functional Group and considering the model of sound propagation, two radios may be determined by functional group mitigation: one with the metric value in dBpico and value the metric in dBSELcum. These radios can only be determined for the Hearing Functional Groups that have been reported in the area of seismic acquisition.

2. The largest radius of the two values will be the one used for the Functional Group Hearing.

3. Once you start the operation, during the first week may adjust the radius of mitigation based on actual seismic data acquisition.

Note: In the case where the two radios give a score below 500 m, it is recommended that the 500 m minimum radius established as mitigation.

3.4 OUTREACH PROJECT

As part of the planning of the project proponent may conduct the identification of stakeholders or third parties in the project and the socialization of it, so to include:

- Regional and local authorities
- Coastal Communities Community Organizations
- based community action boards
- NGO sectors that could be potentially affected by the project
- academic Institutions Research Institutes

Based on the inventory of third parties, we can determine how the relationship with each will take.

They can develop a plan of socialization for interested parties adjusted to the scale of the project, in which a schedule of socialization is included and sufficient information to third parties about the activities of the project, potential impacts and measures is provided implement mitigation.

Socialization can be developed in Spanish- Castilian language, dialects and / or languages as required according to third parties, and the material should be easily understandable to the public.

It will develop and implement a mechanism petitions and complaints (PQR) with the presence of a representative at the local level of the operating company, ie they have a space in physical, which is disappointed and manage those PQR , the above should be socialized with third parties.

3.5 OBSERVERS OF MARINE FAUNA

As part of the recommendations in this guide in the planning stage may be identified at least two observers Fauna Marina (OFM). Observers who choose to be on board the seismic vessel, may:

• Have the physical conditions for the work offshore • Being bilingual in English and Spanish.
• Be professional in biology, ecology or related. • Have experience of at least six months in activities associated with the identification of marine mammals and / or sea turtles.
• Be able to use the following instruments:
•binoculars (see note of this section)
•Grid to determine mitigation Radio
•compass to determine the direction of wildlife
•rangefinder (range-finder stick) (A guide to using a rangefinder (rangefinder stick) is available through the http://jncc.defra.gov.uk/ page by placing in the search "rangefinder calculator".)

• Radio Communications
•Tables or species identification

It is recommended that OFM are familiar with the species of marine mammals and turtles that have been identified in the baseline survey. It is especially important that the OFM can easily recognize the threatened species of marine turtles and forth in Resolution 0192, 2014 or as may amend or replace mammals.

The OFM will have the equipment such as binoculars, rangefinder (Range-finding stick), video camera and compass and radio, among others.
Annex 1 may find the Registration Form Sightings, which may be used by the OFM.
Note: Binoculars use the OFM is recommended that at least 7X50 have focus and are equipped with a grid.

4 GUIDELINES FOR PHASE OF OPERATION

4.1 THE OBSERVER OF MARINE FAUNA (OFM)

The Observer of Fauna Marina is responsible for determining the presence of marine mammals and turtles in the area of seismic acquisition permanently to recommend effecting a process delay (delay the start of activities) or suspend the start of the seismic acquisition activities; these recommendations shall be technically sound by the OFM and is recommended to be received

by the crew. The OFM can register in the format Sightings if the recommendation was or was not received by the crew.

The OFM will shipboard marine seismic and remain on a high shelf where there is a sufficient view of the horizon and where the communications with the crew to be effective, always prioritizing the security of the Observer. The OFM observation remain on duty before, during and after seismic acquisition activities (ie operating airgun) occurring during daylight a day, according to the time associated with the procedure described in section 5.1.3 .
Therefore, you can have two OFM permanently aboard the ship take marine seismic shifts of two hours each.

The OFM will also record sightings of birds, cartilaginous fish, bony fish and other marine wildlife that may be identified during the course of the project.

The OFM will make a taxonomic classification at the best possible level. If you have high uncertainty on the classification, may be supported by national or international academic experts for identification. It is recommended that the taxonomic classification is made with the highest scientific rigor, so that the records have a minimum level of uncertainty. If that can not be classified sighted individuals, this will be duly registered Sightings format.

The OFM be supported by any member of the crew to perform a sighting that has not been detected by the same or by the crews of support vessels. In other words it is important that all crews seismic vessel and support vessels to report sightings to OFM and if conditions permit, carry photographic and film records the sighting to support the OFM make identification of species.

In many cases, personal crew may have been trained as Observer of Fauna Marina and therefore may act to perform this role. However it is suggested that MFOs are Colombians to improve local skills as part of the learning curve of the country's offshore seismic.

4.2 PRE-OPERATIONAL MEETING

The head of the seismic acquisition board may conduct a pre-operational meeting before the start of seismic acquisition activities. The meeting should be attended by all staff who is involved in the transaction including the OFM.

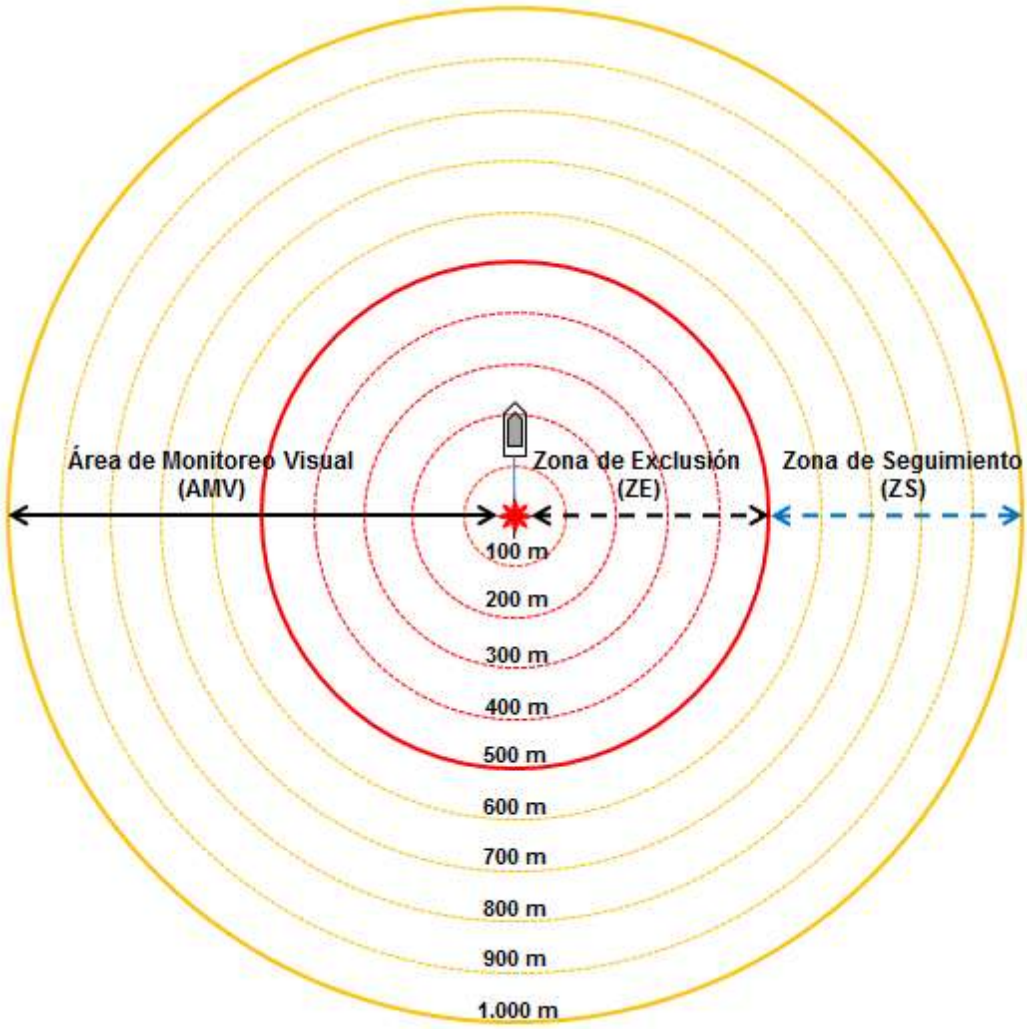
In the first pre-operative meeting, it is recommended that the OFM introduced to the crew the guidelines that have been demanded by the Colombian government (through the concept of the Ministry of Environment, Housing and Territorial Development - Decree 644 of 1990) (see section 3) and recommendations for the operational phase of this Guide. Also when you have staff turnover during the project, it is recommended that the OFM do briefings on these guidelines with the new crew.

This first pre-operational meeting in which the OFM intervene may be filed by an attendance sheet and subsequent briefings product turnover.

4.3 VISUAL MONITORING OF MARINE FAUNA

4.3.1 Area of visual monitoring of marine fauna

It comprises two areas, the Exclusion Zone (EZ) which is delimited by the radius of mitigation has been determined by the project or alternatively that at least will be 500 m, and Tracking Area (ZS) leading from where it ends the Exclusion Zone to additional 500 meters, usually 1000 m (see Figure No. 1).



Visual Monitoring 4.3.2 Prior (Pre-shooting search):
Before beginning the shooting of air guns, the observers Fauna Marina, carry out a visual recognition in the ZS at least 60 minutes (cetacean ocean waters can stay up to 90 minutes under water, so the JNCC (Joint Nature Conservation Committee - 2010) recommends that long to deeper areas.). If seismic acquisition occurs more than 200 m depth, may be commenced prior visual monitoring before the end of the seismic line (while still operating air guns) so as not to delay for turning (JNCC, 2010).

4.4 PROCEDURE FOR DELAY
If the presence of mammals and / or turtles during the previous visual monitoring within the ZE detected, may delay implementing the method, which consists in delaying the start until the species has left the ZE.

In case concerned a threatened species (according to Resolution 0192, 2014) may delay the start 60 minutes more after that (the) individual (s) are removed from the ZE. (According to the JNCC guidelines some whale species (Cachatole and beaked whale) can remain submerged in the depths for over 30 minutes.) If it is not an endangered species, it may take 30 minutes until (the) individual (s) are removed from the ZE.

If that mammals and / or turtles are in the monitoring area, it will be attentive to the direction of navigation. In no event shall physically scare species to leave the exclusion zone.

4.5 PROCEDURE FOR SOFT START

The procedure called soft start soft start or ramp up in English, is that a single shot gun start and gradually increase the number of guns (ie shooting), for a period of 20 minutes, which enables wildlife it is present leave the area. The increase in power can occur uniformly to provide a steady increase. This good start should not exceed 130 dB re 1micro Pa (1 atm).

If previous time visual monitoring and add delay procedure may be considered in all the following times:

- 140 minutes (60 + 60 + 20): In case concerned a threatened species present in the area and delay procedure applies.
- 110 minutes (60 + 30 + 20): In case concerned a non-threatened species present in the area and delay procedure applies.

These times may be considered in the design of seismic acquisition. Additionally you can consider (JNCC, 2010):

- The soft start start while there is daylight.

- Once the procedure is complete soft start will begin immediately seismic acquisition, ie avoiding unnecessary shots at full power before the start of the seismic line.

- In case of any eventuality air guns have stopped working and have not restarted for more than 10 minutes prior visual monitoring and soft-start procedure will be performed.

- If the suspension of the activity was less than 10 minutes OFM may conduct a visual assessment (no previous visual monitoring). In case a mammal or sea turtle is in the ZE you can implement the method of delay, otherwise you can restart the activity.

In the case where you intend to test for air guns, is recommended (JNCC, 2010):

- If there is to be tested for all air guns simultaneously and with the highest power is recommended that the procedure soft start.
- If only it comes to testing a single airgun at low power, it is not necessary to perform the procedure soft start.
- If there is to be tested for one pistol or more on high power, it is recommended that first shoot low power and then increase the required level. The test time will be proportional to the number of guns to be tested and ideally not exceed 20 minutes.

- The OFM will be maintained during the entire testing visual monitoring and in case of a threatened species of mammal or sea turtle within the radius of ZE, recommend the temporary suspension of the test until the individual leaves the area.

4.6 SUSPENSION OF SEISMIC ACTIVITY OF ACQUISITION

In the event that a marine mammal species or threatened turtle entering the exclusion zone all the guns will be turned off and suspended seismic acquisition activity.

If it is a species that has the ability to soak for extended periods of time may be reset through the process of soft start after 60 minutes after the animal was last seen in the exclusion zone. Otherwise time will be 30 minutes.

For turtles, if they have been before the seismic vessel but outside the exclusion zone, the OFM can record the last place she was seen and request the suspension of the activity of air guns when the exclusion zone reaches the point where the tortoise was last seen; this practice is appropriate since these species have a slower movement, and therefore may not have enough time to leave the area before the gun is close enough to generate a damage (EMA, 2014).

4.7 HOW TO CHANGE LINE

Depending on marine seismic is used, a line break can vary between five to ten minutes (2D seismic) to two to three hours (3D seismic). The recommended procedure is the following:
For seismic acquisitions with a volume of air gun 500 cubic feet or more:

- If the line change requires time greater than 20 minutes, it may suspend the activity of air guns once the line is completed, and the procedure for soft start before the next line will be.
- You can also perform a preliminary visual monitoring and implementing the procedure promptly if applicable. If the line change is performed in night hours and can not be installed PAM system may maintain the shooting of at least one gun during the line change.

4.8 USE OF PASSIVE ACOUSTIC MONITORING (PAM)

With the best professional judgment it may be determined whether the Monitoring Acoustic Passive (PAM) significantly increase the probability of the presence of marine mammals within the radius of mitigation so that it can complement the observations of OFM, whereas the PAM still lacks precision.

PAM operator may follow the same procedures OFM at times of low visibility or at night, performing an acoustic monitoring prior analogous to previous visual monitoring, monitoring during the procedure soft start recommendation delay implementation of the procedure if the PAM detects the presence of a marine mammal within the Exclusion Zone during soft start, and the suspension of activities in the event that the PAM detects the presence of a marine mammal within the Exclusion Zone during operation airgun for seismic acquisition.

It is recommended that the power of PAM hydrophone has a minimum length of 100 meters when conditions permit and depth, so that they can move away from the associate to ship (EMA, 2014) noise.

The operator of PAM as the OFM can have two-hour shifts, so may have two PAM operators on board.

4.9 COLLISION PREVENTION AND COMMUNICATION WITH OTHER VESSELS

In order to prevent potential collisions with other vessels, industrial fishing vessels and / or artisanal fisheries, both seismic vessels and support vessels shall be equipped with radars.

Support vessels accompanied at all times seismic vessel (except for the times when the supply is made in ports), in order to prevent collision with any vessel that is in front of the ship, given their low or zero maneuverability. In any case at least a boat accompanied at all times remain the seismic vessel.

It is recommended that at least one of the support vessels is of Colombian flag and the crew speak Spanish, especially the chase boat, so that it can communicate with local vessels and fishermen, to withdraw from the area in case of risk of collision.

It also recommended that one of the two boats the crew speak English language to communicate with foreign ships.

Regarding fishing gear, especially those that are difficult to locate by the use of trammel nets that although marked with buoys are not identified by radar and in most cases fishing lines not reach make withdrawals, it is recommended as a preventive measure of support vessels make a preliminary tour of the area of acquisition, in order to rule out these instruments and reduce potential damage to them and the risks in the operation.

WASTE MANAGEMENT

Waste management and disposal is regulated by MARPOL 73/78, which was hosted by Colombia by Law 12 of 1981 or amending or replacing, therefore, all companies and specialized marine seismic vessels should benefit to the requirements in MARPOL 73/78.

4.9.1 Management of solid and liquid waste (domestic, pathological, industrial and special)

All solid wastes generated on board, whether domestic, pathological, industrial and special character, may be willing and incinerated on board. Incinerators must have the International Certificate for the Prevention of Air Pollution, as required by MARPOL 73/78.

In turn, the type of waste to be incinerated should be free of substances that may affect the ozone layer, which are set out in Annexes I, II, II and VI of MARPOL 73/78 Convention and regulated by the IMO.

4.9.2 Household waste

According to MARPOL 73/78 solid waste resulting from meals produced by ships may be willing to sea at 12 or 13 miles offshore, prior shredded, ground and sieved through a screen with openings no greater than 25 mm Eye Network . Otherwise they should be referred to shore for disposal.

The handling of other waste (packaging, food and beverage packaging made from materials of paper, cardboard, glass, cans, plastics, etc.) considered as household can be incinerated under the conditions of the ships and the provisions of MARPOL 73/78.

In the case of liquid waste, boats with RTB ≥ 400 tonnes or less but is able to carry more than 15 persons traveling internationally, you must have a plan for handling domestic sewage. For three miles off the coast, these domestic water can be disposed at sea.

4.9.3 Hospital waste

Hospital waste must be labeled with color coding, may be cremated and his ashes placed in special containers and sent ashore final disposal.

4.9.4 Hazardous waste and chemicals management

Procedures within the environmental management system may include guidelines for handling chemicals are registered in the respective MSDS (Material Safety Data Sheet).

Hazardous wastes must be handled and disposed of in accordance with the provisions of Decree 4741 of 2005 or amending or replacing.

Liquid wastes are generally three types: liquid industrial waste (unused oils including cooking), bilge water and sludge (sludge) resulting from the accumulation funds fuel tanks, bilge separator hydrocarbon.

The management of this waste depends Registry Gross Tonnage (RTB) for each vessel. If the vessels ≥ 400 RTB, must have the International Certificate for the Prevention of Oil Pollution

(International Oil Pollution Prevention Certificate - IOPP), which ensures that owns the systems and equipment for handling bilge water, which can be sea always willing to regulation 16 of Annex I of MARPOL 73/78 is fulfilled. For smaller tonnage vessels IOPP not required, but the management of these wastes must be done in earth, so that must be stored on board to the port.

4.9.5 Handling and disposal of waste on land

According to its type and its characteristics, waste disposal on land will be properly packaged and transported, which requires the hiring of a specialized transport and handling of this material Port Operator, that has environmental license issued by the environmental authority for the operation of the treatment, handling and disposal.

5 GUIDELINE POST-OPERATIVE PHASE

When the seismic survey is completed, the OFM and operator of PAM (if applicable) may make a final report to be submitted to Ministry of Environment, Housing and Territorial Development, National Parks and INVEMAR (Institute of Marine and Coastal Research "Jose Benito Vives De Andreis ") (in the case where the marine seismic happen in the Caribbean Sea), or the Pacific Research Institute (IIAP), (in the case where the seismic has been realized in the Pacific Ocean), 60 business days after completion of the seismic acquisition. It is suggested that the report contains the following information:

• Area Summary seismic acquisition and operations (including program dates and characteristics of the power supply).

• Analysis from recording observations of marine mammals and sea turtles which includes: o Histogram number of sightings per day during the entire seismic acquisition or Histogram of number of sightings by time of day the sighting or table that records:

♣ Number of times the delay procedure

♣ Number of times the recommendation of suspension of activities implemented seismic acquisition was implemented.

♣ Percentage completion of the crew to the recommendations made by the OFM or Operator PAM (if applicable). or Histogram showing number of individuals per species sighted or table with the following columns:

♣ List sighted species (common and scientific names)

♣ Degree of threat based on Resolution 0192 of 2014 or the amended or replaced, or books IUCN red.

♣ Coordinates comments relevant sighting sightings of each species eg group, presence of juveniles swimming in the bow (bow riding), etc. Map with points or sightings with the name of the species sighted.

• pictures of each species sighted and criteria used for the determination of the species.

• Additional information otherwise sighted marine fauna: birds, cartilaginous fishes, bony fishes, etc. (if applicable).

• Attach all reports of sightings and film media. • Attach records of meetings of the OFM with the crew

The document may be delivered on physical media and magnetic to all institutions mentioned. In magnetic media are recommended include high resolution photos and videos of sightings.

6 REFERENCES

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7 ANNEXES

7.1 APPENDIX NO. 1: REGISTRATION FORM OF SIGHTING

ANNEX NO. 1: REGISTRATION FORM OF SIGHTING

Proposal Format Whale Marine Mammals. Format used by many of the observers in seismic activities (Adopted Format Used for Marine Observer Foundation Omacha- INVEMAR).

******See Appendix in original document for Charts***

7.2 APPENDIX NO. 2: REGULATORY FRAMEWORK FOR MARINE SEISMIC ACQUISITION ACTIVITIES.

7.2.1 International Conventions Ratified by Colombia

In this section, the main international conventions ratified by Colombia, directly associated with marine seismic activities are described.

A. International Convention for the Prevention of Pollution from Ships, 1973 and its 1978 Protocol, MARPOL 73/78:

The aim of this convention is to protect the marine environment from accidental, negligent or deliberate spills of oil or other harmful substances from ships. By Law 12 of 1981 Colombia welcomes this convention, whose regulation is the responsibility of the General Maritime Directorate (DIMAR), in accordance with the precepts in Decree Law 2324 of 1984.

The agreement covers the technical aspects of pollution by ships with a gross tonnage exceeding 150 tons for oil tankers and other vessels with a tonnage of gross tonnage exceeding 400 tons. It applies to all types of vessel including vessels of dynamic lift, submersibles, floating and fixed or floating platforms operating in the marine environment, ie the requirements of this agreement are applicable to both the seismic vessel to support vessels.

The MARPOL 73/78 (Marine Pollution) applies in respect of the national fleet of a State party to the agreement and any other flag vessels, including fixed and floating platforms, that are in the waters or ports of that State.

The agreement consists of: an introduction, the text of the International Convention for the Prevention of Pollution from Ships, 1973, the Protocol of 1978 relating to the 1973 Convention, the 1997 Protocol amending the 1973 Convention as amended by the 1978 Protocol and Finally, six annexes containing rules covering the various sources of pollution from ships:

 Annex I. Rules to prevent oil pollution.

 Annex II Regulations for the Prevention of Pollution by Noxious Liquid Substances Carried in Bulk.

 Annex III Regulations for the Prevention of pollution by harmful substances carried by sea in packaged form. Optional Annex, since the transport of dangerous goods is regulated by the International Maritime Dangerous Goods Code.

 Annex IV Rules to prevent pollution by sewage from ships.

 Annex V. Regulations for the Prevention of Pollution by Garbage from Ships.

 Annex VI Regulations for the Prevention of Air Pollution from Ships. This annex entered into force on 19 May 2005.

The Convention applies through the monitoring and control of the National Maritime Authority DIMAR regard as approved by law, within its legal functions (jurisdiction and competence).

B. International Convention on Cooperation, Preparedness and Response to Oil Pollution, 1990, London (ORPC / 90) and the "Protocol on Cooperation, Preparedness and Response to Pollution Incidents by Hazardous and Noxious Substances", 2000:

This agreement was welcomed by Law 885 of 2004. It is known as ORPC / 90 Convention, was established at the threat posed to the marine environment pollution incidents by oil in involving ships, offshore units, sea ports and facilities oil handling.

The intention with ORPC / 90 Convention, in the first instance is greater preparation by the States through the development of specific prevention measures to avoid possible oil pollution incidents arising from ships, sea units in, maritime and oil handling facilities ports.

The third article of Law 885 of 2004 establishes the obligation to have emergency plans in case of oil pollution due to ships entitled to fly the flag of a State party, offshore units and seaports and facilities oil handling, under the jurisdiction of a state party.

7.2.2 Regulation Colombiana associated with marine seismic activities

 Law 12 of 1981 which hosts the International Convention for the Prevention of Pollution from Ships, 1973 and its 1978 Protocol, MARPOL 73/78

Decree 644 1990

 Law 885 of 2004 which gets the International Convention on Cooperation, Preparedness and Response to Oil Pollution 1990 (ORPC / 90).

A. Decree 1874 of 1979

Decree establishing what functions for the protection of the marine environment in terms of pollution, which must assume the Coast Guard of the Navy.

B. Decree 1875 of 1979

Decree applies in the internal waters, territorial sea, exclusive economic zone and continental shelf Colombian. Regulates everything related to marine pollution.

The first article defines marine pollution understood as the introduction by man directly or indirectly, of substances or energy producing harmful effects in the short and long term, such as damage to living resources and marine life, hazards to human health, hindrance to marine activities. Text clarifies, fishing and other legitimate uses of the sea, impair the quality of the seas and undermine places of entertainment.

This Decree assigns functions to the Directorate General Maritime, to authorize, upon application made through the respective Port Captaincy, discharge, spillage or dumping at sea of harmful or potentially polluting substances such quantity and concentration, not exceeding limits regeneration particular

environment where the discharge, spills or dumping imposed by that entity is permitted, and may ask his opinion, as appropriate concept to today Ministry of Environment, Housing and Territorial Development, the Ministry of Social Protection and / or the Ministry of Mines and Energy.

As important aspect indicates that as of January 1, 1982 all ship arrives or operate a / or Colombian port must already be equipped with suitable spacers to prevent the escape of fuel sea bilges. Further notes that the ships to arrive at Colombian port should be protected by a liability insurance policy or a bank guarantee in the amount to be established to cover pollution damage that may result to the Nation or third parties during the time spent in port or in Colombian territorial waters. The Harbor must refrain from granting pratique or the respective sail the ships that do not comply with the provisions.

Provides that in no case may be authorized dumping at sea of the following:

 mercury or mercury compounds.

 Cadmium and cadmium compounds.

 Halogenated Compounds.

 Materials in any of the solid states, liquid, gaseous or living creatures, produced for chemical warfare and / or biological.

 Any other substance or form of energy which in the opinion of the Directorate General Maritime and Port should not be discharged into the sea by high pollutant.

Paragraph 2 of Article 7 of that rule states that the ships that carry scans using seismic research system must submit warranty up to five hundred thousand dollars (US $ 500.000.oo) of the United States or its equivalent in currency national.

C. Law 12 of 1981 which hosts the International Convention for the Prevention of Pollution from Ships, 1973 and its 1978 Protocol, MARPOL 73/78

The aim of this convention is to protect the marine environment from accidental, negligent or deliberate oil spills and other harmful substances from ships. By Law 12 of 1981 Colombia welcomes this Convention, the regulation is the responsibility of the General Maritime Directorate (DIMAR), in accordance with the precepts in Decree Law 2324 of 1984.

The Convention covers the technical aspects of pollution by ships tonnage gross tonnage and above 150 for tankers and other vessels with a tonnage of overall gross tonnage and above 400. It applies to ships of all types including lift vessels

dynamic, submersibles, floating craft and fixed or floating platforms operating in the marine environment. That is, the requirements of this Convention are applicable to both the seismic vessel to support vessels.

Except for small boats, ships engaged in international navigation must carry on board the acceptable valid international certificates in foreign ports that demonstrate compliance with the Convention.

The Convention contains: twenty articles, two protocols and six annexes (five of which Colombia has ratified)

Structure Marpol

******See Appendix in original document for Charts***

Ratified by Colombia

I

Prevention of oil pollution from ships. No oil with ab equal to or greater than 400, and oil equal to or greater than 150 vessels

Yes. The October 2, 1983 Annex I, have amendments made in 1984 which came into force on January 7, 1986.

II

Control of Pollution by Noxious liquid substances to granel.Todos ships certified to carry snl. If snl tanker, carrying loads of anx i also applies her anx i.

Yes. The April 6, 1987 and its amendments / 85 (addition to rules 5A and 12A)

III

Prevention of Pollution by Harmful substances in packaged form. All ships carrying harmful goods in packaged form.

Yes. 01 / July / 92

IV

Sewage Pollution Prevention by vessels .All ships carrying harmful packaged goods international traffic waters: equal and greater than 400 (new), with less than 400 ab, carrying more than 15 people. Equal to or greater than 400 existing, five years after entry into force.

States that do not allow ships to discharge sewage within four miles from the nearest land, unless they have in operation an appropriate treatment plant. Between 4 and 12 miles establishes that the water must be treated and disinfected before discharge. In addition, IMO has developed guidelines on technical and operational characteristics that must meet treatment plants. With regard to waste, have established specific minimum distance from land for waste disposal. It is forbidden to download any type of plastic which should be referred to port

Yes. 27 / Sep / 03

V

Prevention of Pollution by Garbage from Ships. All vessels, unless it is made explicit in the rules

With regard to the validity of Annex V, December 31, 1984, as amended in October 1989 from the February 18, 1991, November / 90 from March 17, 1992 and July / 91 from April 4, 1993

VI

Prevention of Air Pollution from ships. All vessels, unless it is made explicit in the rules.

Colombia is NOT a party to the Protocol of 1997 to approve Annex VI of MARPOL.

D. Decree Law 2324/84

This rule reorganized the Directorate of Ports and Maritime (DIMAR). Among its main provisions are:

 Rearrange the Directorate General Maritime.

 Regulates linked him with maritime activities.

 Fixed procedures for investigations by accidents or maritime incidents related to collision, marine pollution, fire, malfunction, damage to port platforms, among others.

 Set the administrative system, security certificates ships and floating structures.

 Establishes maritime activities considered in its exercise, being of interest: (a) the conservation of the marine environment, (b) the use, protection and preservation of coastal areas, (c) the administration and development of the coastal zone (d) shipping, national, foreign ships and naval vessels in maritime navigation and (e) the dredging and ocean engineering, among others.

 In the final part, regulates matters related to navigation and other related activities, special provisions for merchant navy personnel, staff sea shipping in general, concessions and construction permits.

Article 181 (Chapter II of Title IX) is related to marine exploration and determines that the coastal or offshore exploration refers to exploration carried out in the maritime beaches, territorial waters or on the continental shelf by geological methods, geophysical or other, including seismic method for locating oil, gas or other minerals whose operation technique needed or not the use of explosives.

For seismic exploration is meant establishes the method of geophysical exploration in which explosives are used or electric shock.

Meanwhile Article 182 warns that works to advance coastal and offshore seismic exploration in sea beaches, in the jurisdictional sea or on the continental shelf of the Republic, is required permission of the Directorate General Maritime, prior favorable opinion of the Ministry of Mines and Energy and Development Institute of Renewable Natural Resources, today Affairs Directorate of Marine, Coastal and Aquatic Resources of the Ministry of Environment, Housing and Territorial Development.

Decree 644 1990 E.

Sets the processing of applications for marine scientific and technological research in the Colombian jurisdictional maritime spaces and other provisions. 6

Seismic exploration activities must perform the procedure regulated permit here.

According to what is established in the standard, for this permit requires the following:

 Submit the application to the Ministry of Foreign Affairs of Colombia through their respective embassy or their counsel of record in the country;

 National Natural or legal person wishing to conduct scientific research and technological port with ships or naval craft flying foreign flags, submit your application to DIMAR who will forward it to the

relevant entities to which the provisions of the Decree meets 7 which must be made at least six (6) months prior to the date of initiation of the investigation.

Then refer to the minimum requirements of the standard for submitting an application to the competent authority shall, as follows:

 Document of existence and legal representation, full name, address, profession or specialty from the applicant as in the case of legal entities or natural persons, as well as an indication of the sponsoring of research, if it were appropriate. If the application is made through a representative, must accompany the title or official document attesting to their representation;

 First and last names, addresses, occupations and specialties and nationalities science team to participate in research and documents proving their qualifications;

 Certified copy of the navigation license and registration of the ship or vessel;

 Characteristics of the ship or vessel, type, class and description of scientific equipment used in the cruise;

 Nature and objectives of the research project;

 Programs, methods and techniques of research to be carried out and environmental impact;

 Schedule of activities in the country and outside it;

6 Regulates the Decree Law 2324 of 1984

7 If the Directorate General Maritime's study what your competition sees fit using ships or naval craft research Colombian flag, and shall inform the applicant, in accordance with the provisions of Articles 12, 13 and 14 Decree 644 of 1990. this is why it is important to analyze prior to submitting this application market, because if there are Colombian flag vessels engaged in similar operations, DIMAR the priority given to these vessels. Especially in the case of support vessels this analysis is particularly relevant.

Precise geographic area where they will conduct the research, defeat duly marked on a chart and routes of travel;

 Geographical position of workstations and profiles to be covered, clearly indicated in the chart;

 Expected dates of arrival in port or Colombian waters, final departure of the research vessel and placement or removal of equipment, as appropriate;

 Quotas offered by the applicant for Colombian scientists involved in the stages of planning, execution and analysis of research results.

Additionally, the favorable opinion of 5 entities for the permit is required. These authorities may require additional information prior to giving its favorable concept to DIMAR and may impose additional requirements.

a) Ministry of National Defense.

b) Ministry of Mine and Energy and related bodies or affiliates that have direct bearing on the type of research being planned and implemented (The National Research Institute of Geological and Mining Weber County, The Institute of Nuclear-IAN Affairs, Empresa Colombiana de Minas ECOMINAS and Empresa Colombiana de Petroleos -ECOPETROL).

c) Institute of Hydrology, Meteorology and Land HIMAT. (Today IDEAM)

d) National Institute of Renewable Natural Resources and Environmental INDERENA8.

e) Directorate General Maritime and Port-DIMAR.

Decree 1999 321 F.

With this decree the National Contingency Plan is approved - PNC against oil spills, derivatives and harmful substances in marine, river and lake waters.

Act 885 of 2004 G. catching the International Convention on Cooperation, Preparedness and Response to Oil Pollution 1990 (ORPC / 90).

The International Convention on Cooperation, Preparedness and Response to Oil Pollution, 1990, London and the "Protocol on Cooperation, Preparedness and Response to Pollution Incidents by Hazardous and Noxious Substances was welcomed by Law 885 of 20049. This Convention known as ORPC / 90 Convention was established before the threat

8 For this particular case referred to research projects related to hydrocarbons is Ministry of Environment, Housing and Territorial Development

Law 9, Convention and Protocol declared enforceable by the Constitutional Court Judgment C-150-05 of February 22, 2005.

for marine pollution incidents by oil in involving ships, offshore units, sea ports and oil handling facilities.

The intention with ORPC / 90 Convention in the first instance is greater preparation by the States through the development of specific measures of precaution and prevention to avoid oil pollution incidents arising from ships, sea units in and maritime and oil handling facilities ports.

Article Three of Law 885 of 2004 establishes the obligation of emergency plans in case of oil pollution, noting that:

Emergency plans in case of oil pollution:

1) a) Each Party shall require that all ships entitled to fly its flag carry on board an emergency plan in case of oil pollution under the provisions adopted by the Organization for this purpose *.

b) Every vessel under subparagraph a) on board must carry an emergency plan in case of oil pollution is subject, while in a port or offshore terminal under the jurisdiction of a Party, to inspection by officials duly authorized by such Party in accordance with the practices mentioned in the international agreements ** or in their national legislation.

2) Each Party shall require that operators in the sea units under its jurisdiction have contingency plans in case of oil pollution, coordinated with national systems established under the provisions of Article 6 and approved in accordance with procedures established by the competent national authority.

3) Each Party shall require that authorities and companies in charge of sea ports and oil handling facilities under its jurisdiction, as it deems appropriate, have emergency plans in case of oil pollution or similar means coordinated with national systems established pursuant to Article 6, and approved in accordance with procedures established by the competent national authority.

H. Resolution 295 of 2005 DIMAR

National Standard Safety, Protection of Ships and Pollution Prevention - NGS, whose objective is the implementation in all maritime activities in a structured system that would ensure maritime safety and prevent personal injury or loss of life human as well as damage to the marine environment.

I. Decree 2820 of 2010

Regulates the Title VIII of Law 99 of 1993 on environmental licenses, and establishes exclusive way by the Ministry of Environment, Housing and Territorial Development, now the National Environmental Licensing Authority (ANLA).

This standard is contemplated, as subject to environmental licensing, seismic exploration activities that are intended to develop in marine areas of the country to less than 200 meters deep.

J. Law 1450 of 2011 (National Development Plan 2010-2014).

Article 207 special protection is set to coral reefs and other strategic marine ecosystems.

Prohibits coral reefs and mangroves mining, exploration, exploitation of hydrocarbons, aquaculture, industrial trawl fishery and coral extraction components for making crafts are developed.

For its part, the same rule also provides that in seagrasses, can be partially or totally restricted the development of mining, exploration and exploitation of hydrocarbons, aquaculture and industrial trawl fishery based on technical, economic, social and environmental studies adopted by the Ministry of Environment, Housing and Territorial Development or his substitute.

K. Resolution 0022 of 2013

Establishes measures applicable to all vessels and equipment Colombian flag and foreign flag carrying out transportation of oil in bulk in areas under the jurisdiction of the Directorate General Maritime.

By virtue of this provision and as of July 30, 2013 the vessels and equipment Colombian flag, regardless of tonnage, date of construction or adaptation carrying oil in bulk in its cargo, must have a barrier, with segregated ballast tanks or spaces other than cargo tanks or intended to contain hydrocarbons and / or oily mixtures, they go emplaced section of the length to which the cargo tanks are contained as indicated in the Annex this resolution. However, Directorate General Maritime may accept other methods of design and construction of oil tankers alternatively, provided they offer at least the same degree of protection against oil pollution caused by marine casualties and incidents, accepting to do the "Interim Guidelines revised Guidelines for approval of alternative methods of design and construction of

oil tankers ", adopted by the Committee on the Protection of the Marine Environment of the International Maritime Organization by resolution MEPC.110 (49), and future amendments.

According to this resolution, the registration of ships or naval craft flying the flag of the country or foreign, as well as empowerment and operating permit that companies providing accorded

the shuttle of oil in bulk in waters under the jurisdiction of the Directorate General Maritime following checks that the protective measures referred to above will be made.

Similarly, Colombian companies shipping service, may operate or charter vessels or naval craft carrying foreign flag bulk cargo such as hydrocarbons, after verification of compliance with the requirements already mentioned.

L. Decree 1120 of 2013

Coastal Environmental Units regulates -UAC- and commissions that need to be shaped to the joint formulation of management plans and management of such units.

This Decree provides 10 coastal environmental units, which are areas of the coastal zone geographically defined for ordination and management, containing ecosystems own distinctive characteristics, with similar conditions and connectivity in their structural and functional aspects. These UAC are distributed along the Caribbean and Pacific coasts, as follows:

 Coastal Environmental Unit (UAC) Insular Caribbean.

 Environmental sew Unit (UAC) from the Alta Guajira

 Coastal Environmental Unit (UAC) on the North Slope of the Sierra Nevada de Santa Marta.

 Coastal Environmental Unit (UAC) of the Magdalena River, Canal Dam complex -System lagoon of Cienaga Grande de Santa Marta.

 Coastal Environmental Unit (UAC) Estuarine Sinu River and the Gulf of Morrosquillo.

 Coastal Environment (UAC) Darien Unit.

 Coastal Environmental Unit (UAC) Chocoano North Pacific.

 Coastal Environmental Unit (UAC) Baudó-San Juan.

 Coastal Environmental Unit (UAC) Complex Málaga Buenaventura.

 Coastal Environmental Unit (UAC) of South Alluvial Plain.

It is important to note that a significant portion of marine territory of the country, is in these subject to planning, organization and management, which will end with the issuance of Management Plans and

Management of Coastal Environmental Units (POMIUAC) moments; it will be a planning tool of reference for the development of all activities in the future.

Finally in Title III of the decree in question, the rules of procedure and criteria for future regulation of total or partial restrictions for the development of mining, exploration and exploitation of hydrocarbons, aquaculture and industrial fisheries on the ecosystem were established seagrasses.