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**Subject:** Environmental Impact Study – EIA/Environmental Impact Report - RIMA

**Interested Party:** Ceará State Water and Sewage Company - CAGECE

**CNPJ:** 07.040.108/0001-57

**Address:** Praia do Futuro – Fortaleza/CE

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## 1) OBJECTIVE

This Term of Reference aims to establish guidelines and standards to be adopted in the preparation of the Environmental Impact Study - EIA and its respective Environmental Impact Report - RIMA for the **Desalinated Water Supply System** destined to the **Water Distribution Integrated Macrosystem of the city of Fortaleza, CE**.

This instrument establishes the minimum requirements for the survey and analysis of the environmental components existent in the enterprise area and its area of influence, thus becoming a guiding device; the responsible team shall use it as a basis to perform the studies without, however, excluding its capacity for innovation and improvement, while complying with the rules and procedures established in Resolutions n° 01/86 and n° 237/97 of the National Environmental Council - CONAMA.

This Term of Reference shall be valid for 01 (one) year, counting from the date of its receipt by the entrepreneur, and can be renewed at SEMACE's discretion.

## 2) PRESENTATION CONDITIONS

The EIA shall be sent electronically, through the internet, at SEMACE's own system, by the interested party or its legal representative, accompanied by proof of the payment related to the License request, in addition to a copy of the Term of Reference and the State Technical Registration numbers of professionals responsible for composing the Study, all in digital media. It shall not constitute a waiver to any other requirements at the agency's discretion, as long as justified.

The Environmental Impact Report - RIMA shall be accessible to the public, and a copy must remain available for consultation of interested parties at SEMACE's Library.

The terms of Ordinance n° 47 of February 29th, 2012, issued by SEMACE must also be observed.



### 3) STUDY CONTENT

Environmental studies must be prepared to comply with Resolutions n° 01/86 and n° 237/97 of the National Environment Council - CONAMA, as well as other specifications and guidelines established in this document, based on the environmental aspects of the enterprise's direct and indirect influence areas and their relationships.

The Environmental Impact Study – EIA shall comply with the enforceable legal provisions, regarding the use and protection of environmental resources. It shall be prepared based on the following topics:

#### 3.1. IDENTIFICATION OF THE ENTERPRISE AND ENTREPRENEUR

- a) Official enterprise name;
- b) Entrepreneur's identification;
  - Name or legal name;

Legal registration numbers;

CNPJ;

Full address, phone numbers, fax, e-mail;

Legal representatives (name, CPF, address, phone numbers, fax and e-mail);

Contact person (name, CPF, address, phone numbers, fax and e-mail);

- c) Identification of the consulting company responsible for the Environmental Study

Name or legal name;

Legal registration numbers;

CNPJ;

Full address, phone numbers, fax, e-mail;

Legal representative (name, CPF, address, phone numbers, fax and e-mail);

Technical team (name, CPF, professional qualification, registration in the respective Professional Councils).

**NOTE:** the environmental consulting company must be registered with SEMACE and present the Technical Responsibility Note - ART of the legal consultancy representative.

SEMACE may, at its own discretion, summon the entrepreneur or his respective consultancy, in case there is a need for detailing and/or rectification of the Study.



### 3.2 COMPLEMENTARY DOCUMENTATION AND BASIC STUDIES

- Permission from the Fortaleza City Hall, regarding the Participative Urban Development Master Plan;
- Permission from the 4th Superintendence (Ceará) of the National Historical and Artistic Heritage Institute - IPHAN, in relation to the Tangible and Intangible Cultural Patrimony (Natural and Man-made) in the respective project's area;
- Statement from the Union Patrimony Secretary - SPU, determining if the respective area is under the Union's jurisdiction, and thus administered by this Secretary;
- IBAMA's statement regarding the competence to license, considering the areas presented in the prior consultation phase.
- Map of the Project Area and its interface in relation to surrounding areas;
- Map of the Project Area and its critical and risk areas regarding surface drainage, land use and floods and inundations);
- Environmental vulnerability map, on a scale of at least 1:2000, defining potentials and limitations to the use and occupation of the areas to be used by the enterprise, depending on the natural land conditions and given the proposed use and occupation characteristics;
- Planialtimetric (in the surface) and topobathymetric (in the submerged area) plants, containing the seawater intake and effluent discharge (brine) outlet sites, and, as well as the interconnection plan to CAGECE's system, displaying the location of pumps and pipelines. They must be presented as a part of the enterprise's DAA - Directly Affected Area.
- Sampling variety and collection procedures in the studied area, composed of at least 10 sampling sites and distributed in a manner that represents the current marine conditions of the area planned for marine outfall implementation. It must also consider the characteristics of effluents that shall be released and diffuser pipe specificities.
- Assessment of the characteristics of vessels and fishing activities present the coastal and marine area where the desalination plant is located;
- Waste treatment process from the desalination plant to its final destination;
- Dependency study for the high energy intensity projected for the plants and alternatives proposed;
- Hydraulic and Hydrologic Studies – project details, with discrimination of water resources;



- Identification of Preservation Units, Permanent Preservation Areas and areas relevant to the biodiversity conservation in the enterprise's direct and indirect influence a;
- Socioeconomic viability of the enterprise - cost x benefit ratio;

**NOTE:** present a map with the final selected alternatives from the required studies (except hydraulic and hydrologic) in UTM *datum* SIRGAS 2000 coordinates, including accesses at the local level, with a description of the main incident routes, identification of sediment source areas (if necessary to ground some plant sections) and discard/disposal areas.

The study must include all technology and project location alternatives, including the occupation feasibility of these areas. The alternatives must be confronted with the hypothesis of non-execution, according to CONAMA Resolution n° 01/86. The cost-benefit should be analyzed, considering technical, economic, social and environmental aspects, with a focus on area use restrictions, as well as the existence of urban centers, water courses, archaeological sites, historical heritage, permanent preservation and relevant environmental interest areas.

Only primary data collection will be considered for the selected location, in reference to factors such as: temperature, luminosity and salinity, associated with nutrients dissolved in the sea (organic matter); seawater pollution and eutrophication; proliferation of diatom algae; a study on nearshore hydrodynamics, associated with diffuse effluent sources (seasonality and volume), rich in nutrients and causing microalgae blooms; a study of coastal dynamics in the enterprise's area of influence, detailing the sedimentological balance of the beach and shallow inner shelf (up to 15m isobath); a topographic profile of the beaches associated the behavior of waves, tides and currents and their influence on hydrodynamics, including a bathymetry measurement to the isobath under the influence of water intake and discharge sites (a 15 m isobath minimum).

### 3.3. ENTERPRISE CHARACTERIZATION

- a) General objective: to justify the project's importance in the economic and social contexts, within the its area of influence;
- b) Georeferenced location of the area selected for the project, represented in a planialtimetric plan in a compatible scale. Present the geometric coordinates for georeferencing, in the UTM Projection



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System and Sirgas 2000 projection. For the incorporation of geographic data (georeferenced plants and images), present the following formats and extensions: vector file - SHP and image file - TIFF or JPG, and in KLM or KMZ;

c) Description of the enterprise including the basic criteria that shall guide it through the executive project, installation and operation phases, as well for its appropriate maintenance. This characterization must contain the following minimum information:

- Composing elements and main technical characteristics;
- A *Layout* with the enterprise's descriptive memorial, considering the entire system – intake, treatment, water distribution – including the infrastructure, superstructure, construction model and the materials used in the construction of all internal and external equipment, including the distribution of the desalination plant's sectors and the quantification of the population served;
- The enterprise's security system, including escape routes for eventual collective emergency situations;
- The Desalination Plant's operation and maintenance plan, describing its use, listing quantity, dimensioning (with respective volumetric capacity) and cleaning, with the respective intake sources and the destination and volume of permeate water;
- Interference with existing infrastructure and its systems, such as water and sewage networks, power lines, telecommunications, pavement, etc.;
- Project to remove interferences, if the existing infrastructure is affected; the final destination of the material to be removed, that is, the waste arising from demolition or renovation works of the already existent structure;
- Present the Electric Project and Hydrosanitary Project, with their respective descriptive memorials;
- In case it is necessary to install an electrical substation for power supply, present the substation's plant, or a Technical Feasibility Certificate - AVT from ENEL;
- Equipment used in the construction works, with respective noise, vibration and gas emission levels, as well as any other polluting source;
- Origin and quantification of the labor employed;
- Associated and / or subsequent Enterprises, and the induction of new occupations;



- Physical schedule of the works, indicating the areas with the respective contemplated population, associated with schedule of the environmental impact mitigating and control measures;
- Location and layout of construction sites.
- A description of all submarine cable sites installed in the enterprise's area of influence;
- A description of all noise emission sites, as well as the equipment or systems that shall be used, with their expected efficiency and monitoring that will be performed;
- A description of all waste generation sites, as well as the storage and treatment systems to be used and the final destination of each type of waste, mainly those classified as Class I - Hazardous;
  - To detail, qualitatively, the liquid effluent generated, as well as its respective treatment and final destination;
  - A layout (general arrangement with indication of areas destined for the administrative, utility and production sectors, among others);

**NOTE:** aspects that, due to their nature, can only be detailed in later stages of environmental licensing must be technically justified for an evaluation by SEMACE.

### 3.4 ENTERPRISE AREA CHARACTERIZATION

- A detailed study of coastal dynamics comparing historical data with current conditions, characterizing causes and effects of erosive marine processes in the area, considering the physical, social, economic and cultural influences on the enterprise;
- Delimitation of the coastal ecosystem in the project area, enabling the territorial identification of influence areas.

### 3.5 ENVIRONMENTAL MANAGEMENT

- Environmental management practices to be adopted at each project phase: planning, installation and operation;
- Detailing of all waste generation sites and an estimate of its quantity, as well as the storage, treatment and environmentally appropriate destination for each type of waste;



- Detailing of the qualitative estimate of the generated liquid effluent, as well as its selected treatment and final destination;
- Description of the operational, prevention, maintenance and safety routines;
- Present sustainable brine management (innovations in use, reuse, dissolution, new uses for waste, etc.), as well as socio-environmental projects, with a focus on the development of solidarity projects with the communities involved.

#### 4) ENVIRONMENTAL COMPENSATION

To present, for environmental compensation calculation, a physical and financial expenses spreadsheet for all enterprise investments. It must address the methods, technologies and actions employed, including a justification for the adverse impacts that cannot be mitigated, while suggesting compensatory measures that may be adopted in environmental compensation, in compliance with related legislation, notably Federal and State Resolutions - CONAMA n° 371/2006 and COEMA n° 26/2015 and 06/2017.

#### 5) ENTERPRISE'S AREA OF INFLUENCE

Present the boundaries of the geographic area to be directly or indirectly affected by the impacts, which is the enterprise's area of influence. The areas of influence must contain the areas where the impacts shall occur, as well as their characterization at local and regional levels.

#### 6) COLLOCATED PLANS AND PROJECTS

List all collocated plans and projects and their compatibility with sectoral policies, plans, and federal, state and municipal action plans, proposed or in execution in the enterprise's area of influence.

Describe and classify government plans and programs in the aforementioned matters, as well as public and private projects proposed and in implementation in the enterprise's area of influence and their compatibility, such as:

- Public Environmental Policies;



- Territorial and Environmental Organization Plans and Programs - Macroregional Planning, Soil Use and Occupation in the municipality, Conservation Units; Spring Protection Areas, Master Plans, etc.;
- Compatibility with Regional and Municipal Projects;
- Drainage Basin Plan; and
- Interference with other ventures to be implemented in the region.

Thus, any conflicts between the enterprise and such plans, programs and projects should be analyzed, as well as solution alternatives, if possible.

## 7) ENVIRONMENTAL DIAGNOSIS OF INFLUENCE AREA

Factors such as the geographical and environmental characteristics of the enterprise's planned site shall be considered, in addition to its nature, size and environmental modification potential, as well as the relevant soil use and occupation legislation.

The areas of influence, including the Indirect Influence Area (IIA), Direct Influence Area (AID) and Directly Affected (DAA) must be defined, delimited and justified, in relation to the socioeconomic, physical and biotic environments. The last two should include areas of terrestrial and aquatic influence.

### 7.1 Physical Environment

The physical and environmental conditions of the area to be affected by the enterprise shall be characterized by the following approaches:

a) Hydroclimatic meteorological aspects;

- Influence of prevailing winds (temporal systematization and frequency of wind speed and direction data);
- Influence of natural phenomena, including El Niño, La Niña and the Intertropical Convergence Zone, which may have interference in the enterprise area;
- Rainfall regime (rainfall data);
- Insolation and evaporation;





- Local temperature data (annual average, maximum and minimum).

b) Characterization of air quality in the area, displaying air pollutant concentrations before implementation of the enterprise (baseline), as well as a description of the methods adopted to obtain these findings;

c) Characterization of ambient noise levels (ambient noise) in dB(A), in the enterprise's area of influence, and description of the methods used for these findings;

d) Geological, Geomorphological and Pedological Aspects:

- Local geology;
- Characterization of coastal dynamics and the beach's sedimentary budget (wind transport);
- Coastal geomorphology surrounding the enterprise;
- Geological evolution of the marine environment extending at least to the 15 m isobath;
- Seismicity;
- Soil characteristics in the area potentially affected by the enterprise.

e) Water Resources

- Surface and underground water resources (qualitative and quantitative assessment and degree of susceptibility to the enterprise)
- River discharges;
- Classification of underground aquifers and groundwater interference, if identified in the area;
- Presentation of thematic maps on a compatible scale (geological, geomorphological, pedological, among others);

f) Brine plume dispersion modeling after its discharge into the high seas, through which it will be possible to ascertain or estimate at what distance from the discharge site a total dilution of salinity levels can be observed;

g) Sedimentology study;



- h) Demonstration of the type of dilution and effluent percentage in the project through modeling, considering the possibility of an increase in sedimentation and other salt levels;
- i) Measurement of the water's physical and chemical parameters (temperature, salinity, hydrogen potential (pH), dissolved oxygen, electrical conductivity); suspended solids, currents, simulation of effluent behavior discharge by submarine outfall and the presentation of liquid effluent plumes, containing toxic substances or conventional pollutants; granulometric and compositional analysis of calcium carbonate content; n-alkane and total n-alkane analyzes; unresolved complex mixture and inorganic compounds - dissolved aluminum, total arsenic, total barium, total boron, total cadmium, total lead, free cyanide, total residual chlorine, dissolved copper, total chrome, dissolved iron, total fluoride, total phosphorus, total manganese, total mercury, vanadium, total nickel, nitrate, nitrite, total ammoniacal nitrogen, polyphosphates, plate, selenium, sulphides, total thallium, uranium, zinc; phytoplankton and other parameters that are related to reject material.

## **7.2 Biotic Environment**

To present a fauna and floristic survey in detail in the project's area of interference and its nearest surroundings, contextualized with a characterization of the substrate and ocean water, as well as the biological and ecological relationships developed at the site.

### **7.2.1 Terrestrial Environment**

#### **7.2.1.1 Flora**

##### **On the Directly Influenced Area (DIA)**

To present a description of the area's original and current vegetation cover, considering its occupation and anthropic conservation/preservation interference history, to define the degree of alteration existing on local ecosystems. For that, it is necessary to identify and characterize the forest classes present in the study area, through field survey and specialized bibliographic research.

##### **On the Direct Influence Area (DIA) and Directly Affected Area (DAA)**

Identify and characterize forest types, if present in the studied area, through a field survey complemented by a specialized bibliographic research. Submit a list of sampled species, which must



contain the following information:

- Family, scientific name, popular name, origin (native, exotic or invasive), frequency or occurrence classes (abundant, common, occasional or rare); threat of extinction, classified according to lists of flora species threatened with extinction in legislation; endemism; successional stage (pioneer and non-pioneer); species of economic, medicinal, scientific, food and / or ornamental importance; species under any degree of protection, such as those immune to cutting or considered environmental heritage; bioindicator species (with justification); georeferenced fragments and sampling points where the species (endemic, endangered or of economic, medicinal, scientific, food and / or ornamental importance, protected, bioindicators) were found.

Based on the field survey, the analysis of aerial photographs and satellite images, the degree of conservation of the forest types in the study area and the importance of the various types of vegetation for conservation must be discussed, based on the size, shape, connectivity and the conservation status of the remaining native forest fragments.

#### **7.2.1.2 Fauna**

Fauna characterization in the study area must be carried out through field and bibliographic research. Collection of primary data, this should minimally include mammal, bird and herpetofauna groups. The sampling areas and spots should be described and indicated in a plan, with the location where the fauna individuals were observed during the survey. The results should be presented as a list and discussed regarding the environmental characteristics of the sampling area at the time of the study (soil, relief, vegetation, climate, precipitation).

##### **7.2.1.2.1 Minimum Requirements**

The survey to be presented must contain, minimally, the following information or consideration:

- Field methodology description (transects, direct or indirect notes, footprints, camera traps, among others), with justification of the method adopted for each group;
- Execution period (date);
- Sampling effort used to survey each fauna group, by methodology and season, which must be compatible with the interference in vegetated and protected areas. Field effort (time) of



all methodologies, respecting the periods of greatest activity of each studied taxon (morning, afternoon, night and twilight);

- Weather conditions during the survey periods;
- Equipment used and their specifications;
- Reasoning behind sampling spot selection, considering enterprise characteristics, landscape, the natural history of the species and the potential of each type of environment;
- Description of sampling spot characteristics, considering the area, phytophysiology, matrix and presence of watercourses;
- Photographic records of animals and traces visualized during the survey, with geographical coordinates;
- Present, in aerial photos or satellite images, in a 1:10,000 scale or another scale with a greater level of detail, with a minimum resolution of 1m, georeferenced forest fragments and evaluated pathways, in addition to the fauna sampling spots (linear transects, trapping points and paths), and, when available, photographic records of the sampled individuals (with dates), and traces, in particular, of threatened species;
- If it is necessary to collect individuals for taxonomic confirmation, a proposal must be submitted establishing the collection of the smallest possible number of individuals;
- Collection, seizure, capture, manipulation, marking, handling, withdrawing, extraction, translocation and captivity activities, must be previously authorized by SEMACE, after orientation on the Wildlife Management Program;
- Present a list of the surveyed species, containing: scientific and popular name; order; family; habitat; origin (native, exotic or migratory habits); record classification (note, trace, report, auditory contact, etc.); registration period (morning, afternoon, evening and twilight); indication of the sampling spots where the species were registered and endemism;
- Identification of threatened species according to official lists or those legally protected, considered rare or not previously described in the area studied or by science;
- In surveys where interviews are used, at least the following instructions should be considered: it must be done through questionnaires and with the use of field guides that allow the interviewed person to visually confirm the species described; to highlight, among the species listed in bibliographic, field and interview surveys, those that are classified as endemic and threatened with extinction, analyzing their migratory patterns, life, feeding,



mating and reproduction habits; to describe the areas adjacent to the studied fragment, in order to characterize the use and occupation of its surroundings.

## 7.2.2 Marine Environment

### 7.2.2.1 *Characterization of planktonic, benthonic and nektonic organisms*

- Conduct a survey of the environmental conditions present in the enterprise's area of influence, characterizing the substrate, biota, intensity and direction of currents and seawater quality. Present an analysis of the physicochemical parameters of water quality (use the standards provided for in CONAMA Resolution n° 357/2005 - Saline Waters) and sediments, correlating with the ecological niches of aquatic biota;
- Execute an inventory of the species that make up the adjacent marine community;
- Present on a map with an adequate scale for the analysis of sea turtle nesting areas;
- Present on a map, with an appropriate scale for analysis, the movement routes of turtles and Guiana dolphins;
- Characterize the distribution patterns of the species present in the study area, based on a methodology validated in scientific literature;
- To present the interpretation of the distribution patterns of the benthic organisms in the concentrate (brine) disposal's influence area, considering the following factors: topography, tides, substrate nature, salinity, temperature, dissolved oxygen, humidity, luminosity and biological factors, such as predation and competition;
- Description of the methodology used in the field, with justification of the method adopted for each group. For benthic organisms, in particular, the methodology adopted must include three sampling and a supplementary collection spot at the discharge site, including water collection sites (surface, middle and bottom);
- Inform the starting and ending dates for data collection, in addition to the georeferencing of sampling spots, route speed, characterization of vessels and fishing equipment used (number of traps, size and material used in the nets, number and size of hooks, among others), the



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seasons in which sampling was performed, meteorological and oceanographic observations at the time of the surveys, among others;

- Sampling effort used to survey for each group (indicating the methodology applied, sampling days and times and the seasonal period);
- Species discovery curve (collector curve), to determine whether the sampling effort used was adequate, accompanied by an evaluation of the results obtained;
- Weather conditions during the survey periods;
- Equipment used during sampling (caliper, measuring tape, scale, devices for measuring parameters, among others) and their specifications;
- Justification for the choice of sampling spots, considering enterprise characteristics, landscape, the species' natural history and the potential of each type of environment;
- Photographic records of the biota registered during the survey;
- If it is necessary to collect individuals for taxonomic confirmation, a proposal must be submitted establishing the collection of the smallest possible number of individuals;
- Collection, seizure, capture, manipulation, marking, handling, withdrawing, extraction, translocation and captivity activities, must be previously authorized the responsible organs in the STATE and FEDERAL, after orientation on the Wildlife Management Program;
- The sampled individuals should be classified down to the lowest specific level possible (preferably to the species taxon). If it is not possible to carry out any identification, due justification for this imprecision and its implications must be presented;
- Present an evaluation and discussion of the results obtained, comparing them with existing data in literature, when possible;
- Present a list of the surveyed species, containing: scientific and popular name; order; family; gender, behavior (planktonic, nektonic or benthic); habitat; origin (native, exotic or migratory habits); indication of the type of record (note, trace, report, auditory contact, etc.); registration period (morning, afternoon, evening and twilight); indication of the sampling sites where the species were registered;



- Identification and characterization of species that are endemic, threatened with extinction or almost threatened with extinction (in danger), according to official lists, or those legally protected, considered rare or not previously described in the area studied or by science;
- Indication of monitoring measures for the adjacent aquatic biota.

### 7.3 SOCIOECONOMIC ENVIRONMENT (ANTHROPIC) – RESEARCH

The characterization of the socioeconomic environment to be potentially affected by the enterprise must be presented through the information listed below, and considering the existing populations in the directly affected area, as well as those presenting a relationship with the socioeconomic environment and subject to significant changes by indirect effects.

#### a) Population Dynamics

- Sample survey with collection of primary data from the directly affected community, including economic, educational and cultural activities, especially riverside fishermen, including fishing docks;
- Characterization of the resident and floating population;
- Population distribution in the surrounding areas, including the closest residences within the enterprise's proposed area;
- Indication of population distribution in the surrounding areas, including the closest residences;
- Population growth trends in the area;
- Details of expropriation and/or removal processes, if any; expropriation and/or removal process, if any;
- Characterization of the economic activities in the area, highlighting the direct and indirect jobs generated and directly affected by the enterprise;
- Local population's quality of life;
- Data on basic infrastructure and services provided to the population in the surrounding areas;
- Characterization of the area's social organization;
- History of occupation of the Praia do Futuro area;
- Industries in operation in the Mucuripe Port Area;



- Identification of formal and non-formal leaders working in the study area;
- Identification of forms of communication in the enterprise's area of direct influence.

b) Sanitation infrastructure characterization:

- Water supply;
  - Percentage of population served and water origin;
  - Service quality;
  - Water supply adequacy.
- Sanitary sewage;
  - Percentage of population served by the collection network;
  - Existence and type of treatment given to domestic effluents.
- Solid residues
- Percentage of the population served by the public collection system;
  - Existence and type of treatment given to solid waste (domestic, industrial and biomedical);
  - Final destination location
  - Commitment to health (presence of vectors, water table contamination, etc.);
  - Collection type and locations;
  - Existence and type of drainage system implemented;
  - Presence of stagnant water;

*Economy*

- Identification and characterization of relevant economic activities in the study area, with an emphasis on the fishing and tourism production chain;
- Analysis of trends in the evolution of economic activities.
- Storage of hazardous products;
- Description of the transportation and storage of chemical products (drainage and leakage and tanking containment projects) for the Desalination Plant.

*Geoenvironmental Zoning*

Define on a map, on a compatible scale, all identified geological and environmental units, with





legends and a descriptive memorial, considering:

- Delimitation of Permanent Preservation Areas;
- Urban and urban expansion areas;
- Service Areas;
- Ecological Reserve/Preservation Units;
- Areas Protected by Law
- Environmental risk and management areas

#### **7.4 ARCHAEOLOGICAL AND PALEONTOLOGICAL DIAGNOSIS**

To present the diagnosis with mapping of the probable archaeological and paleontological sites, in accordance with Federal Law n° 3,924 of July 26<sup>th</sup>, 1961 and Normative Instruction n° 01, of March 25<sup>th</sup>, 2015 of the National Institutes of Historical and Artistic Heritage - IPHAN, including areas of relevant scientific interest and cultural manifestations for communities in the area, as well as sites of historical and architectural value.

#### **8) RELEVANT ENVIRONMENTAL LEGISLATION**

Description and analysis of Federal, State and Municipal legislation related to the enterprise, including the institutions involved and their respective attributions, as well as an approach to the specific norms related to the enterprise's classification and licensing phase, considering the structural and locational aspects, activities to be developed and the services provided, the legal standards related to soil use and occupation and those related to the preservation of natural and environmental resources. In addition, it is necessary to evaluate and communicate the obligations, prohibitions and recommendations, in reference to the legal standards and regulations, considering the activities to be developed by the enterprise, the spatial scope of environmental impacts, the enterprise's area of influence and its ecosystems and the environmental licensing process.

#### **9) ENVIRONMENTAL IMPACT IDENTIFICATION AND ANALYSIS**

Based on the environmental diagnosis prepared, knowledge of current environmental legislation and activities proposed by the project, the eventual impacts that may take place during the implementation and operation phases of the enterprise should be identified.



It is necessary to describe potential impact-generating actions that must be performed at each stage of the project's implementation and system expansions, considering the cumulative effects and synergy of the impacts with other existing enterprises in the area of influence.

The identification, measurement and appraisal of the predictable environmental impacts, the related project actions and its alternatives in the construction, installation and operation phases, with descriptions of character, prediction of degrees of magnitude, duration, temporality, severity, class, reversibility and scale, as defined in current environmental legislation and resulting from work implementation actions, considering, among others, the following aspects:

- Impact of interference from the works on the current coastal dynamics process, including marine erosion;
- Impacts of works on natural sediment transport by wind;
- Impacts on the population, resident and leisure visitors and service sectors, among others considered relevant;
- Impact on the landscape, atmosphere and subsoil;
- Assessment of impacts on shoreline retreat and bathing water quality level;
- Regional and local impacts;
- Noise levels;
- Regional and enterprise access road networks;
- On the soil;
- Natural soil drainage;
- On water bodies;
- Local labor;
- Over infrastructure services;

Identify the marine environment area subject to impacts, considering a brine plume diffusion study after its release into the open sea, by which it shall be possible to ascertain or estimate the how far from the discharge point a total dilution of saline levels can be observed;

Impacts on terrestrial and marine biota: this item shall consider displacement routes, water intake, reject discharge, structures designed for installation, with emphasis on the population of Guiana dolphins and turtles, as well as on intra and interspecific relationships;



- Impacts related to the possibility of increased sedimentation and salts in the marine biota, due to the Desalination Plant's presence;
- Magnitude prediction, considering degrees of intensity of duration and importance of the identified impacts, specifying indicators, criteria, prediction methods and techniques used.
- A classification of the impacts' degree of importance towards the affected environment and all other impacts, as well as the relevance given to each by the affected social groups.
- Evaluation of the synergy of impacts caused by the activity, considering the existence of other activities in operation in the area of influence.

The methods for identifying impacts, magnitude prediction techniques and the criteria adopted for the interpretation and analysis of their interactions must be mentioned.

This item shall be presented in two ways:

- a) a conclusive summary of the relevant impacts of each phase planned for the enterprise (planning, implementation and operation);
- b) A detailed description of the impact (cause x effect relationship) on each environmental factor, according to CONAMA Resolution n° 01/86, namely:

Impacts on the physical environment;

Impacts on the biological environment;

Impacts on the socioeconomic environment.

## 10) PROPOSAL OF MITIGATING MEASURES

In this topic, the measures that shall minimize or eliminate the adverse impacts identified and analyzed must be presented, including the enterprise's areas of implantation and influence, also discriminating to the studies, implementation and operation phases, which shall later integrate the control and monitoring environmental impact programs, with their respective execution schedule.

The most complex measures, that involve a particular work methodology to obtain the mitigation and/or compensation for one or more significant impacts, should be consolidated in an "Impact Mitigation Program" .

The mitigating measures shall be classified as:



- a) Nature - preventive or corrective (including pollution control systems, an assessment of their efficiency in relation to the quality criteria and disposal standards for liquid effluents, gaseous emissions and solid waste);
- b) Project phase in which they must be adopted - planning, implementation, operation, expansion and in case of accidents;
- c) The environmental factor for which it is intended - physical, biological, socioeconomic;
- d) Permanence period of its application - short, medium and long term;
- e) Responsibility for its implementation - entrepreneur and / or Public Agencies involved;
- f) Feasibility in terms of means, resources and technology, among others.

Methods, technologies and actions employed must be mentioned, including a justification for adverse impacts that cannot be mitigated, with the suggestion of compensatory measures that can be adopted in environmental compensation, in compliance with CONAMA Resolution n° 371/2006 and COEMA Resolutions n° 26/2015 and 06/2017.

Emphasis should be given to the following measures: reduction of interferences and inconvenience resulting from the works for the surrounding population; prevention of accidents, including protected areas; soil use discipline; erosion control; landscape recovery; transportation impact control; handling, storage and disposal of raw material and waste generated in the process and protection of fauna and flora, among others identified in the enterprise.

## **11) ENVIRONMENTAL IMPACTS CONTROL AND MONITORING PROGRAM**

Measures aimed at minimizing the identified and quantified adverse impacts should be presented, with details of the processes, methods, technologies and actions for the elimination, reduction or compensation of environmental damage, including a justification for impacts that cannot be avoided or mitigated.

The mitigation measures and the basic environmental program must contain the schedule of actions and environmental indicators for each measure, that can serve as parameters to evaluate their effectiveness, considering the planning, installation and operation phases.



Present, at least, the environmental plans and programs listed below, whose implementation shall require details, including an execution schedule:

- a. Environmental Management Program;
- b. Marine Biota Monitoring Program, including the definition of sampling frequency according to the knowledge of environmental dynamics in the monitored areas; elaboration of sampling and analysis routines; definition of the monitoring period of marine communities; an analysis of the physicochemical parameters of water quality and sediments, with classification among the aquatic biota's ecological indexes;
- c. Construction Works Environmental Control Plan;
- d. Noise and Vibration Level Monitoring Plan;
- e. Recovery Plan for Degraded Areas;
- f. Worker's Protection and Workplace Safety Plan;
- g. Environmental Education Program;
- h. Environmental Audit Program;
- i. Chemical Spill Emergency Action Plan;
- j. Social Communication Plan for surrounding communities;
- k. Archaeological, Cultural and Historical Heritage Identification and Rescue Program;
- l. Effluent Management Program, Waste Management, Control of Particulate Material, Gases and Noises, combat against noise and visual pollution.
- m. Desalination Plant's Operation and Maintenance Worker Training Program;
- n. Seawater Quality Monitoring Plan;
- o. Implemented Infrastructure Maintenance Plan;
- p. Eventual Enterprise Deactivation Plan, including the removal of structures and recovery of impacted areas;
- q. Fishing Activity Monitoring Plan;
- r. Marine Biota Sampling Plan;
- s. Coastal Dynamics Monitoring in the Enterprise's Area of Influence;
- t. Global schedule of construction works and phases, with its mitigating measures.

## 12) RISK ANALYSIS STUDY



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A Risk Analysis Study shall be carried out, focusing on conditions whose consequences may harm the facilities, the public (internal and external) and the environment. The following items must be discriminated:

- A historical analysis, considering accidents that have occurred with similar undertakings in and out of the country, and that resulted in damage to men, the environment and facilities;
- Identification of hazards, with recognition of the most likely accidental systems and scenarios, including their triggering factors and consequences;
- Determination of the types of accident;
- Estimation of physical effects and vulnerability analysis, including individual and social risks for internal and external personnel, as well the total risk undertaken by the enterprise. This analysis should be determined using models with probabilistic functions;
- Estimation of frequency and incidence of the accidental situations identified;
- Risk Estimation and Analysis, as Social Risk and Individual Risk and risk reduction methods, involving measures capable of reducing the probability of accidental circumstances and/or the magnitude of their consequences to the community and/or ecosystems;
- Risk Management Plan - *PGR*, covering all operations and equipment, with the objective of establishing requirements containing general management guidelines, aiming at accident prevention, thus including the following procedures:
  - Consequence analysis;
  - Vulnerability analysis;
  - Process safety information;
  - Review of process risks;
  - Management of alterations;
  - Critical system integrity maintenance and guarantees;
  - Operational procedures;
  - Personnel training;



- Investigation of incidents;
- Emergency Action Plan - PAE;
- Audits.

### 13) ENVIRONMENTAL QUALITY PROGNOSIS STUDY

A definition of the various situations resulting from the adoption of each technological and locational alternative, considering the enterprise's implementation or nonexecution. Its implications for the environmental quality of the enterprise's area of influence, water quality aspects, the quality of life of the region's population and the adequate provision of services, according to the normative and regulatory parameters, considering the Desalination Plant's nature.

### 14) CONCLUSIONS AND RECOMMENDATIONS

Considerations on the results of environmental impact assessments shall be presented, including:

- Prognostic assessment carried out in the study area regarding project feasibility, as well as the possibility non-execution;
- Demonstration of the selected alternative as the most favorable for environmental protection and the socio-environmental relationship;
- Modifications (environmental, socioeconomic) resulting from the adopted alternative;
- Benefits versus socioeconomic, cultural and environmental adversities resulting from the enterprise's implementation and operation.

### 15) ATTACHMENTS

All documentation cited as an attachment the Study must be listed and presented, maintaining its graphic data (color photographs, texts and maps legible and on a compatible scale) and presentation of other content.

### 16) RIMA – ENVIRONMENTAL IMPACT REPORT



The Environmental Impact Report, RIMA, should reflect the conclusion obtained in the Environmental Impact Study, EIA. It must be composed in a language accessible to the public, so that the possible environmental consequences of the project and its alternatives can be clearly understood, comparing advantages and disadvantages in each.

The Environmental Impact Report - RIMA must contain:

- The objectives and justifications for the project and its relations with governmental plans and programs;
- A descriptive summary of the project and its technology and location alternatives;
- A summary of the environmental study diagnosis for the project's area of influence;
- An analysis of environmental impacts, considering the project, its alternatives and impact incidence periods, while indicating the methods and techniques adopted for their identification, quantification and interpretation;
- Characterization of the future environmental quality in the area of influence, comparing the various project selections and its alternatives, as well as the possibility of non-execution;
- Description of the expected effect with the adoption of mitigating measures for negative impacts, mentioning those that cannot be avoided, the degree of change expected and the compensatory measures;
- A summary of the impact control and monitoring programs;
- Conclusions and recommendations.

## 17) REFERENCES

The bibliographic references consulted to elaborate the studies must be listed, including citations of the researched sources (texts, drafts, maps, graphs, tables, photographs, among others).

## 18) GLOSSARY

The technical terms used in the studies must be listed.