

GENERAL SPECIFICATION

ENVIRONMENT

GS EP ENV 111

Environmental Baseline and Monitoring Studies: Onshore Sites

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1. Scope

The purpose of the present General Specification is to define the technical instructions for compiling a detailed Scope of Work in order to establish the reference environmental status or to carry out environmental monitoring of an onshore site.

This General Specification is the minimum standard required by Company. It should be adapted to each project in order to define a particular specification or Scope of Work.

Additional requirements from the local authorities shall be taken into account.

This General Specification defines the content of the study and its organization, progress, content of the different phases and deliverables.

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

Reference	Title
Rio Convention	Convention on Biological Diversity (United Nations, 1992)

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
GS EP ENV 001	Environmental requirements for projects design and E&P activities
GS EP ENV 011	Environmental specifications for onshore pipeline construction
GS EP ENV 112	Environmental Baseline and Monitoring Studies: Offshore and Nearshore sites
GS EP ENV 120	Environmental Impact Assessment of E&P activities
GS EP ENV 501	GIS deliverables for HSE
GS EP SDV 101	Social Baseline Study

3. Terms and definitions

For the purpose of this document, the following definitions apply:

Coastal area refers to a distance of a few hundred meters inland starting from the lowest low-tide point.

Nearshore or coastal water: in the absence of more stringent local regulations, nearshore or coastal water starts from the lowest low-tide point and extends up to 3 nautical miles towards the sea.

Onshore or terrestrial means on land.

Offshore means situated at sea some distance from the shore and beyond the 3 nautical mile coastal water limit.

The **sensitivity** is the degree to which a **system** may be affected, directly or indirectly, by a perturbation (i.e. potential consequences based on its intrinsic physical, biological and socio-economic characteristics).

System includes areas with ecological or economical importance, such as protected areas or sensitive ecosystems such as mangroves, peat bogs, fishing areas, areas of tourist interest, etc.

The **vulnerability** is the degree to which a **system** (ecologic, socio-economic) is susceptible to, or unable to cope with a perturbation. The vulnerability relies on the sensitivity of the **system**, on the nature, extent, rate of the perturbation, and on the capacity of the **system** to recover from the effects of the perturbation (also known as resilience).

For other definitions or acronyms, refer to Appendix 1 and [GS EP ENV 001](#).

4. Objectives of environmental baseline and monitoring studies

The objective of the Environmental Baseline Study (EBS) or reference status of an onshore site is to describe, before starting any new E&P project, the physic-chemical, biological and general socio-economical characteristics of the site and highlight its main sensitivities. Any existing pollution shall be identified and clearly assessed, in particular that which is related to oil industry activities. The EBS shall also provide an evaluation of the capacity of the disturbed environment for natural self-restoration.

The EBS includes both a bibliographic study and a field survey.

The EBS shall provide all the factual elements and parameters to support completion of an Environmental Impact Assessment (EIA) of the project to satisfy the [GS EP ENV 120](#) requirements.

The mapping of the sensitive areas should be used as the basis to develop an accidental spill prevention and intervention plan.

The objective of the Environmental Monitoring Study (EMoS) is to assess the site conditions at regular intervals during the operation phases or after the end of activities and to compare to the original reference status.

5. Responsibilities

The appointed Company Representative shall be approved by Company Headquarter HSEQ/ESSH/ENV.

The Company Representative is responsible for coordination between the parties involved:

- Company headquarter departments (HSEQ/ENV, HSEQ/SUR, LSO)
- The entity responsible for the Project.

- The affiliate HSE, Environment, Security, Logistics departments, and site RSES.
- The Contractor selected to carry out the study.
- Local Authorities and any International Organizations involved.
- Local community(ies) and associations.

The Company Representative is also responsible for:

- Adapting, if necessary, the scope of work or particular specification to the local conditions and to the characteristics of the project,
- Providing all in-house available information,
- Defining a tentative schedule and approving the final schedule of the study,
- Approving the choice of the logistics means, survey team and laboratory(ies) in charge of the analyses,
- Supervision of the field survey,
- Deciding on the final choice of survey routes, areas to be investigated and sampling locations,
- Approving methods and equipment for sampling, in situ analyses, storage, packaging and shipment to Laboratories,
- Deciding to analyze part or all of the samples recovered and approving methods for analysis,
- The validation of the Contractor's deliverables.

The Contractor is responsible for:

- Proposing a schedule for the study,
- Carrying out the bibliographic study,
- Proposing a preliminary sampling plan,
- Obtaining all the necessary authorizations from the Local Authorities,
- Ensuring at his own cost the health, safety and welfare of all personnel involved in the work ,
- Providing all the necessary equipment for the sampling campaign, and the certificates of conformity/calibration of the equipment,
- Providing the positioning equipment and ensuring it is in good working order during the entire survey duration,
- Carrying out the field survey,
- Selection of the accredited laboratory(ies),
- Performing the in situ and laboratory analyses, equipment calibration, and quality control,
- Ensuring full quality control for sample recovery, storage,

- Ensuring the correct packaging and shipment of samples and that samples are received in good condition by the selected laboratory(ies),
- The interpretation of the results,
- The deliverables and results integration in a GIS (Geographic Information System).

Excessive out-sourcing should be avoided but the Contractor may use dedicated external consultancies or scientists from institutes and specialist laboratories for detailed or special analyses with the agreement of Company.

Integration and participation of local personnel in the field team should be considered (Local Authorities representatives, scientists, experts, etc.) and the choice of participants shall be approved by Company.

6. Organization of the study

6.1 General content of the study

The study consists of:

- **A bibliographic study** of all available documents (previous studies, maps, remote sensing studies,...) in order to identify the specific concerns of the type of environment,
- **A field survey** ("ground truthing") in order to acquire the environmental and general socio-economic data necessary for the study, including in-situ analysis, taking pictures, collecting samples of the different representative media (soil, air, water) as well as the flora and fauna, ...
- **Laboratory analyses**,
- **An interpretation** of the results, field observations, in-situ and laboratory analyses, data from the bibliographic study...
- **Deliverables preparation** (production of a stand-alone document or in some cases limited to a section in the contents of the EIA).

6.2 Schedule

Company defines a tentative schedule including:

- The date of the contract award,
- The estimated date for start-up the study,
- The time required for the acquisition of bibliographic data,
- The time necessary for personal and equipment mobilization/demobilization,
- The estimated duration of the field survey and the administrative authorization,
- The dates for deliverables issues.

The survey duration is adapted to the specificity of the study. In some cases the field survey may need to be split in to several phases in order to take into consideration particular local situations (regulations, site access, climate, seasons, logistics, etc.).

The final schedule of the study is approved by the Company Representative before starting any work. Any change in the work to be done or schedule shall also be approved by the Company Representative.

6.3 Field survey organization

The following minimum information (as an information, a model form is provided in Appendix 2) shall be submitted by Contractor to the Company for approval, before the field survey mobilization, to help for the selection of the sampling locations and survey routes:

- A short description of the main characteristics of the concerned area (geography, meteorology, water resources, archaeology, protected areas, sensitivities,...),
- Valid maps, directly usable for the field survey,
- A proposal for the site study perimeter, route and sampling locations,
- A list of bibliographical references and local contacts.

During the field survey, the route and the investigated areas shall be plotted on maps on a daily basis and, if possible, in real time.

6.3.1 Field survey team

The personnel should include:

- From Company:
 - A Company Representative or mandatory expert,
 - One or several other project representatives (Optional).
- From Contractor (indicative list to be adapted according to the project and the specific characteristics of the site):
 - One senior Project manager,
 - Biologist(s), specialized in the type of environment concerned (desert, arctic region, tropical forests, etc.),
 - One hydrologist or hydro-geologist,
 - One archaeologist (in some countries the archaeologist should be registered/approved by the local Authorities).

Local experts (archaeologists, scientists, socio-economic, etc.), representatives from local Authorities or project partners may be integrated in the survey team on Company request or local authorities' requirements.

The role of the various participants shall be clearly defined, particularly for:

- Sampling decisions and procedures,
- Samples treatment, preservation and transportation,
- In situ analysis.

6.3.2 Logistics

Logistics strongly depend on the environmental context and local conditions.

Logistics, safety and security arrangements shall be submitted to Company for approval.

In areas of political instability or local conflict, team security arrangements shall be considered and approved by Company.

Any logistics used for personnel local transportation (helicopter, vehicles, planes...) shall be in accordance with Company safety requirements.

A short duration **helicopter (or small plane) survey** can be proposed for a preliminary survey of zones with particularly difficult access, with approved landing points for observation.

Logistics (accommodation, food) should be entrusted to approved local agencies (Tour Operator, oil logistics support Company) with a good knowledge of the area. Existing or temporary base camps can be used for accommodation.

In difficult access zones, surveys may be carried out by foot by competent person. Rock climbing or speleological survey details shall be submitted to Company for approval.

All access routes shall be selected in such a way as to preserve the environment (no land clearance, no use of mechanical bulldozers) and ensure employees' safety.

6.3.3 Equipment

Only equipment which has been properly calibrated and is in perfect working order shall be supplied by the Contractor. Its correct functioning shall be demonstrated in the presence of the Company Representative before the survey starts.

Any equipment modification shall be justified to and approved by the Company.

As an information, an indicative list of equipment is provided in Appendix 3. Spares shall be provided.

6.3.4 Samples collection, storage and transport

A record of each sample collected shall be established by the Contractor, with all useful details and information (number, date, time, sampling location, nature, description, measurements, etc.). It is checked and validated by the Company Representative (as information a typical record format is provided in Appendix 4).

On a case-by-case basis, it may be required to duplicate the samples to provide against any loss during transport or for Quality Control. Any duplicate samples shall be carefully identified.

The samples shall be conditioned (packaging shall be adapted to the type of analysis), kept in a cool box during the survey, clearly identified, and stored properly to avoid any disturbance or alteration during transport to the laboratory.

6.4 Laboratory(ies) selection

The Contractor shall provide all data concerning:

- References and certifications of the laboratory,
- Methods and norms used by the laboratory for analyses,

- Laboratory QA/QC procedures,
- Available laboratory equipment,
- Laboratory Personnel list with qualifications, specifically for detailed analyses such as benthic taxonomy...

Company reserves the right to audit the laboratory for validation.

All the samples collected shall be kept for at least three months by the Contractor after delivery of the final report and shall not be disposed of without Company formal approval.

6.5 Deliverables

Any information shall be provided in the geodetic system specified by Company in the particular specification.

The following deliverables shall be provided:

- **Daily report sheets,**
- **A Field Survey Report,** on completion of the field work before the demobilization of personnel and equipment,
- **Draft and Final EBS or EMoS reports** after completion of the survey and final analysis,
- **A Photo catalogue database,**
- **GIS Data and Project.**

The schedule and number of copies of the Reports shall be defined in the particular specification by Company.

In addition to classical paper print-out, reports, illustrations, maps, photos, analytical results, etc., shall be delivered in electronic format in:

- Word® for texts.
- Excel® for analyses results, tables and charts.
- ArcGIS® (compatible with ArcGis 9.2 version from ESRI) for maps and layouts.
- Photo catalogue database compatible with ArcGIS.

Electronic models provided by the Company shall be used.

6.5.1 Field reports

Daily report sheets (as an information a model is provided in Appendix 5) shall be prepared by the Contractor and based on the factual elements collected during the field survey (routes, access, noteworthy events, samples locations, observations, interviews, incidents, photos, videos, etc.) then checked and validated by the Company Representative.

Any particular event which could have an impact on the site status shall be duly recorded and taken into account (e.g. human activities, field exploration work such as seismic surveys, drilling operations, etc.).

After completion of the field survey the Contractor shall present the preliminary result to Company for comments.

The Field Survey Report shall include at least:

- The schedule and list of participants,
- A full description of equipment and methods used for sampling and observations,
- A synoptic chart of the samples taken (number, date, coordinates, description, etc.),
- A positioning map of the sampling stations and routes,
- A compilation of the daily report sheets, samples records, in-situ analytical results and interview recordings (attached in the appendix of the Field survey report),
- A preliminary interpretation of the survey.

6.5.2 EBS and EMoS reports

The typical report contents are detailed in Appendix 6.

The report shall give a synopsis of the different phases of the study, including the bibliographical study and field survey works description and also present the analyses results and their interpretation.

The report shall include an executive summary-conclusion. It shall be written in a clear concise style which is easily usable, with maps, charts, diagrams, graphics and significant photos.

The report shall include all the documentary elements, field survey and laboratory results.

The interpretation methods shall be clearly specified (statistical analysis, diagrams, graphics, etc.).

The various ecosystems shall be identified and located on maps.

Any soil or water contamination by pollutants shall be indicated, as well as the possible source of pollution.

Clear synoptic charts and thematic maps shall be provided (water resources, vegetation, archaeology, agriculture, local constraints, human and socio-economic aspects, etc.).

A global synoptic map shall detail the **sensitive** and **vulnerable** zones to pollution on which the impact study will focus.

All analyses results shall be provided using the Excel model provided by Company.

Recommendations, on the following points, shall be highlighted in the final report:

- Possible further investigations,
- Points to be examined in detail in the EIA,
- For a monitoring program with relevant biological indicators to be taken into consideration for future site bio-monitoring during operations.

A draft of the final report shall be submitted to the Company for comments and approval. After receipt of the comments of the Company, the Contractor shall revise the draft report accordingly.

6.5.3 Photo catalogue database

Photos shall be taken with equipment which ensures a good quality output for future publication.

The photo catalogue database, or as a minimum an Excel file, should include the following:

- Name of the photo and site location, GPS coordinates, azimuth, owner of the photo, date, short description and key words.

6.5.4 GIS deliverables

All maps and georeferenced data (sampling locations, results, observations,...) and interpretations (thematic maps, sensitivity maps,...) shall be provided under GIS format (according to the **GS EP ENV 501** requirements).

7. Bibliographic study content

The bibliographic study shall be based on the available documentation relating to the various disciplines involved and to the remote sensing studies.

The aim of this study is to provide information on site sensitivities, which shall be verified by the field survey (ground truthing).

It shall focus on the following key aspects:

- **Historical study of site activity:** pre-existing installations (including underground or adjacent), identification of any existing contamination of the site related to past or present industrial, or urban activity (mainly hydrocarbons and heavy metals),
- **Sensitive zones and protected areas:** any particularly sensitive zones shall be identified and located, and their vulnerability to pollutants shall be documented,
- **Climatology:** temperature, rainfall, frost and snow cover periods, winds,
- **Physical and geographical context, access:** landscapes, topography, roads, access to sensitive areas,...
- **Geology, pedology, geomorphology:** soil and rock types, structural context, neotectonic indices, mineral resources,
- **Hydrology, Hydrogeology:** hydrographic network, surface water (flow rates, river quality and objectives, existing contamination,...), catchment areas, water resources and vulnerability, water use (food, agriculture, washing, etc.),
- **Natural hazards:** seismicity, lack of ground stability, erosion, flooding, etc.,
- **Biological environment:** ecosystems, fauna, flora, biodiversity,
- **Socio economical general context:** population, density, economical activities, soil occupation, etc.,
- **Archeological general context.**

The results of this bibliographic study shall be synthesized and compared to the field survey results in the final report.