

GENERAL SPECIFICATION

Environment

GS EP ENV 112

Environmental Baseline and Monitoring Studies in Offshore and Coastal Waters

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1. Scope

The purpose of the present General Specification is to define the processes and requirements for conducting an environmental baseline study to establish the reference environmental status and for carrying out an environmental monitoring, offshore or in coastal waters.

Otherwise stipulated by the regulation, this General Specification is the **minimum standard** required by the Company. It should be adapted to each project in order to define a particular specification, or Scope of Work.

Additional requirements raised during early engagements with the authorities and other stakeholders can be considered.

This General Specification defines the content of the study and its organisation, 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
IPIECA	Sensitivity mapping for oil spill response, IPIECA/IMO/OGP, report Number 477, July 2012

Total General Specifications

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

Reference	Title
GS EP ENV 120	Environmental impact assessment of E&P activities
GS EP ENV 501	GIS deliverables for HSE
GS EP GEO 207	ROV Seabed Survey
GS EP LSO 140	Specifications for Aeroplane
GS EP LSO 141	Specifications for Helicopter
GS EP LSO 306	Selection and Operation of Dynamically Positioned Vessels
GS EP LSO 410	Manned underwater operations

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3. Terms and definitions

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

Baseline is a compilation and assessment of information on the natural environmental values occurring in the study area, their current condition, and trends before a project commences. The state against which potential changes due to a project are assessed, and during and after project execution change is measured.

Biodiversity is the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.

Biodiversity values are specific species, habitats or ecosystems, and ecosystem services occurring at a project site that may be included in a biodiversity baseline study. For example, biodiversity values at one project site might include game species that play an important nutritional role in the diets of local communities. At another site, biodiversity values might include rare habitats that occur in only a few places in the world.

Coastal waters start, in the absence of more stringent regulations, from the lowest low-tide point and extend up to 3 nautical miles out to sea.

Critical habitats are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species as listed on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species; (ii) habitat of significant importance to endemic and/or restricted range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

Ecosystem is a dynamic complex of plant, animal and micro-organism communities of species and their non-living environment interacting as a functional unit.

Ecosystem services are benefits people obtain from ecosystems including provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other non-material benefits.

Geographic Information System (GIS) is a set of components (hardware, software, data, users and methods) whose purpose is to process, manage, analyse and communicate geo-referenced information. The information is generally stored in databases, used to produce chart and map representations.

Habitat is the place or type of site where an organism or a population naturally occurs.

Irreplaceability of biodiversity values relates to the number of sites or the geographical extent where the value is present; if biodiversity value (e.g.: rare habitat type) occurs only at a few sites, then it is highly irreplaceable.

Monitoring is observing, checking and keeping a regular record.

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

Project Execution Plan (PEP) is a plan providing details for the execution of the field survey.

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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).

Species refers to the largest group of similar living organisms that are capable of mating and producing fertile offspring. Smaller groups of similar organisms that meet the same criteria may be referred to as populations, or sub-populations.

Study area is the project area of influence which corresponds to the geographic area of anticipated project activities and impacts. At an early stage of a project, it is notional and could evolve at a later stage during the Environmental Baseline Study and/or the Environmental Impact Assessment study.

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). Vulnerable biodiversity value is one that has experienced rapid loss over recent history and/or is faced by current threats that will lead to rapid loss.

The list of acronyms used in the present document is in Appendix 1.

4. Objectives of environmental baseline and monitoring studies

The objectives of the Environmental Baseline Study (EBS) are to describe the physico-chemical and biological characteristics of the study area and highlight its main sensitivities. Any existing contamination of the natural environment by pollutants shall be identified and clearly assessed, in particular that which is related to oil and gas industrial activities. The EBS shall contain the list of threatened species and those identified during field mission including invasive species. The EBS shall also provide an evaluation of the capacity of the disturbed environment for natural self-restoration and emphasise the influence of climate change on biodiversity.

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 EBS constitutes a reference status in case of any changes due to climate change, pollution or incidents occurring and caused by Company activities and/or by others.

The mapping of the sensitive areas should be used as a basis to identify location of sensitive ecosystems, trigger consideration of avoidance measures, prevent impacts to biodiversity values, to facilitate offsetting (i.e. implementing the “mitigation hierarchy”), and to assist in developing an accidental oil spill contingency plan and identifying appropriate targets for restoration.

The main objectives of the Environmental Monitoring Study (EMoS) are to assess the site conditions at regular intervals during and after any activity, to compare the results to the EBS, and measure the impacts of the activities and the effectiveness of the mitigation measures. It also aims to distinguish between impacts on the environment from climate change, alien invasive species or natural occurring events like El Niño and Company activities. All data shall be used to highlight ecological changes and potential trends in the ecosystem (degradation, improvement, recolonization, species changes in composition etc.).

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5. Responsibilities

5.1 Company Environment Project Leader

The Company Environment Project Leader is responsible for coordination between the parties involved (when applicable):

- Company headquarter entities,
- The entity responsible for the project,
- The affiliate (e.g.: HSE, Environment, Societal, Security, Operations, Drilling, Logistics departments, and site RSES),
- The Contractor selected to carry out the study,
- Authorities and any International/National Organisations involved,
- Local community(ies) and associations.

The Company Environment Project Leader is also responsible for:

- Ensuring that all in-house available information are provided,
- Ensuring other Company entities are involved as required (e.g.: Geomatics, LSO),
- Ensuring that Contractor proposed vessel and its equipments are approved by Company responsible entities (e.g.: LSO, HSE),
- Defining a tentative schedule and approving the final schedule of the study,
- Ensuring that the final survey plan is approved by the relevant internal and external authorities,
- Approving methods and equipment for sampling,
- Deciding to analyse part or all samples recovered and approving methods for analysis,
- Approving any change in the EBS scope and execution (e.g.: survey team, equipment and/or laboratory(ies) in charge of the analyses...),
- Reviewing and validating all the deliverables produced by the Contractor,
- Ensuring the number of copies of the reports is as per scope of work.

The Company Environment Project Leader can also be the Company Representative and/or RSES during the field survey.

5.2 Company Representative

The Company Representative is the person participating to the field survey and is responsible for:

- Liaising with the Company Environment Project Leader and RSES, when not the same person,
- Adapting in the field, if necessary, the scope of work or particular specification to the local conditions and to the characteristics of the project,

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- Participating in risk assessment,
- Supervising the field survey from the vessel,
- Liaising with other operators, whenever relevant,
- Ensuring compliance during the survey with the Project Execution Plan (PEP) and approving key field milestones,
- Checking the equipment certificates and conditions before leaving the port,
- Ensuring calibrations are performed before starting the sampling,
- Ensuring samples pre-treatments, storage, packaging and transport to laboratory are as per specifications,
- Ensuring Permit-To-Work are prepared and approved by Company,
- Ensuring respect of HSE rules during the field activities,
- Providing the day before, the 24h ahead planning to the RSES and the Company Environmental Project Leader and any other as agreed,
- Validating the Daily Survey Report (DSR) issued by the Contractor and sending it to the Company Environmental Project Leader and any other as agreed,
- Representing the Company during stakeholders' engagement during the survey, if required.

When the Company Representative is appointed RSES onboard the vessel, the Company Representative ensures that safety measures are taken into account before mobilisation and all resources are available to maintain safety level during the survey.

5.3 Contractor

The Contractor is responsible for:

- Appointing a team leader,
- Appointing a field survey team leader,
- Establishing a detailed program of activities, including but not limited to a kick-off meeting, progress weekly meetings, field survey activities, debriefing meeting and a final meeting and getting it approved by the Company Environment Project Leader,
- Organising and leading meetings as appropriate,
- Preparing Minutes of Meeting (Kick-Off meeting; progress meetings; debriefing meeting, etc.) and Daily Survey Report (DSR),
- Carrying out the bibliographic study and satellite imagery interpretation as required,
- Developing a Project Execution Plan (PEP) and getting it approved by the Company Environment Project Leader,
- Inputting and/or developing a bridging document with Company,
- Conducting a Hazard Identification (Hazid) with Company before mobilisation,

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- Conducting Job Risk Assessment with Company before mobilisation,
- Conducting a Simultaneous Operations / Combined Operations (SIMOPS/COMOPS) risk assessment with Company before mobilisation when in brownfield,
- Preparing Permit-To-Work (PTW) as per Company procedure,
- Obtaining all the necessary authorisations from the Authorities for conducting the survey,
- Submitting logistics, safety and security arrangements to Company for approval,
- Providing appropriate Personal Protective Equipment (PPE) compliant with Company standards and ensuring they are worn during survey,
- Identifying a suitable survey vessel, OVID audited, if required by Company and contracting it if approved by Company,
- Ensuring the vessel is equipped with the adequate lifting gears to handle the *in situ* measurement / sampling equipments / video camera devices, appropriate to the water depth and anticipated metocean conditions,
- Providing all the equipment necessary for the field survey, along with their certificates of conformity/calibration, appropriate to the water depth and anticipated metocean conditions,
- Providing valid calibration certificates for all lifting gears before mobilisation in country,
- Ensuring Contractor's field survey team members have attended appropriate trainings to conduct the work (e.g.: first aid, sea survival, BOSIET (OPITO / STCW95 or equivalent), H₂S, PTW, chemical handling, waste management, etc. When relevant),
- Providing the most recent valid HSE training matrix of all of its field survey team members to Company,
- Ensuring the field survey team members are fully informed about the HSE procedures,
- Respect of HSE applicable rules during the field survey,
- Carrying out the field survey,
- Ensuring at its own cost the accommodation, food, health, safety, welfare of all personnel involved in the survey on the vessel when onshore if required by Company,
- Adapting, where necessary, the scope of work to the local conditions and the characteristics of the Project with Company's approval,
- Preparing the 24h ahead planning during the whole field survey period (from mobilisation to demobilisation),
- Selecting the accredited laboratory(ies),
- Performing the *in situ* and laboratory analyses and quality control,
- Ensuring full quality control for samples recovery, storage, equipment calibration,
- Ensuring the correct packaging and shipment of samples and that samples are received in good condition by the selected laboratory(ies),

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- Ensuring samples are received by laboratories within the samples holding time given in PEP (i.e.: degradation period),
- The interpretation of the results,
- Attending meetings with Company and stakeholders, if required,
- Integrating all results in a GIS (Geographic Information System),
- Producing all the deliverables,
- Performing the QA/QC of all deliverables before submission to Company,
- Respecting the regulations regarding the right to reproduce documents and preserving the confidential nature of certain documents; in this respect Contractor shall be bound by professional secrecy,
- Obtaining approval from Company for involving any subcontracting party in the study, presentation or editing not specified in the contract,
- And smooth roll-out of the study.

Excessive outsourcing 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 before survey mobilisation.

6. Management of the study

6.1 Steps involved

The study consists of the following steps:

1. **Desktop review** of all available documents (previous studies, maps, remote sensing studies, literature, web search data etc.) in order to characterise the environment within the study area and identify any specific concern or sensitivity. This assessment will be done whenever possible at regional and local scales. It will be used for the preparation of the field survey activities.
2. **Field survey(s)** in the study area including *in-situ* measurements, taking pictures, collecting samples of sediments and water for laboratory analyses and characterising biodiversity and associated ecosystem services (BES). A specific attention shall be paid to BES in areas that can be impacted by the project.
3. **Interpretation and reporting** of the results from field observations, *in-situ* and laboratory analyses and data from the desk-based assessment, with production of a stand-alone EBS document* or EMoS report.

Note: * Future monitoring is discussed in the final report to allow verification of the accuracy of predicted impacts and risks to the environment posed by the project, and verification of the predicted effectiveness of environmental mitigation measures implemented and supporting changes in the environmental management actions.

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6.2 Schedule

Company defines a tentative schedule including:

- The date of the contract award,
- The estimated date for start-up the study,
- The periodicity of progress meetings,
- The time required for the acquisition of bibliographic data,
- The time necessary for personal and equipment mobilisation/demobilisation,
- The estimated duration of the field survey and the administrative authorisation,
- The dates for deliverables issues.

Contractor proposes a detailed schedule where changes can be suggested but Contractor must ensure that final deliverables shall be delivered no later than the date defined by Company and it must be approved by Company.

The survey duration shall be 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...).

The survey shall be organised in order to characterise the ecological sensitivity of the environment for the period of the year when the planned activities will take place.

The final schedule of the study shall be approved by the Company Environment Project Leader. Any change in the work to be done or the schedule shall also be documented and approved by the Company Environment Project Leader.

6.3 Field survey organisation

6.3.1 HSE aspects

For the preparation of the field survey activities, Contractor shall:

- Prepare a Project Execution Plan (PEP),
- Perform a dropped object study to anticipate potential drift of the sampling tools in the water column, if activities takes place in a brown field or area where subsea facilities are present (e.g.: IT cables) and include it in the PEP to adapt sampling procedures accordingly,
- When sampling in a brownfield with stations within 500 m safety distance from surface, facilities, 250 m from subsea facilities, or otherwise indicated by regulators/operators/owner, locations shall be agreed with Company Operations entities,
- Develop a HSE bridging document together with Company and all of the Contractors participating to the survey,
- Conduct risk assessment meetings with Company, the vessel master's representative and any other key participants. Those meetings will include: Hazid and Job Risk Assessment as well as SIMOPS/COMOPS if in brownfield,

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- Prepare a Chance Find procedure to manage any archaeological discovery whenever archaeology is a subject identified during the desktop phase or emphasised by the authorities in order to allow Company to have it approved by the authorities before the survey start,
- Agree with Company on the permit-to-work (PTW) to be implemented during the survey,
- Verify that its Personal Protective Equipments (PPE) are in line with Company standards and operational constraints (e.g.: if presence of H₂S),
- Obtain all licenses needed to operate in the country waters prior to the vessel mobilisation,
- Ensure that its survey team follows the HSE induction done by Company if in brownfield,
- Conduct and document before any new shift or when working conditions have been / have to be modified a toolbox talk to ensure that everyone understands the nature of the task, the associated hazards, their roles and responsibilities.
- When diving is necessary for the survey, detailed plans shall be submitted to Company for approval. Procedures shall be in compliance with **GS EP LSO 410**.

Once mobilised on the vessel, Company and Contractor shall hold a pre-job meeting with the entire vessel crew and survey team members before sailing.

A Daily Survey Report (DSR) shall be produced by the Contractor and approved by the Company Representative before distributing it to the agreed key personnel list.

If chemicals have to be used, Contractor shall provide all of the Material Safety Data Sheet (MSDS) to Company and vessel's owner prior to the mobilisation and ensure MSDS are available on board the vessel. Contractor shall also develop a prevention of chemical risks procedure in the PEP and provide adequate PPE.

An HSE inspection will be conducted by Company before sailing offshore or before mobilisation. An indicative list of criteria to be checked is given in Appendix 2.

6.3.2 Field survey team(s)

The field survey team(s) shall be adapted to the scope of work and HSE risks. It includes:

- Company:
 - A Company Representative,
 - Additional representatives (Optional).
- Contractor (indicative list to be adapted according to the EBS/EMoS and the specific characteristics of the site):
 - One senior manager,
 - Experienced marine biologist(s), such as corals/birds/etc. Specialists, Marine Mammals Observers (MMOs) and Passive Acoustic Monitoring (PAM) operators when required,
 - One engineer or technician specialised in marine physico-chemistry and sedimentology (who may be the same person as the marine biologist),
 - Technician(s) experienced in handling lifting equipments,

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- Technician(s) specialised in underwater video / still photographs recording (who may be the same person as the marine biologist).

When working on a 24/24h basis, the survey team shall be organised by adequate shifts in line with the regulation.

Local experts, representatives from local authorities or project's stakeholders may be integrated in the survey team on Company request or local authorities' requirements.

The role of the various participants shall be clearly defined especially regarding:

- Sampling decisions and procedures,
- Samples treatment, preservation, packaging and transportation,
- *In situ* sea water and sediment measurements/observations, and,
- Handling of equipments,
- Biodiversity records.

6.3.3 Logistics

Any logistics used for the survey including helicopter, airplanes, marine vessels shall be in accordance with Company requirements (GS EP LSO 140, GS EP LSO 141, GS EP LSO 306) and shall be accepted by Company before mobilisation.

The marine survey vessel is proposed by the Contractor according to the bathymetric, sea and weather conditions prevailing in the zone to be investigated and the accuracy of station keeping required according to survey scope and equipment. Unless required by Company, the need for a DP system shall be justified.

Contractor shall ensure that any vessel(s) used or chartered for the performance of the work hereunder shall be free from any legal, contractual or other restriction preventing it from operation in those areas required under the terms of the contract.

Vessel owner/operator will be responsible of registering his vessel(s) into the OVID electronic database, to fill in and update the online particulars questionnaire, and to review/comment on-line the inspection report after the inspection.

The vessel shall have all the equipment and material on board to ensure the safety of all personnel in accordance with regulation and Company requirements. This equipment shall be checked to ensure good working order.

In case of coastal waters survey, one or several small vessel(s) for accessing shallow water depths and berthing on the shore will be used. The boats will be fitted for purpose; attention shall be paid to sun or rain protection and safety onboard.

The minimum requirement for the vessels is listed in Appendix 3, but Company reserves the right to impose modifications in the particular specification.

A short duration aerial survey can be suggested for a preliminary survey of *coastal waters* particularly when difficult access, with approved landing points for observation.

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6.3.4 Equipment

The Contractor shall provide all survey equipment and spares required to perform the survey and shall ensure that they are in good operating conditions, clean and calibrated prior to the start of the survey.

The Contractor shall commit to provide valid lifting gear certificates and colour code once contract is awarded together with a comprehensive list of those gears (including shackles).

Any modification or additional material shall be justified and approved by Company.

The equipment required for the survey shall be adapted to the scope. An indicative list of equipment is proposed in Appendix 4. Spare shall be considered for any key equipment.

During the survey, a defect report shall be issued for any survey equipment failure.

6.3.5 Positioning

6.3.5.1 Real-time DGPS

The use of differential GPS, as a stand-alone positioning system, may be required to facilitate positioning of the underwater equipment. An absolute accuracy of better than ± 1 m is then required for survey operations.

6.3.5.2 USBL positioning

When sampling in browfield and/or in water depths greater than 300 m, a USBL positioning system shall be integrated in the primary positioning system in order to locate continuously any underwater equipments. An absolute accuracy of better than ± 1 m is required.

Otherwise if not required by the regulators, the use of USBL positioning system is decided on a case by case basis.

6.3.5.3 Drift acceptance limit

When dropping the *in situ* measurements and sampling equipments into shallow waters, Company accepts a maximum radius drift of 5 m of the total water depth from the original sampling location given in the Project Execution Plan (PEP). In deeper depth (greater than 300 m), it shall not exceed 25 m.

6.3.6 Underwater photo and video

Underwater photos and videos shall be acquired with either following options depending on the characteristics of the ecosystems (sea bed, depth, etc...) :

- a camera system mounted within a purpose-built camera frame with one high resolution video camera, one stills camera, a separate strobe and LED lights (except for stations with safety restrictions),
- a camera system fitted on a Remote Operated Vehicle (ROV),
- a camera system handheld by divers.

A scale bar shall be set up with colour banding at regular intervals to provide a scale and a colour reference. The cameras shall be low light, high resolution type and colour with a wide-angle lens. System shall be mounted such that it can be lowered to give an optimal view of the seabed during the survey.