

GENERAL SPECIFICATION

ENVIRONMENT

GS EP ENV 055

Preliminary assessment of environmental and health risks related to chronic emissions on operated sites

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1. Scope

This specification defines the mandatory methodology for identification and preliminary assessment of environmental and health risks related to chronic chemical emissions from activities on sites operated by E&P.

1.1 Field of application

This General Specification is applicable to all operated entities in the E&P branch. It covers onshore sites in operation (active) and non-operational (passive) sites that may contain historical pollution sources.

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 addendums, is the latest revision published at the effective date of this document.

Reference	Title
IPIECA Operations good practice series 2014	Management and remediation of sites in the petroleum industry
Directive n° 2013/39/EU of 12/08/13	Directive modifying directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy
Document CE # C(2010) 9369	Technical Guidelines for the identification of mixing zones pursuant to Art. 4(4) of the Directive 2008/105/EC

Total General Specifications

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

Reference	Title
GS EP ENV 111	Environmental baseline and monitoring studies: Onshore Sites
GS EP ENV 501	GIS deliverables for HSE
GS EP SAF 041	Technological risk assessment methodology

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3. Definitions

For purposes of this document, the following terms and definitions are applicable:

- **Active source:** any industrial unit in operation that may generate chronic pollutant emission into the environment.
- **ALARP:** (As low as Reasonably Practicable) risk reduced to a level at which further reduction measures become unreasonably disproportionate to the additional risk reduction obtained.
- **Chronic emission:** any continuous or intermittent pollutant emission into the environment from active or passive sources, excluding accidental emissions.
- **Conceptual model:** according to the "source – vector – target" concept, this is an overall view of the sources, pollutants, and vectors on a site and protection issues (populations and environmental context).
- **EQS:** Environmental quality standards in the field of water policy ([Directive n° 2013/39/EU](#))
- **GHS:** United Nations Globally Harmonized System of classification and labelling of chemicals.
- **Groundwater:** any natural, permanent or temporary, dynamic or static groundwater system.
- **Mixing zone:** limited zone near the discharge point in surface water, where pollutant concentrations may exceed the EQS. This zone does not affect the compliance of the rest of the body of water with the EQS ([Document CE # C\(2010\) 9369](#)).
- **Passive source:** any non-operating industrial unit or historical pollution that may generate chronic pollutant emission into the environment.
- **PM10:** particles in suspension in air, with an aerodynamic diameter of less than 10 microns (inhalable).
- **PM2.5:** particles in suspension in air, with an aerodynamic diameter of less than 2.5 microns, known as "very fine and ultrafine particles" (penetrate the lung alveoli).
- **Pollutant:** chemicals, particles/aerosols, and PM10 and PM2.5 particulates
- **Sensitive ecosystem:** (Valued Ecosystem (VEC), as described in [GS EP SAF 041](#)); Ecosystem, animal or plant species that are considered significant in term of size, sensitivity and being potentially at risk and therefore selected for chronic risk analysis.
- **Sensitivity:** degree of direct or indirect disturbance of a population or ecosystem subjected to a given contamination; the potential consequences depend on physicochemical, biological, and socioeconomic factors.
- **Significant risk:** risk that is unacceptable or not demonstrated as ALARP according to the criteria of the Chronic Risk Preliminary Assessment (CRPA)
- **Surface water:** any natural water system on the surface, onshore or nearshore, permanent or temporary, dynamic or static (stream, river, estuary, wetland, lake, lagoon, mangrove, etc.).

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4. Introduction

The environmental and health risks related to chronic emissions from activities on sites operated by E&P shall be identified and assessed and a plan for managing these risks shall be implemented and monitored, in keeping with the conclusions of the assessment.

This General Specification defines the graduated methodological approach to analysing environmental and health risks due to chronic chemical emissions from an operated onshore site.

The following aspects are not covered:

- Analysis of environmental and health risks related to accidental events (**GS EP SAF 041**)
- Response to accidental liquid hydrocarbon spills.
- Assessment of the environmental and health impacts of accidental liquid hydrocarbon spills.
- Exposure at work.
- Assessment of health and environmental issues related to onshore industrial asset acquisition (**GS EP ENV 111**).
- Environmental surveys in the context of site rehabilitation.

5. Chronic environmental and health risk analysis methodology

This methodology, based on the principles of the conceptual model (source-vector-target) ([IPIECA Operations good practice series, 2014](#)) consists of three phases:

1. Preliminary chronic environmental and health risk assessment (CRPA, *Chronic Risk Preliminary Assessment*)

This document deals with the inventory phase and initial risk analysis. It is generally conducted in-house.

It covers:

- Identification of active and passive sources on the site and pollutants emitted,
- Identification of vectors (air, soil, surface water, and groundwater),
- Identification of potential targets (environment and surrounding populations),
- Assessment of risk levels using a probability x consequences matrix.

2. Detailed chronic environmental and health risk assessment (CRDA, *Chronic Risk Detailed Assessment*)

This phase concerns sites where at least one significant risk was identified in the CRPA. A detailed analysis is then conducted by a consultant specialised in confirming and quantifying these risks. Guidelines and references for this second phase are included in this document.

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3. Setting up a corrective action and emission monitoring plan

Depending on the conclusions of the detailed analysis, this phase is implemented in-house or by a specialised consultant. Guidelines and references for this last phase are included in this document.

5.1 Chronic Risk Preliminary Assessment (CRPA)

The objective of the preliminary assessment is to inventory and classify the potential chronic contamination sources according to their risk level and define the necessary corrective actions.

The analysis is conducted once the emission sources, pollutants, vectors, and potential targets have been identified.

The following factors from the analysis are taken into account:

- the quantity of product potentially emitted,
- the intrinsic hazardousness of the product,
- the sensitivity of the potential target,
- factors likely to exacerbate or attenuate the impact on the target.

For a given risk, these elements are used to estimate a **probability of occurrence**, as well as the impact and **severity of the consequences**.

The 5x5 technological risk assessment matrix (**GS EP SAF 041**) does not cover the "minor" severity or "isolated" probability categories. Actions aimed at reducing chronic risks are, therefore, defined according to the risk level determined by the 6x6 matrix below.

			Severity of the consequences					
			Minor	Moderate	Serious	Very serious	Catastrophic	Disastrous
			1	2	3	4	5	6
Probability of occurrence	Very probable > 10 ⁻¹	6				LEVEL 1		
	Probable 10 ⁻¹ - 10 ⁻²	5						
	Unlikely 10 ⁻² - 10 ⁻³	4	LEVEL 2					
	Very unlikely 10 ⁻³ - 10 ⁻⁴	3						
	Extremely unlikely 10 ⁻⁴ - 10 ⁻⁵	2	LEVEL 3					
	Isolated < 10 ⁻⁵	1						

Three risk levels are identified:

- **Level 1: unacceptable risk** to be obligatorily reduced to level 2 or 3.

Actions:

- implement temporary protective measures immediately in case of emergency
- conduct a detailed analysis
- take steps to reduce the risk to level 2 or 3 (e.g. set up monitoring of the source by installing a fixed, regular sampling and measuring system, and/or reducing the emissions at source, and/or eliminating the source, and/or site remediation).

- **Level 2: tolerable risk if demonstrated to be ALARP.**

Actions:

- ALARP demonstration study (GS EP SAF 041)
- conduct a detailed assessment then work to achieve an ALARP level (e.g. set up monitoring of the source by installing a fixed, regular sampling and measuring system, and/or reducing the emissions at source, and/or eliminating the source, and/or site remediation).

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- **Level 3: acceptable risk**, as the potential impacts are insignificant or controlled by existing measures and continuous improvement of the HSE management system.

Action:

- set up or maintain simplified, regular monitoring

5.1.1 Identify sources, pollutants, vectors and potential targets

5.1.1.1 Identify on-site emission sources and pollutants

It is important to document the emissions from industrial facilities in the vicinity of the site as accurately as possible to distinguish the impact of the site on its surroundings.

This first stage is based on document analysis and requires on-site verification.

It includes active as well as passive sources and those related to historical pollution (drilling mud pits, contaminated soil/aquifers, old underground structures, etc.).

The objectives are as follows:

- inventory potential sources of pollutant emissions,
- inventory all categories of point-source and fugitive discharges (gas, liquid, solid) as exhaustively as possible,
- qualitative characterisation of the emissions (chemicals, particles/aerosols, PM10 and PM2.5 particulates),

In particular, the following are consulted:

- baseline survey data (EBS, EIA, etc.)
- description of the initial design of the facilities and the various updates (*P&ID, "Piping/Process & Instrumentation Diagram"*)
- documents describing production processes,
- process and monitoring data,
- regular discharge reports (internal environmental reporting or regulatory reporting to the authorities),
- information on historical pollution.

5.1.1.2 Identify vectors and estimate flows

All vectors are considered:

- Atmosphere
- Soil
- Surface water
- Aquifers

This stage includes estimating the quantities of pollutants emitted from the sources identified via each vector. The reference period for quantifying discharges may be the last annual report, the average over the past 5 years, the most representative year in normal operation, etc. Grounds shall be given for the choice.