

GENERAL SPECIFICATION

ENVIRONMENT

GS EP ENV 270

Deep well disposal

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1. Scope

1.1 Purpose of the specification

The purpose of the present specification is to define the requirements for protecting the environment applicable when designing and implementing deep well disposal of liquid effluents produced on oil and gas production installations.

1.2 Domains of application

1.2.1 Installations concerned

The present specification applies to disposal wells drilled at onshore production sites. It can also be adapted to offshore installations.

1.2.2 Type of effluents to be disposed of

The principal effluents concerned are production water (produced water and process water). To a lesser extent and in certain specific conditions, this means of disposal can be used for drainage water and chemical effluents or "dissolved contaminants".

2. Reference documents

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

The latest edition or update of the relevant documents at the time of the project will be used.

Regulations applicable to deep well disposal

The regulations of the country where the disposal well is to be drilled will be applied.

The in force legislation should be reviewed in order to determine the technical and administrative constraints to which this type of disposal is subject, in particular any regulatory reports to be submitted to the Authority in charge:

- Request for authorization prior to disposal
- Environmental impact assessment (EIA)
 - Onshore activities ([GS EP ENV 121](#))
 - Offshore activities ([GS EP ENV 122](#)).

If there are no local regulations in force, the disposal wells will be designed, drilled, and controlled according to the recommendations of French and/or European regulations.

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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
Not applicable	

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 121	Environmental impact assessment onshore activities (cancelled document)
GS EP ENV 122	Environmental impact assessment offshore activities (cancelled document)

3. Specifications regarding deep well disposal (injection or reinjection)

3.1 General remarks on the elimination of liquid effluents

Technical and environmental constraints relating to the elimination of production water are mainly governed by the ultimate destination of these effluents. Subsurface or deep well disposal, i.e. reinjection into the reservoir or injection into a deep geological layer is, together with discharge (disposal in surface water), one of the main methods for disposing of liquid effluents.

The required conditions to be fulfilled regarding authorization of discharge will be specific to each of the two solutions. Whereas, in the case of surface discharge, conditions will mainly concern the treatment of water, especially de-oiling and compliance with imposed disposal standards, in the case of injection into a deep layer, the main conditions to be fulfilled concern:

- Selection of the disposal zone (see § 3.2)
- Protection of fresh water aquifers

whence the present specifications for designing a disposal well (§ 3.3) and recommendations implied by the use of this type of well (§ 3.4).

3.2 Choice of injection site

3.2.1 Regional and local geology

Before running any other study regarding injection conditions at great depth, a good knowledge of the deep geology of the region must be acquired and a synthesis file established.

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The stratigraphic cross-section of the formations should be drawn giving the type of layer lithology and identifying the different cap rocks or impermeable formations, as well as all reservoirs or fresh or salt water aquifers.

3.2.2 Criteria for selecting the disposal zone

If there are no known stratigraphic or structural geological traps, or if it is not possible to reinject into the aquifer of the reservoir itself (see § 3.3.4), the reservoir selected for injection has to satisfy a certain number of criteria.

A receiving formation with good permeability must be found, limited by impervious layers to prevent any vertical displacement which could generate contamination of aquifers used for drinking water supply.

The reservoir should be selected on the basis of the ten following criteria:

- Uniformity of the reservoir
- Large horizontal extension
- Adequate thickness
- Sufficient depth
- High porosity and permeability
- Low injection pressure
- Salt water aquifer
- Insulation from the drinking water aquifers
- Good sealing properties of any wells existing in the vicinity
- Compatibility between the injected fluid and receiving zone.

3.2.2.1 Uniformity of the reservoir

The layer selected should be as continuous and homogeneous as possible, without any major lateral facies changes or faults.

3.2.2.2 Large horizontal extension

This characteristic is closely related to the above criterion.

3.2.2.3 Adequate thickness

The layer should have a thickness or height "h" of several dozen meters.

3.2.2.4 Injection at great depth

The injection zone should be a **deep reservoir**, lying, as far below the producing layer as possible so that injected fluids will not corrode the casing of producing wells.