



Exploration & Production

GENERAL SPECIFICATION

STRUCTURAL

GS STR 611

Determination of the location of an offshore terminal
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03	10/04	Added Appendix 4
02	11/03	Change of Group name and logo
01	10/02	Paragraph 3.6: revised required water depth
00	02/01	First issue
Rev.	Date	Notes



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1. Scope

This specification sets the minimum requirements, which are applicable to determine the location of an offshore oil terminal with respect to obstacles over and under the sea surface, offloading tankers size and manoeuvres.

Note: At first, determination of the location of an offshore oil terminal shall have been assessed with respect to the following considerations:

- Local meteo-oceano conditions and water depth
- Location of terminal relative to other petroleum installations
- Size of floating storage unit.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

Where national regulations exist, their provisions and those of the standards and codes to which they refer shall apply, supplementing or amending the provisions of this document.

If there are no national regulations covering all or part of the subject of this document, the reference documents shall be strictly applied, as supplemented by the provisions of this document.

Only the main reference documents are mentioned; the CONTRACTOR shall be responsible for complying with all secondary reference documents dealing with the subject of this document.

Standards

Reference	Title
Not applicable	

Professional Documents

Reference	Title
SOGREAH	First International Symposium on the Ship Approach and Landing Operations, 19/23 September 1977, Grenoble (France)

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	

Total General Specifications

The provisions of this document shall be applied in the light of the supplementary documents supplied by the OWNER, including:

- Country specificity appendices
- Job specification
- Data sheets
- Articles and conditions; list of tasks
- Quality assurance provisions.

Reference	Title
Not applicable	

3. Minimum requirements

Two main concepts of offshore oil terminals are considered according means of mooring offloading tankers they provide:

- Terminals based on Single Point Mooring (SPM)
- Terminals based on tandem mooring to Floating Storage Unit (FSU).

Determination of terminal location shall take into account the following considerations:

- Size of offloading tankers
- Surface obstacles nearby loading facilities
- Approach and mooring manoeuvres of offloading tankers
- Weathervaning of the offloading tankers around the SPM facilities (SPM based terminals) or weathervaning of FSU -offloading tanker- assistance tug around the FSU anchoring facilities (tandem mooring based terminals)
- Sail away manoeuvres of offloading tankers
- Emergency withdrawal manoeuvres of offloading tankers
- Underwater obstacles.

Three types of zones are defined as follows (see Appendix 1, Appendix 2, and Appendix 3).

3.1 Free manoeuvring zone (type 1 zone)

The zone 1 covers:

- The area where offloading tankers weathervane around the SPM facilities (SPM based terminals) or the area where FSU -offloading tanker- assistance tug weathervane around the FSU anchoring facilities (tandem mooring based terminals)
- The area necessary to offloading tankers for mooring and sail away manoeuvres.

This zone shall be free of any obstacle.

The type 1 zone is defined as a circle centred on the offloading tankers mooring point (SPM based terminals) or on the anchoring point of the FSU (tandem mooring based terminals), one nautical mile (1852 metres) minimum radius.

This radius can be reduced according to equipment of offloading tankers (bow thrusters, variable pitch propeller, etc.), number of tugs or support vessels available on the site for mooring operations and local meteo-oceano conditions.

3.2 Additional manoeuvring zone (type 2 zone)

The type 2 zone provides an extension of the free manoeuvring zone in the situation where a surface obstacle is in the axis of the FSU and thus in the approach heading of the offloading tanker; this additional zone allows, in this particular situation, the offloading tanker to ensure its manoeuvres, at a safe distance from the obstacle.

The type 2 zone is defined as a circle centered as shown in Appendix 2, 150 metres radius.

This radius can be reduced according to equipment of offloading tankers (bow thrusters, variable pitch propeller, etc.), number of tugs or support vessels available on the site for mooring operations and local meteo-oceano conditions.

3.3 Surface obstacles nearby the loading facilities (type 3 zone)

Surface obstacles are permanent petroleum installations, platforms or barges, located nearby the loading facilities.

The offloading tankers shall never sail or manoeuvre at a distance lower than 0.5 nautical mile (926 metres) from these obstacles.

The type 3 zone is defined as a circle centred on a surface obstacle, 0.5 nautical mile (926 metres) radius.

This radius can be reduced according to equipment of offloading tankers (bow thrusters, variable pitch propeller, etc.), number of tugs or support vessels available on the site for mooring operations and local meteo-oceano conditions.

3.4 Emergency withdrawal of offloading tankers and safety distance

Approach and mooring manoeuvres of offloading tankers as well as loading operations can be interrupted for emergency considerations, and subsequently lead to an emergency withdrawal of the offloading tanker, among them:

- Oceano-meteo conditions more severe than those specified for mooring or loading operations
- Breakdown of the offloading tanker engine during approach, loading or sail away manoeuvres
- Breakdown of the offloading tanker steering system during approach, loading or sail away manoeuvres
- Break down of the mooring line
- Fire on the offloading tanker
- Fire on the FSU.

As a result, safety distances relative to surface obstacles shall be considered in order to allow offloading tankers to withdraw safely with the assistance of a tug; these minimum safety distances are as follows:

- $d = 2700$ metres, distance between the offloading tanker anchoring point and any surface obstacle, for SPM based terminals

or

- $d = 3000$ metres, distance between the FSU anchoring point and any surface obstacle, for tandem mooring based terminals (cf. Appendix 3)
- $d_1 = 300$ metres, minimum distance between offloading tanker - tug and any surface obstacle.

Distance d can be reduced according to number of tugs or support vessels available on the site to assist offloading tankers and local meteo-oceano conditions.

3.5 Underwater obstacles

These obstacles are subsea installations such as subsea wellheads, templates or stations, rigid and flexible sealines, PLEM's, electric cables, umbilicals.

The free operating zone (zone 1) shall be clear of any of these underwater obstacles excepted the lines necessary for the terminal operation.

3.6 Required water depth

The minimum required water depth, H_m , depends on:

- Offloading tankers maximum draft
- Amplitude of motions induced by maximum waves and swell specified for mooring and/or loading operations

- Draft clearance (ref. figure N 5)

H_m: Minimum required water depth relative to LAT (Lowest Astronomical Tide)

T_E: Maximum offloading tankers draft

Z_p: Maximum vertical amplitude of offloading tankers resulting from heave, pitch and roll motions

H_o: Height of seafloor above seafloor or height of any other obstacle necessary for the terminal operation

P_p: Draft clearance

$$H_m = T_E + 1.2 Z_p + H_o + P_p$$

$$P_p = \frac{2T_E}{10} \quad \text{in open sea}$$

$$P_p = \frac{1,5T_E}{10} \quad \text{in sheltered area}$$

$$P_p = \frac{T_E}{10} \quad \text{in harbour}$$

This minimum water depth is required over the entire zone 1 as defined in paragraph 3.1.

Appendix 1 Terminal location

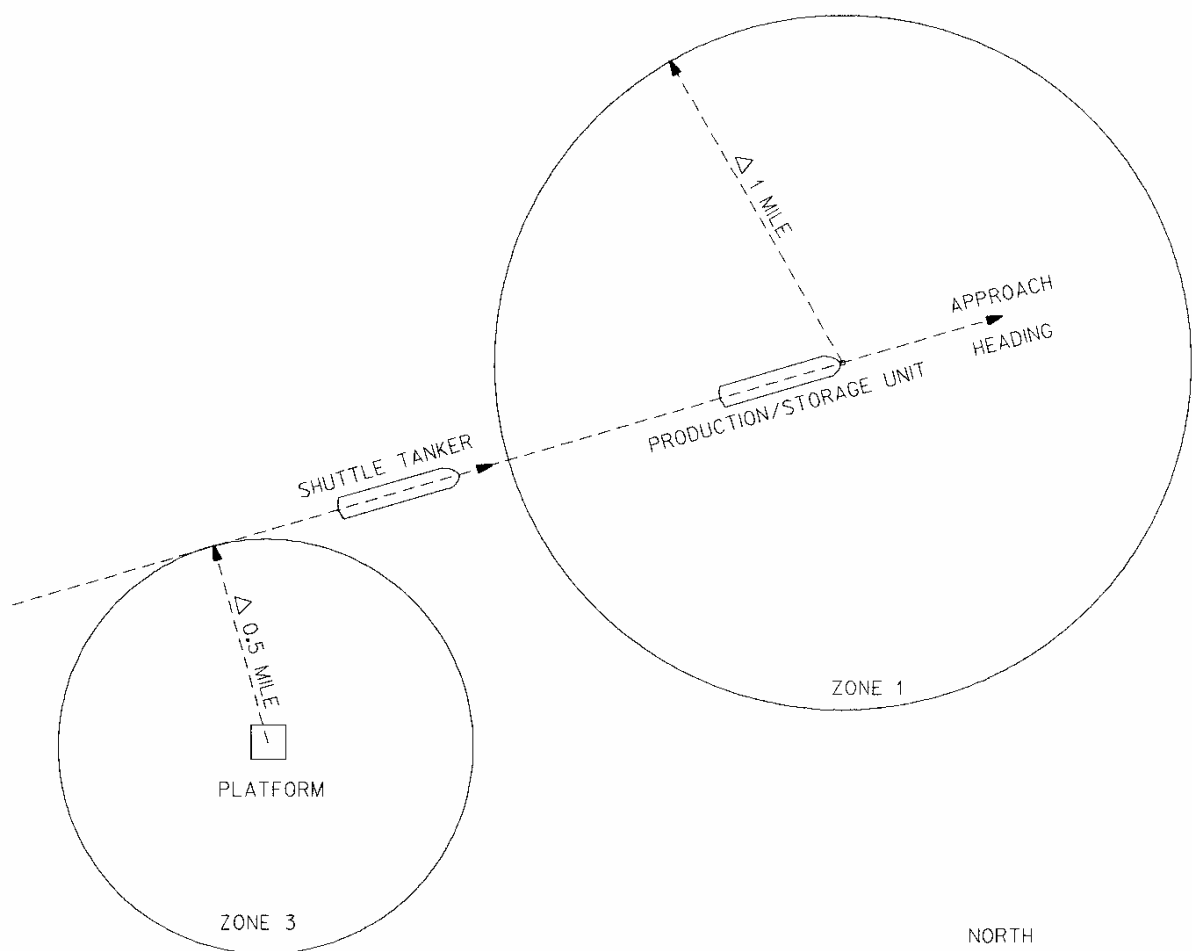
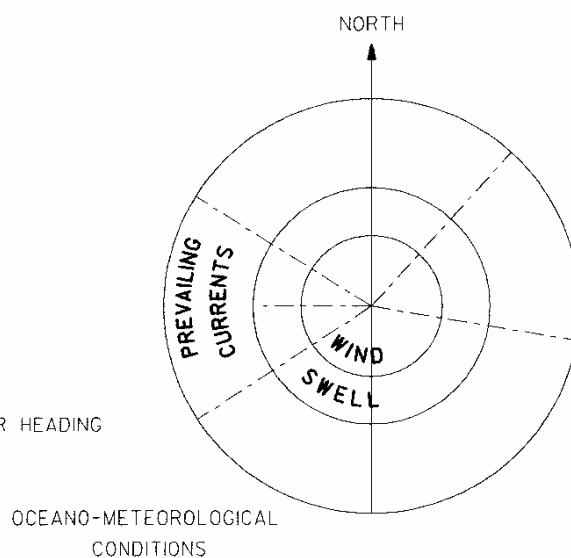


FIGURE N°2
TERMINAL LOCATION

LIMIT CASE : THE PRODUCTION/STORAGE UNIT TANKER HEADING
IS TANGENT TO THE PLATFORM SAFETY ZONE



Appendix 2 Terminal location

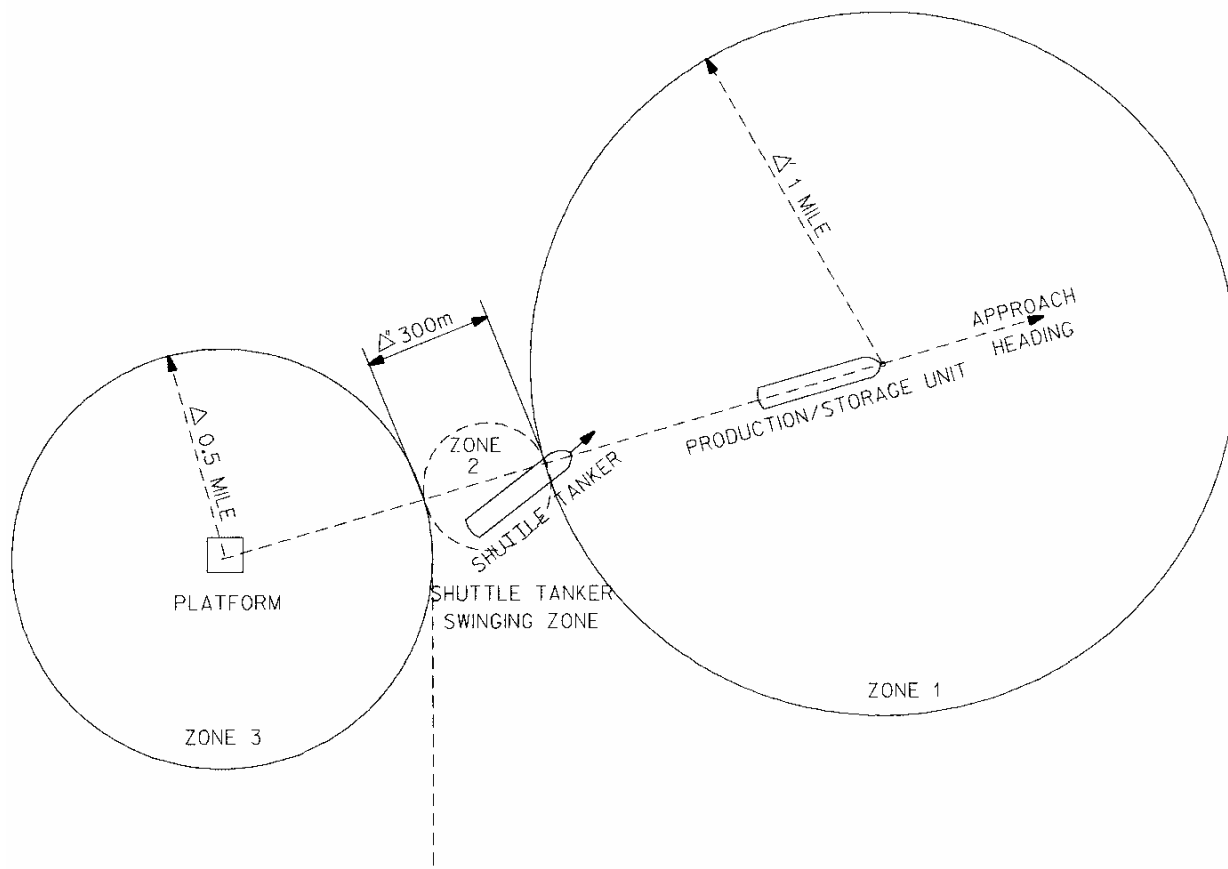


FIGURE N°2A
TERMINAL LOCATION

LIMIT CASE : THE PRODUCTION/STORAGE UNIT HEADING CROSSES THE PLATFORM CENTER
- A SHUTTLE TANKER MANOEUVERING ZONE OF AT LEAST
300 M IN DIAMETRE BETWEEN ZONE 1 AND ZONE 3 MUST BE ARRANGED

Appendix 3 Terminal location

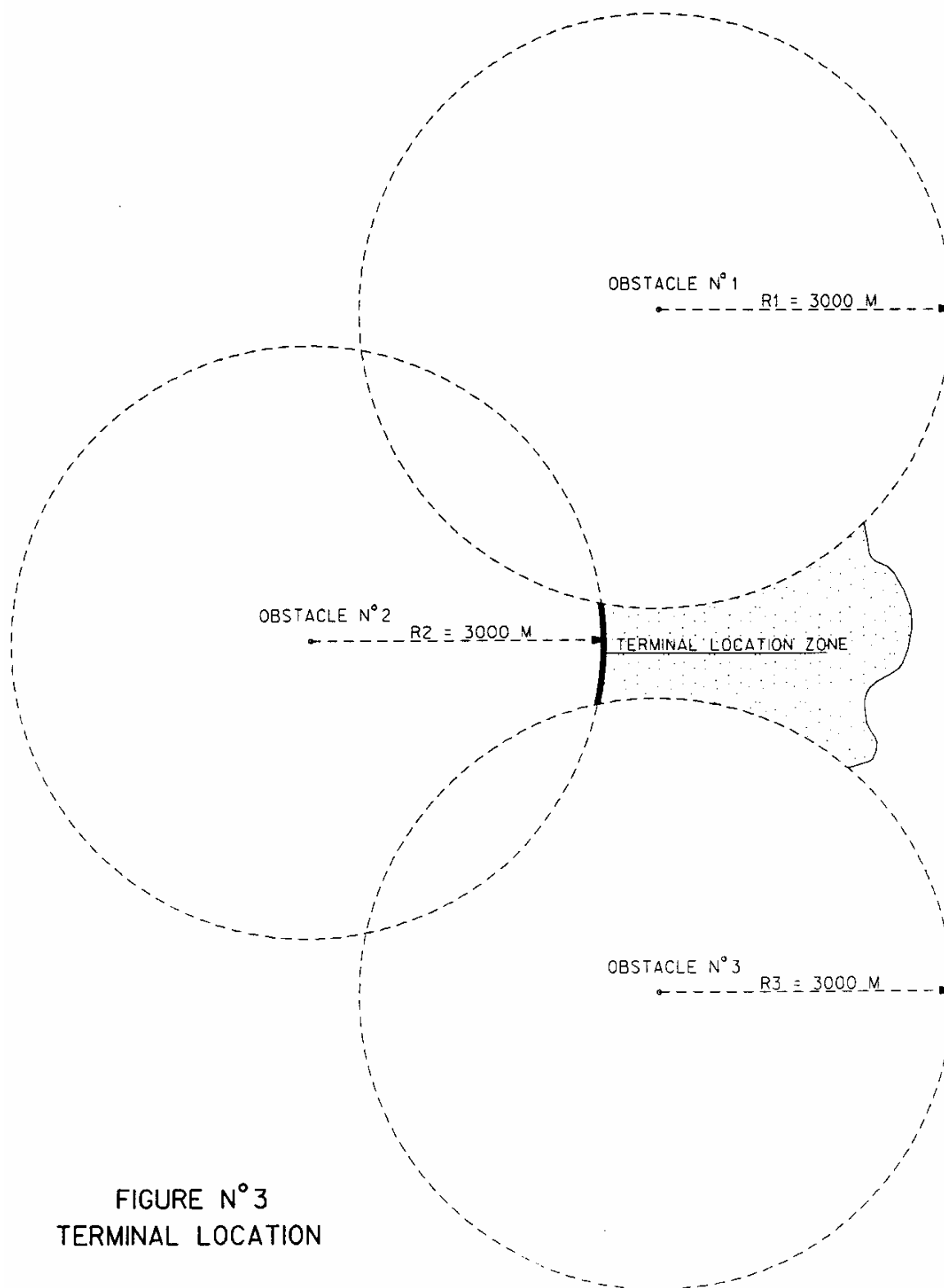


FIGURE N°3
TERMINAL LOCATION

Appendix 4 Terminal water depths

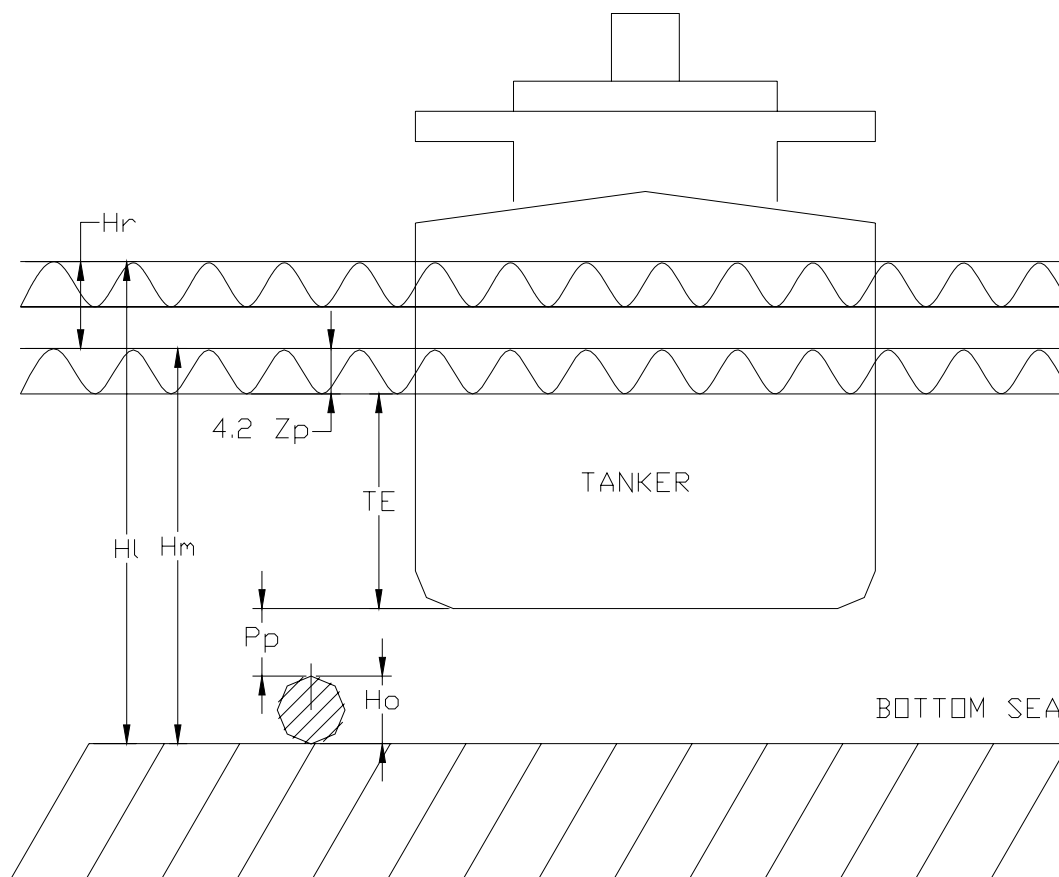


FIGURE N°5
TERMINAL WATER DEPTHS