ISO 19901-10:2021 (E)

Petroleum and natural gas industries — Specific requirements for offshore structures — Part 10: Marine geophysical investigations

Contents

Foreword

Introduction

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 Symbols and abbreviated terms
 - 4.1 Symbols
 - 4.2 Abbreviated terms

5 Objectives, planning, and quality management

- 5.1 General
- 5.1.1 Objectives and project specifications
- 5.1.2 Georeferencing and GIS
- 5.1.3 Ground model
- 5.2 Desk study
- 5.2.1 General
- 5.2.2 Use of exploration 2D and 3D seismic data in a desk study
- 5.2.3 Desk study for pre-drilling well-site investigations
- 5.3 Scoping and planning
- 5.3.1 General
- 5.3.2 Scoping of seafloor mapping and sub-seafloor mapping
- 5.3.2.1 General
- 5.3.2.2 Reconnaissance seafloor mapping
- 5.3.2.3 Engineering seafloor mapping
- 5.3.2.4 Detailed engineering seafloor mapping
- 5.3.2.5 Reconnaissance sub-seafloor mapping
- 5.3.2.6 Engineering sub-seafloor mapping
- 5.3.2.7 Detailed engineering sub-seafloor mapping
- 5.3.2.8 Pre-drilling well-site investigation seafloor and sub-seafloor mapping
- 5.4 Operations planning and data quality management
- 5.4.1 Quality plan
- 5.4.2 Effects of attenuation
- 5.4.3 Data quality management

Positioning

6

- 6.1 General
- 6.2 Coordinate reference systems
- 6.2.1 Horizontal coordinate reference system
- 6.2.2 Vertical coordinate reference system
- 6.3 Surface positioning requirements
- 6.4 Vessel heading
- 6.4.1 General
- 6.4.2 Gyro compass
- 6.4.3 GNSS based heading reference
- 6.4.4 Alignment
- 6.5 Sub-sea positioning Ultra-short baseline system
- 6.6 Inertial navigation system
- 6.7 Auxiliary sensor: doppler velocity log

- 6.8 Auxiliary sensor: altimeter
- 6.9 Auxiliary sensor: pressure-depth sensor

7 Seafloor mapping

- 7.1 General
- 7.2 Instrumentation and acquisition parameters
- 7.2.1 Multi-beam echo sounder
- 7.2.1.1 General
- 7.2.1.2 Sub-sea vehicle-mounted MBES
- 7.2.1.3 Vessel-mounted MBES
- 7.2.2 Side scan sonar
- 7.2.3 Auxiliary sensor: velocity of sound in seawater
- 7.3 Data acquisition methods
- 7.3.1 General
- 7.3.2 Reconnaissance seafloor mapping
- 7.3.3 Engineering seafloor mapping
- 7.3.4 Detailed engineering seafloor mapping
- 7.4 Seafloor mapping deliverables

Sub-seafloor mapping

8

- 8.1 General
- 8.1.1 Resolution and signal penetration
- 8.1.2 Equipment selection for sub-seafloor mapping methods
- 8.1.3 Assessment of data quality
- 8.1.4 Deliverables
- 8.2 Acquisition equipment and parameters for seismic data
- 8.2.1 Equipment performance
- 8.2.2 Acquisition and processing parameters
- 8.2.3 High resolution seismic reflection
- 8.2.3.1 Checks of equipment performance
- 8.2.3.2 Data processing
- 8.2.3.3 Deliverables
- 8.2.4 Ultra-high-resolution seismic reflection
- 8.2.4.1 Checks of equipment performance
- 8.2.4.2 Assessment of data quality
- 8.2.4.3 Data processing
- 8.2.4.4 Deliverables
- 8.2.5 Ultra-ultra-high resolution seismic reflection
- 8.2.5.1 Checks of equipment performance
- 8.2.5.2 Data processing
- 8.2.5.3 Deliverables
- 8.2.6 Sub-bottom profiling
- 8.2.6.1 Acquisition equipment
- 8.2.6.2 Survey platform
- 8.2.6.3 Data processing
- 8.2.6.4 Assessment of data quality
- 8.2.6.5 Deliverables
- 8.3 Non-seismic reflection methods
- 8.3.1 Seismic refraction
- 8.3.1.1 General
- 8.3.1.2 Acquisition equipment and parameters
- 8.3.1.3 Deliverables
- 8.3.2 Magnetometer and magnetic gradiometer
- 8.3.2.1 General
- 8.3.2.2 Acquisition equipment and acquisition parameters
- 8.3.2.3 Deliverables
- 8.3.3 Marine shear waves
- 8.3.4 Marine surface waves
- 8.3.5 Electrical resistivity imaging
- 8.3.6 Electromagnetic imaging

Reporting of seafloor mapping and sub-seafloor mapping

9.1 General

9

9.2 Record of data acquisition operations

- 9.3 Record of data processing
- 9.4 Results report
- 10 Data integration, interpretation and investigation of geohazards
 - 10.1 General
 - 10.2 Horizons, isopachs and isochores
 - 10.3 Mapping stratigraphic units and defining geochronology
 - 10.4 Time-to-depth conversion
 - 10.5 Borehole geophysical logging
 - 10.6 Investigation of geohazards
 - 10.7 Integrated studies

Annex A (informative) Additional information and guidance

- A.1 Scope
- A.2 Normative references
- A.3 Terms and definitions
- A.4 Symbols and abbreviated terms
- A.5 Objectives, planning, and quality control
- A.5.1 General
- A.5.1.1 Objectives and project specifications
- A.5.1.2 Georeferencing and GIS
- A.5.1.3 Ground model
- A.5.2 Desk study
- A.5.2.1 General
- A.5.2.2 Use of exploration 2D and 3D seismic data in a desk study
- A.5.2.3 Desk study for pre-drilling well-site investigations
- A.5.3 Scoping and planning
- A.5.3.1 General
- A.5.3.2 Scoping of seafloor mapping and sub-seafloor mapping
- A.5.3.2.1 General
- A.5.3.2.2 Reconnaissance seafloor mapping
- A.5.3.2.3 Engineering seafloor mapping
- A.5.3.2.4 Detailed engineering seafloor mapping
- A.5.3.2.5 Reconnaissance sub-seafloor mapping
- A.5.3.2.6 Engineering sub-seafloor mapping
- A.5.3.2.7 Detailed engineering sub-seafloor mapping
- A.5.3.2.8 Pre-drilling well-site investigation seafloor and sub-seafloor mapping
- A.5.4 Operations planning and data quality management
- A.5.4.1 Quality plan
- A.5.4.2 Effects of attenuation
- A.5.4.3 Data quality management
- A.6 Positioning
- A.6.1 General
- A.6.2 Coordinate reference systems
- A.6.3 Surface positioning requirements
- A.6.4 Vessel heading
- A.6.5 Sub-sea positioning Ultra-short baseline system
- A.6.6 Inertial navigation system
- A.6.7 Auxilliary sensor: doppler velocity log
- A.6.8 Auxilliary sensor: altimeter
- A.6.9 Auxilliary sensor: pressure-depth sensor
- A.7 Seafloor mapping
- A.7.1 General
- A.7.2 Instrumentation and acquisition parameters
- A.7.2.1 Multi-beam echo sounder
- A.7.2.2 Side scan sonar
- A.7.2.3 Auxiliary sensor: velocity of sound in seawater
- A.7.3 Data acquisition methods
- A.7.4 Seafloor mapping deliverables
- A.8 Sub-seafloor mapping
- A.8.1 General
- A.8.1.1 Resolution and signal penetration
- A.8.1.2 Equipment selection for sub-seafloor mapping methods
- A.8.1.3 Assessment of data quality

- A.8.1.4 Deliverables
- A.8.2 Acquisition equipment and parameters for seismic data
- A.8.2.1 Equipment performance
- A.8.2.2 Acquisition and processing parameters
- A.8.2.3 High resolution seismic reflection
- A.8.2.3.1 Checks of equipment performance
- A.8.2.3.2 Data processing
- A.8.2.3.3 Deliverables
- A.8.2.4 Ultra-high resolution seismic reflection
- A.8.2.5 Ultra-ultra-high resolution seismic reflection
- A.8.2.6 Sub-bottom profiling
- A.8.3 Non-seismic reflection methods
- A.8.3.1 Seismic refraction
- A.8.3.2 Magnetometer/Magnetic gradiometer
- A.8.3.3 Marine shear waves
- A.8.3.4 Marine surface waves
- A.8.3.5 Electrical resistivity imaging
- A.8.3.6 Electromagnetic imaging
- A.9 Reporting of seafloor and sub-seafloor mapping
- A.9.1 General
- A.9.2 Record of data acquisition operations
- A.9.3 Record of data processing
- A.9.4 Results report
- A.10 Data integration, interpretation and investigation of geohazards
- A.10.1 General
- A.10.2 Horizons, isopachs and isochores
- A.10.3 Mapping stratigraphic soil units and defining geochronology
- A.10.4 Time-to-depth conversion
- A.10.5 Borehole geophysical logging
- A.10.6 Investigation of geohazards
- A.10.7 Integrated studies

Page count: 81