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Requirements

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## TR2381 LCI Requirements substitution for Wind

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Operation and maintenanceRequirements, TR2381 LCI Requirements substitution for Wind, Version 3,

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Document replaces version 2**Relevant versions:**

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- [3](#) (2020-11-12 10:53)

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## 1 Objective, target group and provision

### 1.1 Objective

Life cycle information (LCI) is technical information required for all phases of a plant's life cycle and shall ensure efficient project execution as well as safe and efficient operation.

The objective of this document is to enable wind projects to scope sufficient Life cycle information (LCI) and deliver it on time, with correct content and in the correct format.

### 1.2 Target group

Anyone who scopes, creates, updates, delivers LCI and/or performs LCI quality control.

### 1.3 Provision

This document is provided for in TR3110 - Life cycle information (LCI), Technical requirements and standards.

### 1.4 How to read this document

The requirements included in this document are generic requirements developed for wind segment worldwide.

Chapter 2 gives an overview of Company's general requirements related to scoping, planning, required quality and handover formats of LCI.

Chapters 3 gives an overview of the multi discipline requirements for engineering deliverables, including selected information from fabrication and construction.

Chapter 4 gives an overview of LCI deliverables for selected categories and types of equipment.

Chapter 5 details the requirements related to LCI deliverables listed in chapters 3 and 4. In addition, each LCI deliverable has assigned attributes: LCI milestone, handover format, and local language explicit requirement when applicable.

Chapter 6 contains pre-defined Supplier Document Requirements for Wind turbine generator (WTG) package.

## 2 General LCI requirements

This chapter gives an overview of Company's general requirements related to scoping, planning, required quality and handover formats of LCI.

### 2.1 Scoping the LCI delivery

**SR-62032** - The LCI delivery scoped and supplied by projects shall be limited to what is relevant for the actual scope of work, and shall be agreed upon with Asset.

**SR-62033** - All LCI scoped as relevant, whether or not it is described in TR2381, shall be delivered to Company's LCI systems. No documents or drawings shall be retained.

### 2.2 National/regional regulations

**SR-62389** - The requirements in TR2381 LCI Requirements, substitution for wind, are Company's general requirements for wind assets. National/regional regulations may require additional documentation.

**SR-62094** - If some requirements are found to be in conflict with national/regional legislation and regulations, these requirements shall be amended or substituted by alternative requirements.

### 2.3 Language

Authorities requirements and operational needs dictate which LCI shall be delivered in the local language.

**SR-2444** - The information defined as LCI, directly used in the daily operational activities, shall be available in the local language in addition to the English language. Deliverables with explicit local language requirement are clearly marked in TR2381.

**SR-62704** - Projects shall identify if other LCI deliverables, beyond items explicitly marked in TR2381, are required in the local language, in addition to the English language, due to national/regional regulations.

Some of considerations to be made are, but not limited to:

- When under transportation, lifting and installation, personnel not specialized in the equipment/package performs the activity
- When the equipment in operation shall comply to EU Machine Directive 2006/42/EC and it's operation is not described in SO documents, such as lifting equipment
- When equipment packages control is not integrated into plant's safety and automation systems (SCADA/SAS)
- When pressure equipment in operation shall comply to EU PED Directive 2014/68/EU and it's operation is not described in SO documents

**SR-62403** - Drawings and diagrams such as single line diagrams, C&E, etc, shall be delivered in English language only.

**SR-62077** - All remaining LCI shall at least be delivered in the English language.

### 2.4 Engineering documentation

**SR-62035** - The scope of the engineering LCI delivery, for a project, shall be shown in a Master Document Register (MDR). The MDR shall be kept updated throughout the project and in accordance to the template and routines described in the Contract.

**SR-2414** - Engineering documentation that is to be delivered as specified in chapter 3 shall be numbered in accordance with the project/plant specific Engineering numbering system (ENS). The ENS document number and revision shall be shown on engineering document front page or drawing title block.

Database deliverables do not require document numbers (e.g. 3D CAD).

### 2.5 Equipment documentation

**SR-62048** - The scope of the LCI delivery for the equipment purchased in projects, shall be communicated to the Supplier in the Supplier Document Requirement List (SDRL).

**SR-62217** - Supplier shall provide in return Suppliers Master Document Register (SMDR) listing the relevant documentation for the equipment which shall be kept updated until the delivery is completed.

**SR-62416** - Documentation of equipment shall cover all relevant information to purchase, preserve, install, operate and maintain the equipment, as well as necessary certificates (e.g. CE certificate).

Chapter 4 gives an overview of LCI deliverables for selected categories and types of equipment.

**SR-80902** - Special attention shall be paid to the delivery of Declaration of conformity, relevant for the equipment covered by one or several



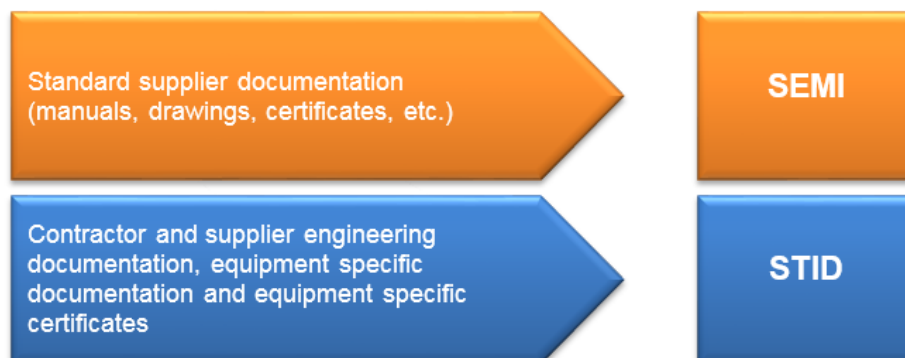
EU legislations and delivered to projects within the EEA. For wind facilities outside EU, equivalent declaration to EU Declaration of conformity shall be delivered.

The deliverable SR-2603 Declaration of conformity is relevant for equipment beyond the ones that are cross referenced to SR-2603 in TR2381 chapter 4.5.

Additional guidance to SR-2603 can be found in the [Official Journal of the European Union, C727 "The Blue guide on the implementation of EU product rules 2016"](#).

**SR-62049** - Standard documentation in the SMDR shall be referenced to unique document ID in the Company's solution for standard documentation for equipment and materials.

Documentation categories with respect to which Company's system for technical information they are stored in:



#### DOCUMENTATION OF STANDARD EQUIPMENT

Standard equipment is defined as equipment/component/products from the supplier catalogue (off-the-shelf equipment).

Such equipment will mostly be documented by standard supplier documentation, but can have documentation unique for the purchased item, such as calibration certificates. Unique equipment documentation shall be transferred to STID.

**SR-86308** - The part of a Wind Turbine Generator (WTG) which is the same for all WTGs of that model, can be considered a standard equipment, and documentation handled as such. Project specific documentation developed by the WTG contractor during tender, engineering and completion phase to suit the individual project need, shall follow normal LCI requirements as described in this document.

**SR-62417** - If the contents of supplier standard documentation comply with the requirements in SR-62416, it is not necessary to split them into separate items to be in line with the structure of the deliverables in this TR.

#### DOCUMENTATION OF EQUIPMENT PACKAGES

Equipment package/skid is an assembly of more than one equipment/product and delivered as one functional unit.

**SR-62127** - LCI for equipment package/skid shall include relevant engineering deliverables from chapter 3, including chapter 3.1, the part that applies to all disciplines, and the equipment deliverables from chapter 4.

**SR-62128** - LCI for package/skid shall cover the complete package/skid (e.g. Data sheet – weight, Data sheet – noise, Declaration of conformity, Manufacturing Record Books, SPIR, Documentation for dispatch, receipt, storage and preservation, Installation Operation and Maintenance manuals and General arrangement drawings should be created for the complete package/skid).

**SR-62138** - Relevant parts/components of equipment package/skid shall be documented.

**SR-62246** - The pre-defined equipment package Supplier Document Requirements Lists (SDRL) for selection of equipment packages, available in chapter 6, shall be used as a basis for scoping of documentation for equipment packages/skids.

#### 2.6 Updating existing LCI

This chapter is relevant for brownfield projects.

**SR-2403** - When performing modification, replacement or decommissioning work, all relevant existing LCI (e.g. tags, drawings, documents, databases and models) shall be updated to reflect the work performed.

**SR-62104** - Assessment of existing LCI shall be performed. Additional scope to the one identified in SR-2403, such as revision of faulty or creation of missing documents, shall be agreed upon with Asset.

## 2.7 Tag numbering

The purpose of tag numbering is to identify a service/location in the plant, not a specific equipment item.

Reference is made to TR0052 Engineering Numbering System - Master for wind, and GL0585 Tagging philosophy for wind facilities.

**SR-62725** - The following shall be tagged:

- Main components/systems scheduled for maintenance and/or inspection
- The item is subject to certification, e.g. anchor points, lifting appliances, elevators
- The item performs a safety function, e.g. pressure relief valves and over-pressure protection devices
- Personal protection equipment e.g. location of survival kits

**SR-62097** - Equipment subject to certification, planned inspection or planned maintenance shall be allocated a unique plant tag number in accordance with the project/plant's Engineering Numbering System (ENS).

**SR-62089** - Each tag shall have a short, precise, meaningful and uniform (consistent) service description representing the functional location as described in TR3111.

**SR-86674** - The level of tagging shall be in accordance with the maintenance philosophy for the plant.

**SR-62432** - Equipment part of the plant's electrical, automation and telecommunication (EAT) systems shall be tagged. This includes network components.

The following items shall not be tagged:

- Internal commodity items in cabinets, boxes and panels, i.e. items that are not identified as EAT equipment
- Commodity items, e.g. instrument tubing, compression fittings, unions, part of instrument hook-up

**SR-62705** - Signals and software application blocks part of the SCADA/SAS shall be tagged in accordance with ENS.

The following items shall not be tagged:

- Signals and functions for monitoring the quality of other signals
- Internal signals in cabinets and panels not used in the SCADA/SAS application

**SR-62706** - The scope of tagging of packages and skids shall be limited to:

- The package itself
- Interfaces (including signals and application blocks part of the SCADA/SAS)
- Tagging required for linking to Company's inspection and maintenance programs

**SR-2427** - Only pipe supports that require a maintenance program, such as spring support assemblies (including dampers/shock absorbers), shall be tagged. All other pipe supports shall be given a unique pipe support number (not a tag number) in accordance with the ENS.

**SR-2428** - Buildings and infrastructure located outside an onshore plant shall not be tagged except for safety systems and barriers within the buildings or infrastructures that are intended to protect against incidents at the plant.

**SR-2429** - Lifting lugs (pad eyes) installed on structure requiring separate certification shall be tagged. Lifting lugs on equipment, designed to carry the equipment's own weight, shall not be tagged.

**SR-62433** - Tagging of offshore cranes shall be in accordance with TR1727 Substitution for unmanned installations, offshore cranes.

**SR-86675** - Structural items subject to inspection and maintenance shall be assigned plant tag numbers classified as main equipment, as described in GL0585 Tagging philosophy for wind facilities. This will be a Company internal delivery.

**SR-62101** - Only the following penetrations shall be tagged (including relevant penetrations in packages/skids):

- H-class fire wall penetrations
- A-class fire wall penetrations where gas ingress to rooms with potential ignition sources is a concern
- A-class fire wall penetrations in rooms containing safety critical equipment (e.g. emergency generators, fire water pumps or typical LER/LIR room)

- Penetrations on floaters that have effect on buoyancy

**SR-62102** - Mooring systems shall be tagged on component level.

**SR-62103** - Components with ENS tag numbers in a package/skid shall refer to the superior tag. The package/skid tag shall be the top level superior tag.

See GL0585 for additional details on tag numbering.

## Planning the LCI delivery dates

### 2.8 Planning the LCI delivery dates

**SR-2439** - LCI is developed during engineering, purchasing, fabrication, installation and completion and shall be continuously available in Company's LCI systems in approved status.

**SR-2441** - In order to provide for optimal follow-up of engineering deliverables and optimal interaction between Contractor and Company, documentation planned delivery dates shall be clearly identified in Contractor's project and PO plans, and approved by Company.

**SR-62123** - Engineering documentation delivery times shall be clearly identified in Master Document Register (MDR), with delivery dates to meet the project milestones agreed in the Contract.

**SR-62122** - Delivery time for supplier documentation shall be clearly marked in SMDRs and aligned with purchase order (PO) plan and overall execution plan.

**SR-62121** - All required supplier documentation according to SMDR shall be available in Acceptance code 1 or 4 prior to Factory Acceptance Test (FAT) with exception of verifying documentation that is generated during FAT.

**SR-2440** - LCI delivered as part of a purchase order shall be complete before the purchase order can be closed out.

**SR-62124** - Before commissioning start at a commissioning package, all LCI for that commissioning package, shall be available in IFC (or similar) in Company's LCI systems.

**SR-62093** - Formal handover and close-out of LCI shall be executed in the project's completion system.

**SR-62125** - As built shall be planned and optimized in order to avoid unnecessary revisions of the same documentation (e.g. 3D will be available to operations in project database at the handover. As-built of 3D database can be performed and verified per area.).

### LCI MILESTONES

The intention with assigning milestones to LCI deliverables (both engineering and supplier documentation) in TR2381, is to indicate which deliverables will be needed for the LCI transfer start-up, maintenance engineering, commissioning and operations start-up.

The milestones assigned to each deliverable in TR2381, indicate the **recommended** latest possible delivery time for each LCI deliverable.

**SR-80901** - If other milestones have *not* been agreed, the following shall be used:

| Project type / Milestone                      | LCI 0                                                                                                                            | LCI 1                                                                                                                 | LCI 2                                                                                                                         | LCI 3                        |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------|
|                                               | Assigned to deliverables needed for start-up of information transfer interfaces and continuous transfer of project documentation | Assigned to deliverables needed for execution of maintenance engineering and for planning of commissioning activities | Assigned to remaining deliverables, in addition to all LCI1 deliverables, needed for commissioning and start-up of operations | As-built milestone           |
| <b>Investment projects (PD)</b>               | 12 weeks after contract award                                                                                                    | 12 weeks before RFC                                                                                                   | 3 weeks before RFC                                                                                                            | 4 weeks after RFO/TAC        |
| <b>Modification projects (PD03)</b>           | 12 weeks after contract award or covered by frame agreement                                                                      | Design freeze                                                                                                         | Ready for installation                                                                                                        | As-built (4 weeks after RFO) |
| <b>Purchase Order (PO) equipment delivery</b> | N/A                                                                                                                              | 12 weeks after PO award                                                                                               | 4 weeks before Factory Acceptance Test (FAT) (excluding FAT Report)                                                           | Delivery of equipment        |

**SR-62120** - The quality of the deliverable at the time indicated by milestone shall be sufficient to execute the planned tasks (e.g. a P&ID is

assigned to LCI 1 and usually revised many times prior to LCI 1, but by LCI 1 it must have sufficient quality to be used for maintenance engineering and commissioning planning).

## Quality of LCI delivery

### 2.9 Requirements related to standard documentation

Standard documentation is the documentation that is not unique to the delivered equipment and can be re-used for any new delivery of the similar equipment (typically for, but not limited to, standard, off-the-shelf or catalogue equipment).

**SR-62082** - The standard documentation for equipment shall be stored in the Company's solution for standard documentation for equipment and materials, and linked to manufacturer and model where each model is represented by a unique ID.

**SR-62043** - The delivered equipment shall be unambiguously identifiable in the documentation by manufacturer's model and variant.

**SR-62047** - Standard documentation shall be delivered in PDF format only.

**SR-2415** - Documentation for standard equipment stored in the Company's solution for standard documentation for equipment and materials shall not be customized and contain tag or plant specific information (e.g. not numbered according to ENS, no ENS tag numbers or ENS document numbers inside the documents, no cover sheets added or Company drawing borders used).

**SR-62084** - Existing documentation in the Company's solution for standard documentation for equipment and materials shall be re-used as far as possible. If the documentation already exists, is complete and up-to-date, it is not necessary to re-submit it.

**SR-62087** - Relevant tag numbers for standard equipment must have reference to the unique ID and variant in the Company's solution for standard documentation for equipment and materials.

### 2.10 Requirements related to STID documentation

**SR-2416** - All engineering and equipment supplier documentation that is not standard documentation, shall be numbered in accordance with the project/plant specific Engineering Numbering System and delivered to STID.

**SR-62238** - For engineering documentation ENS document number and revision shall be shown on engineering document front page or drawing title block.

**SR-62115** - Supplier document front page shall not be customized. The supplier document number and revision shall be shown on the document front page or drawing title block (the ENS number shall be added as text or as a PDF stamp).

**SR-62420** - Each drawing/document shall have a short, precise, meaningful and uniform (consistent) title representing the content of the drawing/document.

Examples:

Datasheet (Type/discipline of datasheet, function of equipment): Instrument datasheet for pressure transmitter in lube oil pump

### 2.11 Information consistency

**SR-62092** - All the information submitted shall be consistent across the systems and documents, drawings and databases (e.g. index information, tag status, revision numbers, 3D model, etc) .

**SR-2432** - ENS tag numbers shall be cross referenced to individual documents to enable easy retrieval of relevant documentation for tagged items. Cross references shall be limited to relevant references only, e.g. a document/drawing shall only reference a tag number when the tagged item is described in the document/drawing. Cross references shall not be removed when a document or tag is set historical.

### 2.12 As-built

**SR-2434** - All LCI shall reflect the as-built status of the plant.

**SR-62071** - All mark-ups shall be implemented.

**SR-85356** - To ensure unambiguous status in Operations, all safety critical documents kept in CCR (SR-62406) and all updated existing documents shall be re-issued in as-built revision.

**SR-85357** - All documents and drawings defined in TR2381 shall be identified as As-built as described in the following table:

|  | Need to issue new | Reason for issue stated on document/drawing files | Revision text in company system (TR3111- REASON_FOR_ISSUE) | Revision status in company system |
|--|-------------------|---------------------------------------------------|------------------------------------------------------------|-----------------------------------|
|--|-------------------|---------------------------------------------------|------------------------------------------------------------|-----------------------------------|



|                                                                                                                                                                                                                     | As-built revision |                                                                               |                                                                           | (TR3111-REV_STATUS) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------|
| <b>1 - Existing and new Safety critical documentation (SR-62406), with or without mark-ups</b><br><br><b>2 - Existing documentation, with or without mark-ups</b><br><br><b>3 - New documentation with mark-ups</b> | Yes               | As-built + reference to M5 or project ID                                      | As-built + reference to M5 or project ID<br>Example: As-built L.O085C.014 | OF                  |
| <b>1 - New documents without mark-ups on IFC (or equivalent) as reason for issue</b>                                                                                                                                | No                | No changes are required to the document/drawing files for the issued revision | As-built - no changes                                                     | OF                  |

## 2.13 As-built tolerances

SR-62717 - The as-built tolerances are shown in the table below:

| No. | Object                                                 | As-built tolerances (mm) | Remarks                                                                          |
|-----|--------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------|
| 1   | Access / transportation ways                           | +/- 100                  |                                                                                  |
| 2   | Anodes                                                 | +/-200                   | +/-50 for subsea                                                                 |
| 3   | Cable ladder/trays >=300 mm                            | +/- 100                  |                                                                                  |
| 3   | Cladding, louvres                                      | +/- 50                   | +/-100 for technical buildings onshore outside CPF (Central Processing Facility) |
| 4   | Deluge and sprinkler nozzles                           | +/- 50                   |                                                                                  |
| 5   | Doors, windows                                         | +/- 50                   | +/-100 for technical buildings onshore outside CPF (Central Processing Facility) |
| 6   | Drain boxes / gullies / tundishes                      | +/- 50                   |                                                                                  |
| 7   | Ducting including HVAC bulk items and inspection doors | +/- 100                  |                                                                                  |
| 8   | Escape routes                                          | +/- 50                   |                                                                                  |
| 9   | Field equipment                                        | +/-100                   |                                                                                  |
| 10  | Fire and gas detectors and buttons                     | +/- 50                   |                                                                                  |
| 11  | Fire doors                                             | +/- 50                   | +/-100 for technical buildings onshore outside CPF (Central Processing Facility) |
| 12  | Fire walls                                             | +/- 100                  | +/-100 for technical buildings onshore outside CPF (Central Processing Facility) |
| 13  | Inline equipment and components                        | +/- 100                  |                                                                                  |
| 14  | Inspection hatches                                     | +/- 50                   |                                                                                  |
| 15  | Instrument/telecom stands                              | +/-200                   |                                                                                  |
| 16  | Instruments attached to piping and equipment           | +/- 50                   |                                                                                  |
| 17  | Insulation of piping, valves and equipment             | +/- 50                   |                                                                                  |
| 18  | Junction boxes                                         | +/- 100                  |                                                                                  |

|    |                                                             |         |                                                                                                                 |
|----|-------------------------------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------|
| 19 | Lay down/storage areas                                      | +/- 100 |                                                                                                                 |
| 20 | Lifting appliances                                          | +/- 50  | Lifting, withdrawal and material handling volumes; cranes; chain hoist; loose lifting gear; monorails & padeyes |
| 21 | Lifting, withdrawal and material handling volumes           | +/- 50  |                                                                                                                 |
| 22 | Main structure (Primary and secondary)                      | +/- 10  | +/-50 for onshore                                                                                               |
| 23 | Main equipment inclusive fire fighting and safety equipment | +/- 50  |                                                                                                                 |
| 24 | Outfitting structure                                        | +/- 50  |                                                                                                                 |
| 25 | Package/Skid interfaces                                     | +/- 50  |                                                                                                                 |
| 26 | Pipe supports                                               | +/- 50  | +/- 100 for all other supports                                                                                  |
| 27 | Piping                                                      | +/- 50  |                                                                                                                 |
| 28 | Piping tubing (not including instrument tubing)             | +/-200  | For subsea: Piping tubing (including instrument tubing) +/-50                                                   |
| 29 | Potable water supply and sanitary sewer lines               | +/- 50  |                                                                                                                 |
| 30 | Import/export cables                                        | +/- 50  |                                                                                                                 |
| 31 | Shop and field welds                                        | +/- 50  |                                                                                                                 |
| 32 | Stairs and lifts cases                                      | +/- 50  | +/-100 for technical buildings onshore outside CPF (Central Processing Facility)                                |
| 33 | Tagged items (such as Monorails, Lifting lugs)              | +/- 50  | Inclusive embedded items for tagged equipment                                                                   |
| 34 | Valves and inline items                                     | +/- 50  |                                                                                                                 |
| 35 | Vessel trim                                                 | +/- 50  |                                                                                                                 |
| 36 | Volume for line detectors                                   | +/- 50  |                                                                                                                 |
| 37 | Walls, ceilings, floors                                     | +/- 50  | +/-100 for technical buildings onshore outside CPF (Central Processing Facility)                                |

Note: As-built tolerances represent actual installation/assembly position compared to object position in the 3D model/2D drawing.

## 2.14 Revision marking

This chapter applies only when revising existing documents on a plant in operation. It describes the requirements related to marking changes for the various file formats. Further guidelines can be found in GL4284 Revising Life Cycle Information documentation.

**SR-62055** - When revising an existing document in As-built status, the new As-built revision shall contain information describing the accumulated changes between the current and previous official As-built revision.

**SR-62057** - Regardless of file format, the revision block shall be updated with the new revision number, date and reason for issue. Reason for issue shall include the M5 or project that triggered the change

### DOC/DOCX revision marking

**SR-62058** - Changes shall be described in the existing or new chapter «Changes from previous version» or equivalent.

### XLS/XLSX revision marking

**SR-62061** - Changes are described as follows:

- All previous revision marks shall be removed before marking the new revision.
- Changes for the new revision in the worksheet is normally\* marked setting the cell background to light grey color.

\* NOTE: If the cell's background color is already light grey, alternative color must be considered, light yellow is recommended.

**DGN/DWG revision marking**

**SR-62064** - The revision marking shall be handled in accordance with TR1970 2D CAD standards and symbols (LCI).

### PDF revision marking

This applies to revisions where there is an existing official revision of the document in PDF-format only.

Changes are described as follows:

#### SR-62066 - PDF Documents

- Fully structured file:
  - If the file is fully structured (PDF created from DOC/DOCX or XLS/XLSX), the file shall be exported back to original format and revision marking performed according to requirements for relevant format.
- Other files:
  - How the changes shall be documented shall be evaluated and agreed in each case, GL4284 Revising Life Cycle Information documentation, provides guidelines.

#### SR-62065 - PDF drawings

When revising drawings with PDF format (or legacy in only TIF format), some considerations should be made.

With relation to the drawings handover format as defined in this TR in chapter 3 or 4:

- If required handover format is PDF, and it is minor changes, the revision may be performed by editing the PDF file, and all changes between the current and previous official As-built revision shall be highlighted with clouds and revision markers.
- If required handover format is PDF, and it is a complex, or comprehensive revision, establishing a hybrid file, DGN + CIT should be created and revision markings in accordance to TR1970 should be performed.
- If the required handover format is DGN/DWG + PDF, regardless of size of revision, establishing a hybrid file, DGN + CIT shall be created and revision markings in accordance to TR1970 shall be performed.

Establishing a hybrid file shall be as described in TR1970 2D CAD standards and symbols (LCI) – 5.15 Hybrid files.

### 2.15 Updating the safety critical documents kept in CCR and electrical equipment room

**SR-62406** - Safety critical documents with master hard copy kept in central control room (CCR), for contingency purposes, are the following:

1. Cause & effect (C&E)
2. Network topology diagram

When updating or creating these documents special attention shall be made to Company's work process OM106.10 - Update master version of safety critical documentation in CCR, Upstream offshore and OM206.10 - Update master version of safety critical documentation in CCR, Mid & downstream.

**SR-62405** - For main power, emergency power and UPS the following document types shall be up-to-date in electrical equipment rooms at all times:

1. Overall single line diagram
2. Circuit/Wiring diagram

When updating or creating these documents special attention shall be made to Company's work process OM105.12.10 - Notification of new installation or modification of electrical installations, Upstream offshore and OM205.12.10 - Notification of new installation or modification, Mid & downstream.

## Handover formats

### 2.16 Formats

In order to secure readability of the LCI in a life time perspective of the plant, the PDF format is explicitly required for a selection of LCI deliverables. The native, updateable format, is required for some deliverables in addition to PDF, to enable efficient update of documentation in modifications during the operational phase.

**SR-81072** - LCI shall be handed over to Asset with the electronic format explicitly marked for each LCI deliverable listed in this TR document.

**SR-62051** - National/regional regulations may require some of the LCI to be delivered in hardcopy in addition.

Following are the standardized formats for LCI deliverables described in TR2381:

**SR-15820 - 3D CAD (TR2231)**

To be delivered in accordance with TR2231.

**SR-15814 - Database (TR3111)**

To be delivered in accordance with TR3111.

**SR-15815 - DGN/DWG (TR1970)**

2D CAD files shall be delivered in accordance with TR1970.

**SR-15816 - DGN (TR1970)**

2D CAD files with hyperlinked PDFs shall be delivered in accordance with TR1970.

**SR-15817 - DOC**

DOC files shall be editable in Microsoft Office Word (doc or docx format).

**SR-15819 - PDF**

- PDF files shall be viewable and printable using Adobe Acrobat reader.
- Text shall be searchable (except for documents where the original is a paper copy, e.g. a certificate with seal/stamp that shall be scanned to PDF at minimum 300 dpi).
- PDF files shall be printed directly from the original (native) file, i.e. not scanned.
- Documents with more than 10 pages shall have bookmarks.
- For multisheet drawings all sheets shall have the same drawing number, i.e. identical discipline code, drawing type code and sequence number. Multisheet drawings shall include an index sheet listing all sheets within the drawing with their respective sheet numbers, titles and revisions.
- PDF files shall be completely unlocked with no password, certificate or encryption security settings that prevent reading, printing, selecting, copying, annotation or similar functionality to be used. Links/URL's may only be used if they will function when the document is stored in Company's technical information system.

**SR-81073 - TBA**

Format to be agreed (TBA) between parties.

**SR-15826 - XLS**

XLS files shall be editable in Microsoft Office Excel (xls or xlsx format).

**SR-15827 - XLS (TR1005)**

To be delivered in accordance with TR1005 in Microsoft Office Excel (xls, xlsx or xlsm format).

**SR-15828 - ZIP**

Native files (e.g. simulation model input files) shall be packed into one ZIP file. The ZIP file shall be compatible with Microsoft Windows Explorer's compressed folder. The ZIP file shall not be password protected.

### 3 Engineering LCI deliverables

This chapter gives an overview of the multi discipline requirements for engineering deliverables, including selected information from fabrication and construction. It should be read in conjunction with chapter 2, that gives an overview of Company's general requirements (related to scoping, planning, required quality and handover formats of LCI) and chapter 5 that details the requirements related to content of LCI deliverables listed in chapter 3.

#### 3.1 General/multi discipline

General engineering deliverables (not discipline specific or apply on general basis)

[Maintain table](#)

| Information item                                            | ID       | Ref.  | Handover Format   | Milestone |
|-------------------------------------------------------------|----------|-------|-------------------|-----------|
| <a href="#">3D CAD model - offshore, onshore and subsea</a> | SR-61919 | 5-1   | 3D CAD (TR2231)   | LCI 2     |
| <a href="#">Additional studies</a>                          | SR-2730  | 5-5   | DOC + PDF         | LCI 2     |
| <a href="#">Contractor's LCI execution strategy</a>         | SR-2686  | 5-39  | DOC + PDF         | LCI 0     |
| <a href="#">Index information</a>                           | SR-61902 | 5-123 | Database (TR3111) | LCI 1     |
| <a href="#">Master grid report</a>                          | SR-81133 | 5-113 | XLS + PDF         |           |

#### Notes

- SR-61898 Relevant if Master Grid established or modified as a part of the project scope

#### 3.2 Architectural

Engineering deliverables from architectural offshore

[Maintain table](#)

| Information item                                                 | ID      | Ref. | Handover Format      | Milestone |
|------------------------------------------------------------------|---------|------|----------------------|-----------|
| <a href="#">Acoustic/thermal insul. and fire protection plan</a> | SR-2551 | 5-3  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Architectural layout drawings</a>                    | SR-2559 | 5-14 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Data sheets - Mechanical</a>                         | SR-2594 | 5-50 | XLS + PDF            | LCI 1     |
| <a href="#">Data sheets - Weight</a>                             | SR-2599 | 5-59 | PDF                  | LCI 2     |
| <a href="#">Fire test results reports</a>                        | SR-2637 | 5-91 | PDF                  | LCI 2     |

#### Notes

- SR-2594 For relevant architectural equipment when part of the engineering and/or purchase process

### 3.3 Civil

Engineering deliverables from Civil. Covers Civil, Structural and Architectural for onshore plants.

[Maintain table](#)

| Information Item                                                                                | ID      | Ref.  | Handover Format      | Milestone |
|-------------------------------------------------------------------------------------------------|---------|-------|----------------------|-----------|
| <a href="#">Buildings architectural drawings</a>                                                | SR-2567 | 5-23  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Concrete structural design report</a>                                               | SR-2580 | 5-35  | PDF                  | LCI 2     |
| <a href="#">Concrete structures geometry drawings</a>                                           | SR-2581 | 5-36  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Concrete structures reinforcement drawings</a>                                      | SR-2582 | 5-37  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Excavation, fill and grading drawings</a>                                           | SR-2628 | 5-83  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">GIS Mapping - Survey reports</a>                                                    | SR-2652 | 5-105 | TBA                  | LCI 2     |
| <a href="#">Ground investigation reports</a>                                                    | SR-2653 | 5-106 | PDF                  | LCI 2     |
| <a href="#">Landscaping drawings</a>                                                            | SR-2685 | 5-132 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Metocean - Meteorological and oceanographical reports</a>                           | SR-2699 | 5-141 | PDF + ZIP            | LCI 2     |
| <a href="#">Road drawings</a>                                                                   | SR-2737 | 5-183 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Site Plan</a>                                                                       | SR-2748 | 5-193 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Structural steel and aluminium structural design report (Civil)</a>                 | SR-2762 | 5-206 | PDF                  | LCI 2     |
| <a href="#">Structural steel and aluminium. Main, secondary and outfitting drawings (Civil)</a> | SR-2763 | 5-207 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Structural steel fire protection drawings (Civil)</a>                               | SR-2764 | 5-209 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Underground piping and cables drawings</a>                                          | SR-2787 | 5-229 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Underground piping hydraulic system calculation</a>                                 | SR-2788 | 5-230 | PDF                  | LCI 2     |
| <a href="#">Underground rock facilities drawings</a>                                            | SR-2789 | 5-231 | DGN/DWG (TR1970)+PDF | LCI 2     |

### 3.4 Electrical

Engineering deliverables from electrical

[Maintain table](#)

| Information Item                                               | ID       | Ref.  | Handover Format      | Milestone |
|----------------------------------------------------------------|----------|-------|----------------------|-----------|
| <a href="#">Black start philosophy</a>                         | SR-81095 | 5-17  | DOC + PDF            | LCI 2     |
| <a href="#">Cable ladder/trays &gt;=300 mm Layout drawings</a> | SR-2569  | 5-24  | PDF                  | LCI 2     |
| <a href="#">Cable routing</a>                                  | SR-62659 | 5-23  | PDF                  | LCI 2     |
| <a href="#">Certificate of conformance</a>                     | SR-2531  | 5-29  | PDF                  | LCI 2     |
| <a href="#">Circuit / Wiring diagram</a>                       | SR-2575  | 5-31  | PDF                  | LCI 2     |
| <a href="#">Data sheets - Electrical</a>                       | SR-81331 | 5-42  | XLS + PDF            | LCI 1     |
| <a href="#">Electrical block diagrams</a>                      | SR-2613  | 5-69  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Electrical calculations / analyses</a>             | SR-2614  | 5-70  | TBA                  | LCI 1     |
| <a href="#">Electrical field equipment layout drawings</a>     | SR-2618  | 5-74  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Electrical Load list</a>                           | SR-2620  | 5-75  | XLS + PDF            | LCI 2     |
| <a href="#">Electrical power system philosophy</a>             | SR-2621  | 5-76  | DOC + PDF            | LCI 2     |
| <a href="#">Equipment room layout drawings</a>                 | SR-61908 | 5-81  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Lighting and small power layout drawings</a>       | SR-2690  | 5-134 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Overall single line diagram</a>                    | SR-2703  | 5-154 | DGN/DWG (TR1970)+PDF | LCI 1     |
| <a href="#">Parameter setting tables</a>                       | SR-2706  | 5-157 | XLS + PDF            | LCI 2     |
| <a href="#">Relay setting table</a>                            | SR-2734  | 5-181 | XLS + PDF            | LCI 2     |

### Notes

- SR-2575 For customized documentation, handover format shall be DGN/DWG (TR1970) + PDF
- SR-2706 Shall be delivered for all equipment requiring setting of adjustable parameters

### 3.5 HSE

Engineering deliverables from HSE (Health, safety and environment)

[Maintain table](#)

| Information Item                                                       | ID       | Ref.  | Handover Format      | Milestone |
|------------------------------------------------------------------------|----------|-------|----------------------|-----------|
| <a href="#">3D Noise Simulation Model</a>                              | SR-61918 | 5-2   | TBA                  | LCI 2     |
| <a href="#">ALARP register</a>                                         | SR-2556  | 5-9   | XLS + PDF            | LCI 2     |
| <a href="#">Area classification drawings</a>                           | SR-2560  | 5-15  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Data sheets - Safety equipment</a>                         | SR-62719 | 5-50  | XLS + PDF            | LCI 1     |
| <a href="#">Data sheets – Safety data sheet and chemical inventory</a> | SR-2601  | 5-56  | ZIP + PDF + XLS      | LCI 1     |
| <a href="#">Design accidental load report</a>                          | SR-2604  | 5-62  | DOC + PDF            | LCI 2     |
| <a href="#">Dropped object protection plan</a>                         | SR-2610  | 5-67  | PDF                  | LCI 2     |
| <a href="#">Emergency preparedness analysis</a>                        | SR-2624  | 5-77  | DOC + PDF            | LCI 2     |
| <a href="#">Helideck pick-up point</a>                                 | SR-62721 | 5-84  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Risk analysis</a>                                          | SR-2736  | 5-182 | DOC + PDF            | LCI 2     |
| <a href="#">Safety layout drawings</a>                                 | SR-2739  | 5-185 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">SIS functional safety information</a>                      | SR-2746  | 5-192 | DOC/XLS + PDF        | LCI 2     |
| <a href="#">Working environment status</a>                             | SR-61904 | 5-245 | XLS + PDF            |           |
| <a href="#">Working environment summary report</a>                     | SR-2655  | 5-246 | DOC/XLS + PDF        | LCI 2     |

### 3.6 HVAC

Engineering deliverables from HVAC (Heating, ventilating and air-conditioning)

[Maintain table](#)

| Information item                                                      | ID      | Ref.  | Handover Format      | Milestone |
|-----------------------------------------------------------------------|---------|-------|----------------------|-----------|
| <a href="#">Air flow diagrams</a>                                     | SR-2553 | 5-6   | DGN/DWG (TR1970)+PDF | LCI 1     |
| <a href="#">Area Duct and Instrumentation Diagrams (D&amp;ID)</a>     | SR-2561 | 5-17  | DGN/DWG (TR1970)+PDF | LCI 1     |
| <a href="#">Data sheets - HVAC</a>                                    | SR-2592 | 5-48  | XLS + PDF            | LCI 1     |
| <a href="#">Equipment Heat Emission</a>                               | SR-2626 | 5-79  | DOC + PDF            | LCI 2     |
| <a href="#">HVAC Bulk items index.</a>                                | SR-2661 | 5-111 | XLS + PDF            | LCI 2     |
| <a href="#">HVAC calculations / analyses</a>                          | SR-2662 | 5-112 | DOC + PDF            | LCI 2     |
| <a href="#">HVAC control philosophy</a>                               | SR-2664 | 5-113 | DOC + PDF            | LCI 2     |
| <a href="#">HVAC design philosophy</a>                                | SR-2665 | 5-114 | DOC + PDF            | LCI 1     |
| <a href="#">HVAC layout drawings</a>                                  | SR-2666 | 5-115 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">HVAC system description</a>                               | SR-2667 | 5-116 | DOC + PDF            | LCI 2     |
| <a href="#">System Duct &amp; Instrumentation Diagrams (D&amp;ID)</a> | SR-2770 | 5-214 | DGN/DWG (TR1970)+PDF | LCI 1     |

### 3.7 Instrumentation

Engineering deliverables from instrumentation, including all automation disciplines

[Maintain table](#)

| Information Item                                                                        | ID       | Ref.  | Handover Format      | Milestone |
|-----------------------------------------------------------------------------------------|----------|-------|----------------------|-----------|
| <a href="#">Alarm C&amp;H (Context &amp; Hiding)</a>                                    | SR-2554  | 5-7   | XLS + PDF            | LCI 2     |
| <a href="#">Alarm classification</a>                                                    | SR-2555  | 5-8   | XLS + PDF            | LCI 2     |
| <a href="#">Automation and SCADA functional specifications</a>                          | SR-62589 | 5-16  | DOC + PDF            | LCI 2     |
| <a href="#">Cable routing</a>                                                           | SR-62659 | 5-23  | PDF                  | LCI 2     |
| <a href="#">Cause &amp; effect (C&amp;E)</a>                                            | SR-2572  | 5-27  | XLS + PDF            | LCI 1     |
| <a href="#">Consequence analysis logic solver</a>                                       | SR-2583  | 5-38  | DOC/XLS + PDF        | LCI 2     |
| <a href="#">Control Diagram / programming Logic Diagrams</a>                            | SR-62598 | 5-37  | PDF                  | LCI 2     |
| <a href="#">Control Sequence Diagrams</a>                                               | SR-62599 | 5-38  | PDF                  | LCI 2     |
| <a href="#">Cyber security self-assessment report</a>                                   | SR-81075 | 5-40  | PDF                  | LCI 1     |
| <a href="#">Data sheets - Instrument field equipment</a>                                | SR-2593  | 5-49  | XLS + PDF            | LCI 1     |
| <a href="#">Equipment room layout drawings</a>                                          | SR-61908 | 5-81  | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Field instrument installation drawing Typical</a>                           | SR-2633  | 5-88  | PDF                  | LCI 2     |
| <a href="#">Fire protection data sheet (FPDS)</a>                                       | SR-2636  | 5-90  | XLS + PDF            | LCI 1     |
| <a href="#">Hardware loop typicals</a>                                                  | SR-2654  | 5-107 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Instrument calculations</a>                                                 | SR-2676  | 5-126 | PDF                  | LCI 2     |
| <a href="#">Instrument field equipment layout drawings</a>                              | SR-2677  | 5-127 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Instrument/telecom. earthing distribution. schematic diagram</a>            | SR-2679  | 5-128 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Instrumented systems - Loading and start up procedures</a>                  | SR-62707 | 5-102 | DOC + PDF            | LCI 2     |
| <a href="#">Instrumented systems - Performance data</a>                                 | SR-62703 | 5-103 | XLS + PDF            | LCI 2     |
| <a href="#">Interconnection cabling block diagrams</a>                                  | SR-62601 | 5-104 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Level instrument arrangement drawings</a>                                   | SR-2687  | 5-133 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Loop information / Loop Drawings</a>                                        | SR-62594 | 5-110 | DGN/DWG (TR1970)+PDF | LCI 2     |
| <a href="#">Network topology diagram</a>                                                | SR-2700  | 5-150 | XLS + PDF            | LCI 2     |
| <a href="#">Pneumatic/hydraulic hook-up drawing</a>                                     | SR-2724  | 5-173 | PDF                  | LCI 2     |
| <a href="#">Settlement and Power Quality metering - configuration parameters</a>        | SR-62590 | 5-153 | DOC + PDF            | LCI 2     |
| <a href="#">Settlement and Power Quality metering - data exchange specifications</a>    | SR-62591 | 5-154 | DOC + PDF            | LCI 2     |
| <a href="#">Settlement and Power Quality metering - functional design specification</a> | SR-62593 | 5-155 | DOC + PDF            | LCI 2     |
| <a href="#">Settlement and Power Quality metering - metering calculations</a>           | SR-62592 | 5-156 | DOC + PDF            | LCI 2     |

|                                                                           |          |       |                      |       |
|---------------------------------------------------------------------------|----------|-------|----------------------|-------|
| <a href="#">Shutdown hierarchy</a>                                        | SR-2743  | 5-189 | DGN/DWG (TR1970)+PDF | LCI 2 |
| <a href="#">SIL verification/calculation/Safety Analysis Report (SAR)</a> | SR-62595 | 5-158 | DOC + PDF            | LCI 2 |
| <a href="#">System topology diagrams</a>                                  | SR-2772  | 5-215 | DGN/DWG (TR1970)+PDF | LCI 2 |
| <a href="#">Tag and signal I/O list</a>                                   | SR-62596 | 5-179 | XLS + PDF            | LCI 2 |
| <a href="#">Wireless network coverage</a>                                 | SR-2798  | 5-242 | DOC + PDF            | LCI 2 |
| <a href="#">Wiring and Termination Diagram</a>                            | SR-62600 | 5-200 | DGN/DWG (TR1970)+PDF | LCI 2 |

### 3.8 Marine Technology

#### Maintain table

| Information item                          | ID       | Ref.  | Handover Format  | Milestone |
|-------------------------------------------|----------|-------|------------------|-----------|
| <a href="#">Cable Hang-Off</a>            | SR-62733 | 5-20  | PDF              | LCI 2     |
| <a href="#">Cable Installation</a>        | SR-62732 | 5-21  | DGN (TR1970)+PDF | LCI 2     |
| <a href="#">Jack-Up Foot Prints</a>       | SR-62729 | 5-105 | XLS + PDF        | LCI 3     |
| <a href="#">Landfall</a>                  | SR-62734 | 5-106 |                  | LCI 2     |
| <a href="#">Offshore Substations</a>      | SR-62728 | 5-125 | XLS + PDF        | LCI 2     |
| <a href="#">Scour Protection</a>          | SR-62735 | 5-150 | PDF              | LCI 2     |
| <a href="#">Seabed Intervention</a>       | SR-62736 | 5-151 | PDF              | LCI 2     |
| <a href="#">Suction Anchors</a>           | SR-62730 | 5-175 | XLS + PDF        | LCI 2     |
| <a href="#">WTG Installation</a>          | SR-62727 | 5-205 | PDF              | LCI 3     |
| <a href="#">WTG/Substation foundation</a> | SR-62726 | 5-204 | XLS              | LCI 2     |

### 3.9 MC/Commissioning

#### Deliverables from MC/Commissioning

#### Maintain table

| Information item                         | ID      | Ref. | Handover Format | Milestone |
|------------------------------------------|---------|------|-----------------|-----------|
| <a href="#">Commissioning procedures</a> | SR-2533 | 5-33 | DOC + PDF       | LCI 2     |

### 3.10 Mechanical

#### Engineering deliverables from mechanical.

#### Maintain table

| Information item                             | ID      | Ref.  | Handover Format      | Milestone |
|----------------------------------------------|---------|-------|----------------------|-----------|
| <a href="#">Data sheets - Mechanical</a>     | SR-2594 | 5-50  | XLS + PDF            | LCI 1     |
| <a href="#">Pneumatic connection diagram</a> | SR-2723 | 5-172 | DGN/DWG (TR1970)+PDF | LCI 2     |

Utility consumption index      SR-2790    5-232    XLS + PDF      LCI 2

### 3.11 Piping/Layout

Engineering deliverables from piping and layout

Maintain table

| Information item                                  | ID       | Ref.  | Handover Format      | Milestone |
|---------------------------------------------------|----------|-------|----------------------|-----------|
| Data sheets - Piping [Data sheets - Special Item] | SR-2595  | 5-52  | PDF                  | LCI 1     |
| Equipment layout drawings                         | SR-62718 | 5-70  | DGN/DWG (TR1970)+PDF | LCI 2     |
| Material handling report                          | SR-2698  | 5-140 | DOC + PDF            | LCI 2     |
| Pipe stress procedure                             | SR-2711  | 5-161 | DOC + PDF            | LCI 2     |
| Pipe support drawings                             | SR-2712  | 5-162 | PDF                  | LCI 1     |
| Pipe support index                                | SR-2713  | 5-163 | XLS + PDF            | LCI 2     |
| Piping component calculations                     | SR-2716  | 5-165 | DOC + PDF            | LCI 2     |
| Piping fabrication records                        | SR-2717  | 5-166 | PDF                  | LCI 2     |
| Piping installation procedure                     | SR-2718  | 5-167 | DOC + PDF            | LCI 2     |
| Piping stress report                              | SR-2721  | 5-170 | DOC + PDF            | LCI 2     |
| Plot plan drawings                                | SR-62722 | 5-139 | DGN/DWG (TR1970)+PDF | LCI 2     |
| Third Party verifications                         | SR-2783  | 5-224 | PDF                  | LCI 2     |

#### Notes

- SR-2783: Third party verification performed by Notified body (PED). Notified body is assigned by Contractor

### 3.12 Preparation for operation

The following documentation shall be prepared by the Company. Engineering input to fulfill the required content shall be delivered by Contractor.

Maintain table

| Information item               | ID       | Ref.  | Handover Format   | Milestone |
|--------------------------------|----------|-------|-------------------|-----------|
| System and Operation documents | SR-2768  | 5-212 | DOC               | LCI 2     |
| Technical tag hierarchy (TTH)  | SR-61877 | 5-217 | Database (TR3111) | LCI 2     |

### 3.13 Process

Engineering deliverables from process

Maintain table

| Information item                     | ID       | Ref.  | Handover Format  | Milestone |
|--------------------------------------|----------|-------|------------------|-----------|
| Piping and instrument diagram (P&ID) | SR-2714  | 5-164 | DGN (TR1970)+PDF | LCI 1     |
| Process safety report                | SR-81366 | 5-142 | DOC + PDF        | LCI 2     |
| Utility consumption report           | SR-2791  | 5-233 | XLS + PDF        | LCI 2     |

### 3.14 Structural

Engineering deliverables from structural for offshore plants

Maintain table

| Information item                                                        | ID       | Ref.  | Handover Format      | Milestone |
|-------------------------------------------------------------------------|----------|-------|----------------------|-----------|
| Anode details and layout                                                | SR-61916 | 5-11  | PDF                  | LCI 2     |
| Concrete detail drawings                                                | SR-2579  | 5-34  | DGN/DWG (TR1970)+PDF | LCI 2     |
| DFI Resumes                                                             | SR-81070 | 5-57  | DOC + PDF            | LCI 2     |
| Material certificates                                                   | SR-2697  | 5-139 | PDF                  | LCI 2     |
| Structural analysis model                                               | SR-2755  | 5-200 | ZIP                  | LCI 2     |
| Structural design report                                                | SR-81147 | 5-166 | PDF                  | LCI 2     |
| Structural fabrication drawings                                         | SR-62724 | 5-167 | PDF                  | LCI 2     |
| Structural fabrication records                                          | SR-2758  | 5-203 | PDF                  | LCI 2     |
| Structural fire protection drawings                                     | SR-2759  | 5-204 | PDF                  | LCI 2     |
| Structural load plans                                                   | SR-2760  | 5-205 | DGN/DWG (TR1970)+PDF | LCI 2     |
| Structural steel and aluminium. Main, secondary and outfitting drawings | SR-61880 | 5-208 | DGN/DWG (TR1970)+PDF | LCI 2     |

#### Notes:

- SR-81070: Delivery of DFI should be evaluated case by case based on the extent of structural scope

### 3.15 Telecommunication

Engineering deliverables from telecommunication.

Maintain table

| Information item                                                  | ID       | Ref.  | Handover Format      | Milestone |
|-------------------------------------------------------------------|----------|-------|----------------------|-----------|
| Antenna tower layout drawings                                     | SR-2558  | 5-13  | DGN/DWG (TR1970)+PDF | LCI 2     |
| Coaxial cable test reports                                        | SR-2578  | 5-32  | DOC + PDF            | LCI 2     |
| Data and telephone cabling network test reports                   | SR-2588  | 5-44  | DOC + PDF            | LCI 2     |
| Electrical connection diagram                                     | SR-2616  | 5-73  | DGN/DWG (TR1970)+PDF | LCI 2     |
| Equipment room layout drawings                                    | SR-61908 | 5-81  | DGN/DWG (TR1970)+PDF | LCI 2     |
| Fiber optical cabling (platform / facility internal) test reports | SR-2630  | 5-85  | DOC + PDF            | LCI 2     |
| Fiber optical long distance cable test report                     | SR-2631  | 5-86  | DOC + PDF            | LCI 2     |
| Loop information / Loop Drawings                                  | SR-62594 | 5-110 | DGN/DWG (TR1970)+PDF | LCI 2     |
| PAGA amplifier load list                                          | SR-2704  | 5-155 | DOC + PDF            | LCI 2     |
| PAGA coverage measurements reports                                | SR-2705  | 5-156 | DOC + PDF            | LCI 2     |
| Telecommunication field equipment layout drawings                 | SR-2777  | 5-219 | DGN/DWG (TR1970)+PDF | LCI 2     |
| Telecommunication power supply load list                          | SR-2779  | 5-220 | DOC + PDF            | LCI 2     |
| Telecommunication signal level diagram                            | SR-2780  | 5-221 | DGN/DWG (TR1970)+PDF | LCI 2     |
| Telecommunication system topology diagram                         | SR-2781  | 5-222 | DGN/DWG (TR1970)+PDF | LCI 2     |
| UHF/VHF radio coverage                                            | SR-2785  | 5-228 | DOC + PDF            | LCI 2     |
| WLAN coverage                                                     | SR-2799  | 5-243 | DOC + PDF            | LCI 2     |

#### Notes:

- SR-2578, SR-2588, SR-2630, SR-2631, SR-2705, SR-2785, SR-2799 to be completed during Commissioning

### 3.16 Weight control

Engineering deliverables from weightcontrol for offshore and floating installations

[maintain/compare table](#)

| Information item                        | ID      | Ref.  | Handover Format | Milestone |
|-----------------------------------------|---------|-------|-----------------|-----------|
| <a href="#">Weight control database</a> | SR-2795 | 5-238 | TBA             | LCI 2     |
| <a href="#">Weight report</a>           | SR-2796 | 5-239 | PDF             | LCI 2     |

## 4 Equipment LCI deliverables

Chapter 4 gives an overview of LCI deliverables for selected categories and types of equipment. It should be read in conjunction with chapter 2, that gives an overview of Company's general requirements (related to scoping, planning, required quality and handover formats of LCI) and chapter 5 that details the requirements related to content of LCI deliverables listed in chapter 3.

For requirements related to Wind turbine generator (WTG) refer to Chapter 6

### 4.1 Electrical

#### SR-62637 -

| ID      | Title                                                       | Doc type | Milestone | Handover format | AIS earth switch, disconnectors | Battery banks for power supply | Bus duct | Electric Motor – Low voltage | Frequency converter, (ER tag) | Generator | Harmonic filter, resistor, reactor and capacitors | Submarine cables, export cables | Switchgear, distribution boards | Transformer | UPS and battery chargers, (ER tag) | Subsea power Cables | Special Cables |
|---------|-------------------------------------------------------------|----------|-----------|-----------------|---------------------------------|--------------------------------|----------|------------------------------|-------------------------------|-----------|---------------------------------------------------|---------------------------------|---------------------------------|-------------|------------------------------------|---------------------|----------------|
| SR-2530 | Single line diagram (Supplier)                              | XJ       | LCI 2     | PDF             |                                 |                                |          |                              |                               |           |                                                   |                                 |                                 |             |                                    |                     |                |
| SR-2531 | Certificate of conformance                                  | VB       | LCI 2     | PDF             | X                               | X                              | X        | X                            | X                             | X         | X                                                 | X                               | X                               | X           | X                                  | X                   | X              |
| SR-2534 | Detail drawing with parts list                              | XS       | LCI 1     | PDF             | X                               | X                              |          |                              | X                             | X         | X                                                 | X                               | X                               | X           | X                                  | X                   | X              |
| SR-2575 | Circuit / Wiring diagram                                    | XX, XT   | LCI 2     | PDF             |                                 | X                              |          | X                            | X                             | X         | X                                                 |                                 | X                               | X           | X                                  | X                   | X              |
| SR-2751 | Spare Parts Interchangeability Register (SPIR)              | MC       | LCI 1     | XLS (TR1005)    |                                 | X                              | X        |                              | X                             | X         | X                                                 |                                 | X                               | X           |                                    | X                   | X              |
| SR-2589 | Data sheet - Product                                        | DS       | LCI 1     | PDF             | X                               | X                              | X        | X                            | X                             | X         | X                                                 | X                               | X                               | X           | X                                  | X                   | X              |
| SR-2650 | General Arrangement Drawing                                 | XD       | LCI 2     | PDF             | X                               | X                              | X        | X                            | X                             | X         | X                                                 |                                 | X                               | X           | X                                  | X                   | X              |
| SR-2675 | Installation, operation and maintenance manual (IOM manual) | MA       | LCI 1     | PDF             | X                               | X                              | X        | X                            | X                             | X         | X                                                 |                                 | X                               | X           | X                                  | X                   | X              |
| SR-2696 | Manufacturing Record Book (MRB)                             | VA       | LCI 2     | PDF             | X                               |                                |          |                              | X                             | X         | X                                                 | X                               | X                               | X           | X                                  | X                   | X              |

#### Equipment notes

- **Bus duct**; Metal housing, in the form of bus duct, for enclosure of busbars
- **Electrical Motors - Low voltage**; All types of low-voltage motors
- **Frequency converter (ER tag)**; Variable-frequency drives are also known as adjustable-frequency drives (AFD), variable-speed drives (VSD), load commutated inverter drives (LCI) and automatic voltage regulators (AVRs)
- **Generator**; All types of generators
- **Harmonic filter**, resistor, reactor and capacitors; Filter for harmonics are necessary for the elimination of the harmonic waves and for the production of the necessary reactive power. Filters may be tuned to the expected harmonic frequencies and consist of series combinations of capacitors, reactors and in some cases resistors.
- **Switchgear, distribution boards**; All types of high voltage and low voltage switchgear, including circuits/starters/feeders.
- **Transformer**; All types of high-voltage and low-voltage transformers, reactors and shunt reactors
- **UPS and battery chargers (ER tag)**; An electrical apparatus that provides instantaneous protection from input power interruptions by means of one or more attached batteries and associated electronic circuitry for low power users

#### Notes

- For Control cabinets, refer to requirements in "4.4 Instrumented systems, included Safety and Automation System"
- For Battery, SR-2589 applies only to minor batteries (start battery, etc)
- SR-2575 For customized documentation, handover format shall be DGN/DWG (TR1970) + PDF
- SR-2696 Manufacturing Record Book (MRB): The Factory Acceptance Test report shall always be included, in addition to all other necessary documents
- SR-2650 shall be delivered if the equipment is a battery bank

### 4.2 HVAC

#### SR-62640 -

| ID      | Title                                                         | Doc type | Milestone | Handover format | Air conditioners. | Air handling units | Cooling and refrigeration units. | Domestic water heaters. | Ducts/Grilles/Registers and Diffusers | DX evaporators and condensers | Electrical heating batteries | F&G-controlled dampers. | Fans | Filters and filter-coalesces. | Humidifiers and dehumidifiers. | Liquid heating and cooling coils | Measuring stations | Miscellaneous HVAC equipment. | Secondary dampers (e.g. shut down, back kick and control dampers). | Sound attenuators. | Terminal units. | Water traps | Weather louvers and water mist eliminators |
|---------|---------------------------------------------------------------|----------|-----------|-----------------|-------------------|--------------------|----------------------------------|-------------------------|---------------------------------------|-------------------------------|------------------------------|-------------------------|------|-------------------------------|--------------------------------|----------------------------------|--------------------|-------------------------------|--------------------------------------------------------------------|--------------------|-----------------|-------------|--------------------------------------------|
| SR-2571 | Calculations, curves and tables                               | CA       | LCI 2     | PDF             | X                 | X                  | X                                |                         |                                       | X                             | X                            | X                       | X    |                               | X                              | X                                |                    |                               |                                                                    |                    |                 |             |                                            |
| SR-2575 | Circuit / Wiring diagram                                      | XK, XT   | LCI 2     | PDF             | X                 | X                  | X                                | X                       |                                       | X                             | X                            | X                       | X    |                               | X                              |                                  | X                  | X                             | X                                                                  | X                  | X               | X           |                                            |
| SR-2589 | Data sheet - Product                                          | DS       | LCI 1     | PDF             | X                 | X                  | X                                | X                       |                                       | X                             | X                            | X                       | X    | X                             | X                              | X                                | X                  | X                             | X                                                                  | X                  | X               |             | X                                          |
| SR-2599 | Data sheets - Weight                                          | DS       | LCI 2     | PDF             | X                 | X                  | X                                | X                       |                                       | X                             | X                            | X                       | X    | X                             | X                              | X                                |                    | X                             | X                                                                  | X                  |                 |             | X                                          |
| SR-2534 | Detail drawing with parts list                                | XS       | LCI 1     | PDF             | X                 | X                  | X                                | X                       |                                       | X                             | X                            | X                       | X    | X                             | X                              | X                                | X                  | X                             | X                                                                  | X                  | X               | X           | X                                          |
| SR-2609 | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             | X                 | X                  | X                                |                         | X                                     | X                             |                              | X                       | X    | X                             |                                |                                  |                    |                               |                                                                    | X                  |                 |             |                                            |
| SR-2715 | Equipment supplier piping and instrument diagram (P&ID)       | XB       | LCI 1     | PDF             |                   |                    | X                                |                         |                                       | X                             |                              |                         |      |                               | X                              |                                  |                    |                               |                                                                    |                    |                 |             |                                            |
| SR-2650 | General Arrangement Drawing                                   | XD       | LCI 2     | PDF             | X                 | X                  | X                                | X                       |                                       | X                             | X                            | X                       | X    | X                             | X                              | X                                | X                  | X                             | X                                                                  | X                  | X               | X           | X                                          |
| SR-2675 | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             | X                 | X                  | X                                | X                       |                                       | X                             | X                            | X                       | X    | X                             | X                              | X                                | X                  | X                             | X                                                                  | X                  | X               | X           | X                                          |
| SR-2696 | Manufacturing Record Book (MRB)                               | VA       | LCI 2     | PDF             | X                 | X                  | X                                | X                       |                                       | X                             | X                            | X                       | X    | X                             | X                              | X                                |                    | X                             | X                                                                  |                    | X               | X           | X                                          |
| SR-2751 | Spare Parts Interchangeability Register (SPIR)                | MC       | LCI 1     | XLS (TR10 05)   | X                 | X                  | X                                | X                       |                                       | X                             | X                            | X                       | X    | X                             | X                              | X                                | X                  | X                             | X                                                                  | X                  | X               | X           | X                                          |
| SR-2790 | Utility consumption index                                     | LA       | LCI 2     | XLS + PDF       | X                 | X                  | X                                | X                       |                                       | X                             | X                            | X                       | X    |                               | X                              | X                                |                    |                               | X                                                                  |                    |                 |             |                                            |

#### Equipment Notes

- SR-2575 For customized documentation, handover format shall be DGN/DWG (TR1970) + PDF

## 4.3 Instrumentation

| ID                 | Title                                                         | Doc type | Milestone | Handover format | Fire & Gas detectors | Flow and restriction Orifices | Flow meter (transmitter and element) | Indicators | Instrument junction boxes | Level gauges | Level instrumentation (transmitters and assembly) | Online analyser assembly | Other electrical instruments | Pressure and temperature transmitter | Rupture disk | Thermowell |
|--------------------|---------------------------------------------------------------|----------|-----------|-----------------|----------------------|-------------------------------|--------------------------------------|------------|---------------------------|--------------|---------------------------------------------------|--------------------------|------------------------------|--------------------------------------|--------------|------------|
| SR-2589            | Data sheet - Product                                          | DS       | LCI 1     | PDF             | X                    | X                             | X                                    | X          |                           | X            | X                                                 | X                        | X                            | X                                    | X            | X          |
| SR-2534            | Detail drawing with parts list                                | XS       | LCI 1     | PDF             | X                    |                               | X                                    | X          |                           | X            | X                                                 | X                        | X                            | X                                    | X            |            |
| SR-2609            | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             | X                    | X                             | X                                    | X          | X                         | X            | X                                                 | X                        | X                            | X                                    | X            | X          |
| SR-2532            | Electrical connection and wiring diagram - instrument         | XP       | LCI 2     | PDF             | X                    |                               | X                                    |            |                           |              | X                                                 | X                        | X                            | X                                    |              |            |
| SR-2650            | General Arrangement Drawing                                   | XD       | LCI 2     | PDF             |                      | X                             | X                                    |            | X                         |              |                                                   |                          |                              | X                                    | X            |            |
| SR-2675            | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             | X                    |                               | X                                    | X          |                           | X            | X                                                 | X                        | X                            | X                                    |              |            |
| SR-2696            | Manufacturing Record Book (MRB)                               | VA       | LCI 2     | PDF             |                      |                               | X                                    |            |                           | X            | X                                                 | X                        |                              |                                      |              | X          |
| SR-2740            | Safety manual                                                 | MB       | LCI 1     | PDF             | X                    |                               | X                                    |            |                           |              | X                                                 | X                        | X                            | X                                    |              |            |
| SR-62639 - SR-2751 | Spare Parts Interchangeability Register (SPIR)                | MC       | LCI 1     | XLS (TR1005)    | X                    |                               | X                                    | X          |                           | X            | X                                                 | X                        | X                            | X                                    | X            |            |

## Equipment notes

- **Flow meter;** Covers both flow transmitters and flow element
- **Level instrumentation;** Level transmitters and assembly (e.g. bridles, collimators)
- **Other electrical instruments;** Instruments like electrical switches (proximity, acoustic, optical), sand detectors, erosion probes and solenoids when these instruments are not part of an assembly (e.g. part of an on/off valve or a control valve)

## Notes

- SR-2696 - Manufacturing Record Book (MRB) shall as minimum contain; Certificate of conformance, Material certificate and Pressure test certificate
- SR2740 - Safety manual; If instrument utilized in a SIF
- SR-2532 – Does not apply to wireless instruments

#### 4.4 Instrumented systems, included SCADA/SAS

##### SR-62638 -

| ID      | Title                                                         | Doc type | Milestone | Handover format | Computer equipment | Panels, cabinets and consoles | Power supply |
|---------|---------------------------------------------------------------|----------|-----------|-----------------|--------------------|-------------------------------|--------------|
| SR-2634 | Detail drawing with parts list                                | XS       | LCI 1     | PDF             | X                  | X                             | X            |
| SR-2609 | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             |                    | X                             | X            |
| SR-2532 | Electrical connection and wiring diagram - instrument         | XP       | LCI 2     | PDF             |                    | X                             |              |
| SR-2650 | General Arrangement Drawing                                   | XD       | LCI 2     | PDF             |                    | X                             |              |
| SR-2675 | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             |                    | X                             |              |
| SR-2696 | Manufacturing Record Book (MRB)                               | VA       | LCI 2     | PDF             |                    | X                             |              |
| SR-2751 | Spare Parts Interchangeability Register (SPIR)                | MC       | LCI 1     | XLS (TR1005)    |                    | X                             |              |

##### Notes

- SR-2532 - Electrical connection and wiring diagram - instrument applies to internal wiring

##### Equipment notes

- Panels, cabinets and consoles;** e.g. termination cabinets, operator panels, SCADA/SAS control units and non SCADA/SAS control units

## 4.5 Lifting appliances

For equipment with interface to plant system (e.g. Safety, Telecom, Fire & Gas), the requirements described in relevant chapters apply.

### SR-62646 -

| ID      | Title                                                            | Doc type | Milestone | Handover format | Chain hoist | Cranes | Lifts for transportation of persons and goods | Loose lifting gear | Runway beams and lifting lugs |
|---------|------------------------------------------------------------------|----------|-----------|-----------------|-------------|--------|-----------------------------------------------|--------------------|-------------------------------|
| SR-2571 | Calculations, curves and tables                                  | CA       | LCI 2     | PDF             |             | X      |                                               |                    |                               |
| SR-2573 | Certificate for use - Lifting appliances                         | VB       | LCI 2     | PDF             | X           | X      | X                                             | X                  | X                             |
| SR-2575 | Circuit / Wiring diagram                                         | XK, XT   | LCI 2     | PDF             | X           | X      | X                                             |                    |                               |
| SR-2589 | Data sheet - Product                                             | DS       | LCI 1     | PDF             | X           | X      | X                                             |                    | X                             |
| SR-2599 | Data sheets - Weight                                             | DS       | LCI 2     | PDF             | X           | X      | X                                             | X                  | X                             |
| SR-2603 | Declaration of conformity                                        | VB       | LCI 2     | PDF             | X           | X      | X                                             | X                  | X                             |
| SR-2534 | Detail drawing with parts list                                   | XS       | LCI 1     | PDF             | X           | X      | X                                             |                    |                               |
| SR-2609 | Documentation for dispatch, receipt, storage and preservation    | MA       | LCI 1     | PDF             | X           | X      | X                                             |                    |                               |
| SR-2532 | Electrical connection and wiring diagram - instrument            | XP       | LCI 2     | PDF             | X           | X      | X                                             |                    |                               |
| SR-2650 | General Arrangement Drawing                                      | XD       | LCI 2     | PDF             | X           | X      | X                                             |                    | X                             |
| SR-2668 | Hydraulic circuit diagrams - Lifting appliances                  | XK       | LCI 2     | PDF             | X           | X      | X                                             |                    |                               |
| SR-2688 | Hydraulic hose list -Lifting appliances                          | LA       | LCI 2     | PDF             | X           | X      | X                                             |                    |                               |
| SR-2675 | Installation, operation and maintenance manual (IOM manual)      | MA       | LCI 1     | PDF             | X           | X      | X                                             | X                  | X                             |
| SR-2530 | Single line diagram (Supplier)                                   | XJ       | LCI 2     | PDF             | X           | X      | X                                             |                    |                               |
| SR-2749 | Slewing ring/Foundation bolts tension table - Lifting appliances | RB       | LCI 2     | PDF             |             | X      |                                               |                    |                               |
| SR-2750 | Software documentation - Lifting appliances                      | ZB       | LCI 2     | PDF             |             | X      | X                                             |                    |                               |
| SR-2751 | Spare Parts Interchangeability Register (SPIR)                   | MC       | LCI 1     | XLS (TR1005)    | X           | X      | X                                             |                    |                               |
| SR-2782 | Test procedures - Lifting appliances                             | KB       | LCI 1     | PDF             | X           | X      | X                                             |                    | X                             |
| SR-2783 | Third Party verifications                                        | RF       | LCI 2     | PDF             | X           | X      | X                                             |                    |                               |

### Equipment notes

- **Chain hoists;** Air driven, electric driven and hydraulic driven chain hoists
- **Cranes;** offshore cranes, Bridge and Gantry cranes, general purpose cranes, special designed lifting appliances in the drilling area, davids, winches.
- **Lifts for transportation of persons and goods;** Electric and Hydraulic lifts, Service lifts, Rack and pinion lifts, Goods lifts
- **Loose lifting gear;** Components or equipment used between the lifting appliance and the load or on the load to grip it, but which is not an integrated part of the lifting appliance

### Notes

- SR-2530 ENS tag number shall only be included in a table cross referencing Supplier tag number to ENS tag number
- SR-2532 Applicable for systems connected to Plant systems
- SR-2532 ENS tag number shall only be included in a table cross referencing Supplier tag number to ENS tag number
- SR-2534 ENS tag number shall only be included in a table cross referencing Supplier tag number to ENS tag number
- SR-2534 Shall be delivered for components that require detailed instruction for maintenance and parts replacement on a regular basis. It is not required for components that are replaced as complete units
- SR-2571 Applies to Lifting appliances with Air conditioners and/or Fans. Calculations for showing that the HVAC system has the necessary capacity to heat/cool the crane cabin/machinery room at the specified ambient temperature
- SR-2575 For customized documentation, handover format shall be DGN/DWG (TR1970) + PDF
- SR-2575 ENS tag number shall only be included in a table cross referencing Supplier tag number to ENS tag number
- SR-2594 Data sheet for the complete machine delivery
- SR-2594 For chain hoist, cranes and lifts, shall be delivered for main Mechanical, hydraulic, electrical, instrumentation and HVAC components
- SR-2629 For all EX classified components

- SR-2650 ENS tag number shall only be included in a table cross referencing Supplier tag number to ENS tag number
- SR -2650 Shall be delivered for the complete machinery delivery
- SR-2675 Maintenance instructions shall be based on RCM analysis. (Applies for Chain hoist, Cranes, Lifts for transportation of persons and goods)
- SR-2675 Shall be delivered for the complete machinery delivery
- SR-2751 Shall cover complete SPIR and SPIR for 1 year of operation
- SR-2751 Shall be delivered for power driven Chain hoist
- SR-2783 Shall include design approval letter and/or type approval

#### 4.6 Mechanical

##### SR-62645 -

| ID      | Title                                                         | Doc type | Milestone | Handover format      | Blower | Coupling | Diesel Engine, Hydraulic motor | Filter pressurized | Heat exchanger, Cooler, Condenser | Mechanical/hydraulic gear | Pump | Tank, Container (atmospheric) |
|---------|---------------------------------------------------------------|----------|-----------|----------------------|--------|----------|--------------------------------|--------------------|-----------------------------------|---------------------------|------|-------------------------------|
| SR-2571 | Calculations, curves and tables                               | CA       | LCI 2     | PDF                  | X      | X        | X                              | X                  | X                                 | X                         | X    | X                             |
| SR-2531 | Certificate of conformance                                    | VB       | LCI 2     | PDF                  | X      | X        | X                              | X                  | X                                 | X                         | X    | X                             |
| SR-2702 | Data sheet - Noise                                            |          | LCI 2     | PDF                  | X      |          | X                              |                    |                                   | X                         | X    |                               |
| SR-2589 | Data sheet - Product                                          | DS       | LCI 1     | PDF                  | X      | X        | X                              | X                  | X                                 | X                         | X    | X                             |
| SR-2599 | Data sheets - Weight                                          | DS       | LCI 2     | PDF                  | X      |          | X                              | X                  | X                                 | X                         | X    | X                             |
| SR-2534 | Detail drawing with parts list                                | XS       | LCI 1     | PDF                  | X      | X        | X                              | X                  | X                                 | X                         | X    | X                             |
| SR-2609 | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF                  | X      | X        | X                              | X                  | X                                 | X                         | X    | X                             |
| SR-2616 | Electrical connection diagram                                 | XP       | LCI 2     | DGN/DWG (TR1970)+PDF | X      |          | X                              |                    |                                   | X                         | X    |                               |
| SR-2715 | Equipment supplier piping and instrument diagram (P&ID)       | XB       | LCI 1     | PDF                  | X      | X        | X                              |                    |                                   | X                         | X    |                               |
| SR-2650 | General Arrangement Drawing                                   | XD       | LCI 2     | PDF                  | X      | X        | X                              | X                  | X                                 | X                         | X    | X                             |
| SR-2675 | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF                  | X      | X        | X                              | X                  | X                                 | X                         | X    | X                             |
| SR-2693 | Lubrication index                                             | LA       | LCI 1     | XLS + PDF            | X      | X        | X                              |                    |                                   | X                         | X    |                               |
| SR-2696 | Manufacturing Record Book (MRB)                               | VA       | LCI 2     | PDF                  | X      | X        | X                              | X                  | X                                 | X                         | X    | X                             |
| SR-2724 | Pneumatic/hydraulic hook-up drawing                           | XY       | LCI 2     | PDF                  | X      |          | X                              |                    |                                   | X                         | X    |                               |
| SR-2751 | Spare Parts Interchangeability Register (SPIR)                | MC       | LCI 1     | XLS (TR1005)         | X      | X        | X                              | X                  | X                                 | X                         | X    | X                             |

##### Equipment notes

- **Coupling;** With or without torque meter

##### Notes

- SR-2571 Simulation model input files shall also be delivered, in ZIP format. Applicable for Heat exchanger, Cooler, Condenser
- SR-2616 For skid/package. Applicable for Blower, Compressor, Diesel Engine, Hydraulic motor, Expander, Mechanical/hydraulic gear, Pump, Steam turbine
- SR-2715 For Coupling with torque meter
- SR-2790 Not required for static mechanical equipment as the information is covered by the equipment datasheet.

## 4.7 Piping/Layout

## SR-62644 -

| ID      | Title                                                         | Doc type | Milestone | Handover format | Hose assemblies | Special items | spring support assemblies |
|---------|---------------------------------------------------------------|----------|-----------|-----------------|-----------------|---------------|---------------------------|
| SR-2599 | Data sheets - Weight                                          | DS       | LCI 2     | PDF             |                 | X             |                           |
| SR-2602 | Datasheets - Hose                                             | DS       | LCI 1     | PDF             | X               |               |                           |
| SR-2609 | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             |                 | X             | X                         |
| SR-2675 | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             |                 | X             | X                         |
| SR-2696 | Manufacturing Record Book (MRB)                               | VA       | LCI 2     | PDF             | X               | X             | X                         |

## Equipment notes

- **Hose assemblies;** Hoses with couplings
- **Special items;** Special Items are components that are NOT manufactured in accordance with standard components listed in the applicable Code. Design of special item shall be checked if suitable for use at pressure-temperature ratings and checked for adequacy of mechanical strength under loadings described in the applicable code. If a special item is a valve, then the requirements for valves shall apply
- **Spring support assemblies;** Spring support assemblies and damper/shock absorber

## Notes

- SR-2675 For special items shall be delivered for equipment requiring preventive maintenance

## 4.8 Safety

## SR-62643 -

| ID      | Title                                                         | Doc type | Milestone | Handover format | Chutes and rafts | Deluge and sprinkler | Dry chemical unit | Equipment for rescue | Firewater hose reel/hydrant/dual agent | Firewater/foam monitor | General fire fighting equipment | Life saving equipment | Life- and MOB boat with release system | Water mist and gaseous extinguishing/inerting system |
|---------|---------------------------------------------------------------|----------|-----------|-----------------|------------------|----------------------|-------------------|----------------------|----------------------------------------|------------------------|---------------------------------|-----------------------|----------------------------------------|------------------------------------------------------|
| SR-2531 | Certificate of conformance                                    | VB       | LCI 2     | PDF             | X                |                      |                   |                      |                                        |                        |                                 | X                     | X                                      |                                                      |
| SR-2589 | Data sheet - Product                                          | DS       | LCI 1     | PDF             | X                | X                    |                   |                      | X                                      | X                      |                                 |                       | X                                      | X                                                    |
| SR-2534 | Detail drawing with parts list                                | XS       | LCI 1     | PDF             |                  | X                    | X                 |                      | X                                      | X                      | X                               |                       | X                                      | X                                                    |
| SR-2609 | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             |                  | X                    | X                 | X                    | X                                      | X                      | X                               |                       | X                                      | X                                                    |
| SR-2675 | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             |                  | X                    | X                 |                      | X                                      | X                      | X                               |                       | X                                      | X                                                    |
| SR-2740 | Safety manual                                                 | MB       | LCI 1     | PDF             |                  | X                    | X                 |                      |                                        | X                      |                                 |                       |                                        | X                                                    |
| SR-2751 | Spare Parts Interchangeability Register (SPIR)                | MC       | LCI 1     | XLS (TR1005)    |                  | X                    | X                 |                      |                                        | X                      |                                 |                       | X                                      | X                                                    |

## Equipment notes

- **Deluge and sprinkler;** Including valves and accessories
- **Equipment for rescue;** Equipment for fire brigade and rescue team members
- **General fire fighting equipment;** Including manual fire extinguisher and foam trolley
- **Life saving equipment;** Including survival suits and life jackets
- **Emergency evacuation systems;** Including evacuation descenders from wind turbines

## Notes

- SR-2531 Including Type certificate and Product certificate
- SR-2589 for Chutes and rafts: Shall cover the life raft
- SR-2589 for Firewater/foam monitor and Deluge and sprinkler: Shall cover the Firewater valve skid
- SR-2589 for Life- and MOB boat with release system: Shall cover MOB boat and Davit
- SR-2740 On Firewater/foam monitor: Covers the release function.

## 4.9 Telecommunication

## SR-62642 -

| ID      | Title                                                              | Doc type | Milestone | Handover format | Access panel/control unit/keyboard | Acoustic hood | Audio/video field equipment | Cabling distribution network equipment | Central telecommunication equipment | Company supplied IT equipment | Fiber optical long distance cable transmission system | Portable radio equipment (Ex) | Radio link | Satellite station | Telecommunication field equipment | Telecommunication field equipment (Ex) | Telecommunication management equipment |
|---------|--------------------------------------------------------------------|----------|-----------|-----------------|------------------------------------|---------------|-----------------------------|----------------------------------------|-------------------------------------|-------------------------------|-------------------------------------------------------|-------------------------------|------------|-------------------|-----------------------------------|----------------------------------------|----------------------------------------|
| SR-2531 | Certificate of conformance                                         | VB       | LCI 2     | PDF             |                                    |               |                             |                                        | x                                   |                               | x                                                     | x                             | x          | x                 |                                   |                                        |                                        |
| SR-2534 | Detail drawing with parts list                                     | XS       | LCI 1     | PDF             | x                                  |               |                             |                                        | x                                   | x                             | x                                                     | x                             | x          | x                 |                                   |                                        | x                                      |
| SR-2575 | Circuit / Wiring diagram                                           | XK, XT   | LCI 2     | PDF             |                                    |               |                             |                                        | x                                   |                               | x                                                     | x                             | x          | x                 |                                   |                                        |                                        |
| SR-2589 | Data sheet - Product                                               | DS       | LCI 1     | PDF             |                                    |               |                             | x                                      | x                                   |                               | x                                                     | x                             | x          | x                 |                                   |                                        |                                        |
| SR-2609 | Documentation for dispatch, receipt, storage and preservation      | MA       | LCI 1     | PDF             | x                                  |               | x                           |                                        | x                                   |                               | x                                                     |                               | x          | x                 | x                                 |                                        | x                                      |
| SR-2632 | Fiber optical long distance cable transmission budget calculations | CA       | LCI 2     | PDF             |                                    |               |                             |                                        |                                     |                               | x                                                     |                               |            |                   |                                   |                                        |                                        |
| SR-2650 | General Arrangement Drawing                                        | XD       | LCI 2     | PDF             |                                    |               |                             | x                                      | x                                   |                               | x                                                     |                               | x          | x                 |                                   |                                        |                                        |
| SR-2675 | Installation, operation and maintenance manual (IOM manual)        | MA       | LCI 1     | PDF             |                                    |               |                             | x                                      | x                                   |                               | x                                                     |                               | x          | x                 |                                   |                                        | x                                      |
| SR-2696 | Manufacturing Record Book (MRB)                                    | VA       | LCI 2     | PDF             |                                    |               |                             |                                        | x                                   |                               | x                                                     |                               | x          | x                 |                                   |                                        |                                        |
| SR-2733 | Radio link budget calculations                                     | CA       | LCI 2     | PDF             |                                    |               |                             |                                        |                                     |                               |                                                       |                               | x          |                   |                                   |                                        |                                        |
| SR-2742 | Satellite link budget calculations                                 | CA       | LCI 2     | PDF             |                                    |               |                             |                                        |                                     |                               |                                                       |                               |            | x                 |                                   |                                        |                                        |
| SR-2751 | Spare Parts Interchangeability Register (SPIR)                     | MC       | LCI 1     | XLS (TR100 5)   | x                                  |               |                             |                                        | x                                   |                               | x                                                     |                               | x          | x                 |                                   |                                        | x                                      |

## Equipment notes

- **Access panel/control unit/keyboard;** Access panel/control unit/keyboard for CCTV, PAGA, etc.
- **Acoustic hood;** Acoustic hood for telephones and PAGA microphone stations
- **Audio/video field equipment;** Audio/video equipment (non EX) like amplifiers, loudspeakers, CD/DVD players, TVs, etc.
- **Cabling distribution network equipment;** Distribution frames/patch panels, outlets, etc.
- **Central equipment (racks) for telecommunication systems:** PAGA, Telephone system, Data network, Multiplexers, Radio systems, Audio/video entertainment, CCTV, Meteorological observation, Marine radar/AIS, Telecommunication power supply, Navigation systems, Positioning systems, etc.
- **Company supplied IT equipment;** PCs, monitors, servers, printers, etc.
- **Fiber optical long distance cable transmission system;** Transmission systems for long distance fiber optical cables. May be part of WDM/SDH/PDH multiplexers or data network equipment
- **Portable radio equipment (EX);** Portable radios (transceivers), pagers
- **Telecommunication field equipment;** Non Ex field equipment like fixes radios, antennas, splitters, meteorological sensors, telephones, etc.
- **Telecommunication field equipment (EX);** Ex field equipment like PAGA loudspeakers, flashing lights, telephones, antennas, splitters, meteorological sensors, etc.
- **Telecommunication management equipment;** Telecommunication interface units for telecommunication management system

## Notes

- SR-2575 For customized documentation, handover format shall be DGN/DWG (TR1970) + PDF
- SR-2696 Telecom test reports and FAT reports shall always be included, in addition to all other necessary documents

## 4.10 Valves and operators

## SR-62641 -

| ID       | Title                                                            | Doc type | Milestone | Handover format | Actuated on/off valves | Actuators (when not a part of valve assembly) | Commodity valves | Control & Choke valves | Manual on/off valves | Pressure relief valves | Subsea pipeline valves |
|----------|------------------------------------------------------------------|----------|-----------|-----------------|------------------------|-----------------------------------------------|------------------|------------------------|----------------------|------------------------|------------------------|
| SR-2531  | Certificate of conformance                                       | VB       | LCI 2     | PDF             | X                      | X                                             |                  |                        |                      |                        |                        |
| SR-2532  | Electrical connection and wiring diagram - instrument            | XP       | LCI 2     | PDF             | X                      | X                                             |                  | X                      |                      |                        |                        |
| SR-2566  | Blast load calculations                                          | CA       | LCI 2     | PDF             | X                      | X                                             |                  |                        |                      |                        |                        |
| SR-2589  | Data sheet - Product                                             | DS       | LCI 1     | PDF             | X                      | X                                             |                  | X                      |                      | X                      | X                      |
| SR-2609  | Documentation for dispatch, receipt, storage and preservation    | MA       | LCI 1     | PDF             |                        |                                               |                  |                        |                      |                        | X                      |
| SR-2673  | Installation , Operating and Maintenance Instructions for Valves | MA       | LCI 1     | PDF             | X                      | X                                             | X                | X                      | X                    | X                      | X                      |
| SR-2696  | Manufacturing Record Book (MRB)                                  | VA       | LCI 2     | PDF             |                        |                                               |                  |                        |                      |                        | X                      |
| SR-2724  | Pneumatic/hydraulic hook-up drawing                              | XY       | LCI 2     | PDF             | X                      | X                                             |                  | X                      |                      |                        | X                      |
| SR-2740  | Safety manual                                                    | MB       | LCI 1     | PDF             | X                      | X                                             |                  |                        |                      |                        |                        |
| SR-2751  | Spare Parts Interchangeability Register (SPIR)                   | MC       | LCI 1     | XLS (TR1005)    | X                      | X                                             |                  | X                      | X                    | X                      | X                      |
| SR-81347 | Valve and operator calculations                                  | CA       | LCI 2     | PDF             | X                      | X                                             |                  | X                      |                      |                        |                        |
| SR-2793  | Valve and operator drawings                                      | XD       | LCI 1     | PDF             | X                      | X                                             | X                | X                      | X                    | X                      | X                      |
| SR-2794  | Valve and operator test reports                                  | RF       | LCI 2     | PDF + ZIP       | X                      | X                                             |                  | X                      |                      |                        | X                      |

## Equipment notes:

**Actuated on/off valves;** On/off valves automatically operated by pneumatic, hydraulic or electrical actuator

**Actuators (when not part of a valve assembly);** A mechanical device that automatically operates a valve by transforming energy into motion

**Commodity valves;** Valves to be replaced (not to be repaired) in case of failure. Applicable VDS/VSK defines whether a valve is a commodity valve

**Manual on/off valves;** Check and on/off valves (excluding commodity valves) operated manually by handwheel, lever or gearbox

**Pressure relief valves;** A valve that relieves over pressure (other terms used: PRV, PSV, OZV)

## Notes

- SR-2566 Shall be delivered for emergency shutdown valves and emergency depressurization valves (ESV) safety critical valves (as determined by Project/Purchaser)
- SR-2629 ATEX certification applicable for electrical actuated valves. Applies for Actuated on/off valves, Actuators (when not a part of valve assembly)
- SR-2724 Shall be delivered for equipment with loose control panel. Applies for Actuated on/off valves
- SR-2724 Supplier's standard drawing. TR0038 is not applicable. Applies for Subsea pipeline valves
- SR-2740 For actuated on/off valves and actuators (when not part of valve assembly), shall be delivered if utilized in a SIF
- SR-2751 Only applicable for actuator. Applies for Subsea pipeline valves

## 5 LCI requirements descriptions

This chapter details the requirements related to LCI deliverables listed in chapters 3 and 4. In addition, each LCI deliverable has assigned attributes: LCI milestone, handover format, and local language explicit requirement when applicable.

### 5-2, SR-61919 - 3D CAD model - offshore, onshore and subsea

The 3D model shall be prepared according to requirements described in TR2231 "LCI requirements - 3D CAD model"

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | 3D CAD (TR2231)                                                                         |

### 5-3, SR-81130 - 3D CAD model - WTG

The 3D model shall be prepared according to requirements described in TR2231 "LCI requirements - 3D CAD model"

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | 3D CAD (TR2231)                                                                         |

### 5-4, SR-61918 - 3D Noise Simulation Model

The Noise Simulation Model shall include all noise sources, piping and reflection from adjacent equipment and structure (walls, floor, ceiling, etc). Noise reducing measures, as absorption, noise hoods, etc. shall be included in the simulation model. The software to be used requires use of point sources, line sources, areas sources and box sources, both directly from sources and from reflections. Recommended software are Soundplan and Cadna (R and/or A), the handover format to be agreed. All necessary files to run the model shall be handed over, including maps and/or plot plans.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  TBA   |

### 5-5, SR-2551 - Acoustic/thermal insul. and fire protection plan

These drawings shall be based on equipment layout drawings or architectural layout drawings and shall include acoustic insulation, thermal insulation and fire protection details as follows:

- All doors and windows
- All insulation in ceiling, floors and walls
- Blast/fire walls
- All penetrations in blast/fire wall

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

### 5-6, SR-2730 - Additional studies

All additional studies required for the specific scope for the project/plant shall be delivered. This may include:

- Technology qualification studies
- 3rd party studies, e.g. special studies and verification studies

These studies shall be delivered as LCI also when performed in project phases prior to the execution phase.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-7, SR-2553 - Air flow diagrams**

Air distribution diagrams (HVAC flow diagrams) shall be provided per system and include the following information:

- Tag codes for supply and extract fans (air handling units)
- Flow rates for supply and extract fans (air handling units)
- Flow rates for all serviced areas and air flows necessary for system balancing
- Temperature range requirements for all serviced areas
- Air change rates for all serviced areas
- HVAC noise range requirements for all serviced areas
- Area code and description for fan rooms and serviced areas
- Notes regarding main design parameters, such as fan standby philosophy, emergency operation, shall be given.

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-8, SR-2554 - Alarm C&H (Context & Hiding)**

The context and hiding charts shall be prepared as a matrix between initiating and actuated elements to be hidden. Both initiating and hidden elements shall be identified by ENS tag numbers.

[C999-ST-J-MT-0003 Template - Alarm C&H \(Context & Hiding\)](#)

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                               |

**5-9, SR-2555 - Alarm classification**

Alarms shall be documented in accordance with the Alarm classification template.

[C999-ST-J-MT-0004 Template - Alarm classification](#)

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                                 |

**5-10, SR-2556 - ALARP register**

ALARP register shall be delivered according to GL0139.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                                 |

**5-11, SR-61916 - Anode details and layout**

Drawing of anodes shall be provided for the structural discipline with the following information:

- Location where the anode is attached
- Number off
- Type/weight/dimension
- Attachment to structure

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-12, SR-2558 - Antenna tower layout drawings**

Antenna tower layout drawings shall be provided. Drawings shall include location of antennas in antenna tower, the type of antenna, associated equipment and the vertical and horizontal distance between the different antennas.

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-13, SR-2559 - Architectural layout drawings**

Architectural layout drawings (plans and elevations) shall be produced for all architectural areas (living quarters, CCR, stores, workshops, etc.). The drawing scale shall normally be 1:100 on A3 format. However larger scales can be selected if required. The drawings shall include stairs, walls, doors, windows, furniture, access and escape routes and all tagged equipment.

Main dimensions shall be included. Elevations of all floors and platforms etc. shall be shown. Room areas shall be included. The area shall be noted in m2 and be positioned adjacent to or directly under the room or area name. A key plan, grid lines with north and east references and match lines with drawing references shall be included. Drawings from adjacent areas shall be referenced.

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-14, SR-2560 - Area classification drawings**

Area classification drawings shall be scaled and prepared in accordance with regulatory requirements for area classification. Fire walls, other gas tight barriers, hazardous area classification of zones and each fire area to be shown with fire area identification. All air intakes and ventilation air outlets to/from all areas shall be shown on the area classification drawings. All sources of releases shall be identified. Area classification drawings should be based on Safety layout drawings

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-15, SR-2561 - Area Duct & and Instrumentation Diagrams (D&ID)**

The complete Area Duct & and Instrumentation Diagrams (D&ID) shall be in accordance with the plants' process typicals and drafting standard.

The level of detail within packages shall be identical to that outside.

Tag number shall be shown for all tagged components including manual valves.

Area Duct & Instrumentation Diagram (D&ID) shall be provided by area and include the following information:

- All relevant HVAC system within the defined area
- All HVAC equipment with their tag number and all HVAC bulk items with their item number
- Equipment data summary with tag number for all equipment such as filters, fans, coils, etc.
- All ductwork identified with system no., sizes, duct classes, insulation classes
- All inline equipment
- Air flow to all serviced areas
- Area breaks and duct class breaks

- All areas/rooms served to be identified
- All instrument locations shall be indicated and completed with tag numbers
- Connections to other systems e.g. sea water, heating, cooling, drain, etc.
- Airflow in and out of diagram with references
- Fire partitions with fire rating

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-16, SR-62589 - Automation and SCADA functional specifications

Basis documents for detailed design and implementation of the control and monitoring system. Individual Functional Specifications (FS) shall be developed for each process system to be controlled and/or monitored in accordance with [C999-ST-J-MT-0007](#) Automation functional specifications - template. A separate FS shall be developed for the control system itself.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

#### 5-17, SR-81095 - Black start philosophy

Black Start Philosophy shall describe the energization sequence of the complete HV, MV and LV electrical systems throughout the wind farm, starting with black conditions at all sites, followed by island mode at all sites and ending with normal operation with power export to grid.

All involved auxiliary systems, temporary equipment and other provisions and supplements shall be described.

Black site condition is meant as the initial scenario where:

- site is unmanned
- installed back-up power is depleted (fuel for diesel generator, energy stored in batteries incl diesel generator start batteries)

A site is in "island mode" when electrical connection to external grid is not available but emergency and essential power is established.

The Black Start Philosophy Study shall contain:

- Stepwise start-up of all sites from black condition to island mode (incl WTGs where such functionality is applicable)
- Stepwise energization from grid to WTGs, including start-up of WTGs for power export
- Stepwise energization from WTGs toward grid (where such functionality is applicable)
- UPS recharging-, diesel refueling-, temporary power alternatives shall be described
- Black start of a site from UPS and diesel generator shall both be described (note: start-up from UPS only is dependent on environmental conditions at site)
- In case of cable from other independent unit this alternative method of black start shall also be described.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

#### 5-18, SR-2566 - Blast load calculations

When specified by Project/Purchaser (i.e. applicable for ESV valves), valve supplier shall document by calculations that the combined unit has sufficient strength for the explosion loads specified.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

#### 5-19, SR-2567 - Buildings architectural drawings

Architectural layout drawings (plans, elevations) and cross sections and details of all architectural components shall be produced.

Drawings showing extent and details for thermal and acoustic insulation and fire protection shall be included. All penetrations including windows and doors shall be shown.

Location, direction and type of sign post shall be shown on architectural layout drawings.

The drawing scale for architectural layout drawings shall normally be 1:100 in A3 format. However different scales can be used on A1 format if readable when reduced to A3 format. The drawings shall include stairs, walls, doors, windows, furniture, access and escape routes and all tagged equipment.

Main dimensions shall be included. Elevations of all floors and platforms etc. shall be shown. A key plan, grid lines with north and east

references and match lines with drawing references shall be included. Relevant civil, structural, HVAC, etc. drawings be referenced. The drawings shall have a title block which contains all the information necessary to identify the drawing and its purpose.

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-20, SR-62733 - Cable Hang-Off**

Reports including earthing details and termination records.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-21, SR-62732 - Cable Installation**

Crossing records, routes, burial records, protection, final configuration, test reports, survey records

|                 |                                                                                                    |
|-----------------|----------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2            |
| Handover format |  DGN (TR1970)+PDF |

**5-22, SR-2569 - Cable ladder/trays  $\geq 300$  mm Layout drawings**

For the following, individual layout drawings shall be provided: Cable ladders/trays  $\geq 300$  mm

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

**5-23, SR-62659 - Cable routing**

Cable route and changes to network shall be delivered for Substations.

STIDcableRouting shall document following:

- Cable route network
- Cable ladder/tray  $\geq 300$ mm
- Cable tray  $< 300$  mm if purpose to connect Cable ladders  $\geq 300$ mm
- Penetrations
- Unsupported Jump between cable ladders
- Cables routed on network

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-24, SR-2571 - Calculations, curves and tables**

Characteristics and functional parameters shall be documented and performance shall be shown to be probable. This shall include but not be limited to calculations, curves, tables, reference to similar applications and test data. This shall as a minimum be at a level customary for the equipment and to the extent such data are of importance for interfaces to plant and system.

Lateral analyses and torsion analyses for compressors; performance curves for pumps and compressors.

Strength calculations, thermal performance and vibration calculations for heat exchangers/pressure vessels.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

**5-25, SR-2572 - Cause & effect (C&E)**

The purpose of Cause & Effect (C&E) is to define logic control and shutdown functions. The C&E shall be prepared as a matrix between initiating (input) and actuated elements (output) performing the corrective action. Both input and output shall be identified by ENS tag numbers. In addition the following information shall be given for each input/output;

- Tag number, Initiator/Actuator, Value, Note, Service description
- Reference drawing number (e.g. Piping & instrument diagram)

*Note:* The cause and effect for the fire and gas detection system is included in the Fire protection data sheet (FPDS).

**C999-ST-J-MT-0002 Template - Cause & effect**

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | XLS + PDF                                                                               |

**5-26, SR-2573 - Certificate for use - Lifting appliances**

Lifting appliances shall be accompanied by a certificate issued by an enterprise of competence prior to use in accordance with ILO C152 or Annex H of NORSOK R-003, or NORSOK R-005, as applicable.

This also includes manufacturers' ILO based certificates for loose Gear (hooks, hooks block, wire, shackles, links, etc.).

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

**5-27, SR-2531 - Certificate of conformance**

- Certificate where Contractor/supplier confirms that the requirements in the contract/purchase order for design, calculations, production, testing and traceability requirements have been met.
- One document shall cover the complete contract/purchase order.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

**5-28, SR-2575 - Circuit / Wiring diagram**

The circuit/wiring diagram shall be sufficient for all testing, troubleshooting and maintenance.

The power circuit shall be shown to the extent necessary for the understanding of the circuit functions and for understanding how the components are wired. Contactor and terminal blocks shall be included. This means also including references to equipment not being part of scope of work. The documentation shall reflect the actual internal wiring. Terminal blocks and external references shall be included. Reference shall be made to the supplier's equipment and terminal marking.

The principles of the circuit/wiring diagrams shall be in accordance with IEC 61082.

Circuit/wiring diagram shall typically include the following (as relevant for the equipment):

- All internal connections for control, alarms, protection, interlocks, trip functions, monitoring, etc.
- Component list for all internal components including control and protection units.
- Switchgear/-board tag code
- Cubicle number
- Consumer tag code
- Type of external signals (fire and gas trip signal, etc.)
- Power and current rating
- Terminal block/socket number
- Terminal/pin number (including spares)
- Internal cable numbers with pair and core colour details
- Destination for internal cables
- Earthing details
- Equipment and equipment connections
- External cable numbers with pair and core colour details

- Signal tag number
- Reference drawings (Company document number)
- Reference to loop database for signal interfaced to instrument/automation and telecommunication systems.

NOTE: For customized documentation, handover format shall be DGN/DWG (TR1970) + PDF.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

#### 5-29, SR-2578 - Coaxial cable test reports

Test reports for coaxial cables (for radio systems) shall be provided

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

#### 5-30, SR-81360 - Commissioning procedures

The Commissioning Procedures shall be prepared.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

#### 5-31, SR-2579 - Concrete detail drawings

The following concrete detail drawings shall be delivered:

- General Arrangements
- Typicals
- Sections and details
- Main Mechanical Outfitting (MMO) drawings

The concrete detail drawings shall contain:

- Concrete dimensions
- All reinforcement types (tensile-, shear, pretension reinforcement, other if applicable)
- Reinforcement dimensions, quantity and location in concrete structure
- Material properties (concrete and reinforcement)

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-32, SR-2580 - Concrete structural design report

Structural design reports and input files/parameters shall be delivered. The report or collection of reports shall be self-contained, i.e. provide all information required to reproduce the results.

The static analysis and calculations shall have specific and detailed references to drawings and relevant part of regulations and referenced standards.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

**5-33, SR-2581 - Concrete structures geometry drawings**

The following detail drawings shall be delivered:

- General Arrangements
- Typical
- Sections and details
- Concrete dimensions
- Material properties

Details related to embedded items, block-outs, pre-stressing and post-tensioning of structures shall be included.

For embedded items for lifting operations documentation of certificates shall be included.

Structural load plans shall also be included.

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-34, SR-2582 - Concrete structures reinforcement drawings**

The following drawings shall be delivered:

- All reinforcement types (tensile-, shear, pretension reinforcement, other if applicable)
- Reinforcement dimensions, quantity and location in concrete structure
- Material properties

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-35, SR-2583 - Consequence analysis logic solver**

There shall be a consequence analysis document for each individual logic solver.

This document shall give information about which process unit is affected if the logic solver is switched off. Description of consequences of switching off the logic solver, including both hardwired signals and software communicated signals, and suggestion to operational mitigating actions to avoid the consequences described to avoid further loss of plant operation covering both switching off and start-up. The document shall describe the general precautions and consequences, and describe in detail signals found to be critical (regularity, safety and environmental) and the effect on these signals after switching off the logic solver.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC/XLS + PDF                                                                             |

**5-36, SR-2686 - Contractor's LCI execution strategy**

LCI strategy shall as a minimum include the following:

- Contractor's Life Cycle information management organization
- An overall strategy for interaction between internal parties, such as procurement and engineering.
- An overall integration strategy of life cycle information from all parties involved such as external contractors, subcontractors and suppliers.
- Contractor shall describe their systems portfolio related to the production and administration of LCI including integration capabilities with the Company systems.
- Training strategy of staff in both Company's and Contractor's LCI tools.
- LCI Handover strategy from MC to Commissioning.
- Strategy for Material control and SPIR handling
- Contractor's method for LCI quality control and systematic correction of quality issues
- Contractor's method for ensuring delivery of 3D CAD design models (Aveva Plant 3D) throughout the project in compliance with TR2231.
- LCI procedures (including):
  - Procedure for collection, storage, processing, transfer and sharing of LCI
  - The procedure for standard documentation handling
  - Work procedures for 3D handling as described in TR2231
  - The procedure shall include transfer methods, information logistics, systems involved, responsibilities, milestones, quality control, error reporting and rectification

- The procedure for tag scoping for supplier packages
- The procedure for tag scoping for engineering
- List containing Contractors planned deliveries of LCI according to Company's requirements
- Time schedules showing LCI deliveries including 3D
- Procedures or method to ensure special attention to identify early access and QC milestones. The schedules shall reflect the project execution plan and time schedules
- Procedure for LCI progress reporting according to LCI time schedules
- Procedures and checklists to ensure quality and completeness of the LCI delivery including maintenance of LCI during MC & commissioning
- Procedure for handling of "mark-ups" from construction and MC & commissioning.

Describe work process for continuous transfer of LCI covering:

- Project revisions of documents and drawings
- Tag information (including tag-doc references)
- Continuous updates of 3D CAD information according to TR2231
- Before issuing safety critical documents and single line diagram in IFC revision, tag information (in Company's LCI systems) for tags shown on document/drawing shall as a minimum include: tag no, description, area, discipline, system and PO references, cross references tag/tag, tag/doc relation.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 0 |
| Handover format | DOC + PDF                                                                               |

#### 5-37, SR-62598 - Control Diagram / programming Logic Diagrams

Control Diagram shall be used to specify and document process control and process shutdown application within the control systems. The method consists in principle of two parts. (1) Use of a defined set of function blocks

And (2) a diagram representation of usage of these function blocks and its interconnections. The diagram has a presentation of the process as background.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  PDF   |

#### 5-38, SR-62599 - Control Sequence Diagrams

Main components of a sequence are:

- Steps with associated actions
- Transitions with associated logic conditions
- Directed links between steps and transitions

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-39, SR-81340 - Critical Line List**

The stress critical lines shall be listed in the document. The list shall include:

- Line number
- Stress ISO document number (typically referenced on piping ISOs/support drawings)
- Pipe size
- Pipe class
- Service
- Max design temp
- Min design temp
- Design pressure
- PED category (applicable for installations that require conformity with Pressure Equipment Directive)
- P&ID document number
- Pipe stress report document number
- Piping stress isometric drawing number

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | DOC + PDF                                                                               |

**5-40, SR-81075 - Cyber security self-assessment report**

Cyber security Self-assessment report shall as a minimum contain:

- Logical topology overview of components (servers, firewalls, switches etc.) with Security Level Targets for Zones and conduits
- Completed template for reply to Cyber security & Network Requirements to suppliers

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format |  PDF  |

**5-41, SR-2588 - Data and telephone cabling network test reports**

Test reports for Data and telephone cabling network (category type copper cables) shall be provided. Test per outlet.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-42, SR-81331 - Data sheets - Electrical**

Engineering data sheet shall be delivered. It shall provide structured data form containing design information, operational data and limitations of the equipment. This document shall be support for engineering and/or purchase process.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | XLS + PDF                                                                                 |

**5-43, SR-2602 - Datasheets - Hose**

Supplier hose datasheet shall contain the information as given below:

- Hose Tag Number (according to ENS)
- Hose ID Number (Supplier serial no)
- Pressure test certificate number
- Product service description
- Hose min operation temperature in degree C
- Hose max operation temperature in degree C
- Hose minimum bending radius

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                       |

**5-44, SR-2592 - Data sheets - HVAC**

Engineering data sheet according to templates below. Delivery may be omitted if data sheets are not used as part of the engineering and/or purchase process.

|                   |                                             |
|-------------------|---------------------------------------------|
| C999-ST-H-DS-0001 | Moisture separators and filters (ISO 15138) |
| C999-ST-H-DS-0002 | Fluid heating coils (ISO 15138)             |
| C999-ST-H-DS-0003 | Electric heating coils (ISO 15138)          |
| C999-ST-H-DS-0004 | DX cooling coils (ISO 15138)                |
| C999-ST-H-DS-0005 | Fluid cooling coils (ISO 15138)             |
| C999-ST-H-DS-0006 | Humidifiers (ISO 15138)                     |
| C999-ST-H-DS-0007 | Fans (ISO 15138)                            |
| C999-ST-H-DS-0008 | Sound attenuators (ISO 15138)               |
| C999-ST-H-DS-0009 | Fire dampers (ISO 15138)                    |
| C999-ST-H-DS-0010 | Mechanical dampers (ISO 15138)              |
| C999-ST-H-DS-0011 | Air handling units (ISO 15138)              |
| C999-ST-H-DS-0012 | Dehumidifiers (ISO 15138)                   |
| C999-ST-H-DS-0013 | Sanitary equipment (HDS-016)                |
| C999-ST-H-DS-0014 | Measuring Stations (HDS-014)                |
| C999-ST-H-DS-0015 | Cooling unit (HDS-015)                      |
| C999-ST-H-DS-0016 | Filters Coalescer Separators (HDS-009)      |
| C999-ST-H-DS-0017 | DX cooling coils (HDS-018)                  |

|                 |                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1     |
| Handover format |  XLS + PDF |

**5-45, SR-2593 - Data sheets - Instrument field equipment**

Engineering data sheet according to templates below. Delivery may be omitted if data sheets are not used as part of the engineering and/or purchase process.

|                   |                                                    |
|-------------------|----------------------------------------------------|
| C999-ST-J-DS-0001 | Turbine and positive displacement flow meter (F01) |
| C999-ST-J-DS-0002 | Ultrasonic flow meter (F02)                        |
| C999-ST-J-DS-0003 | Magnetic flow meter (F03)                          |
| C999-ST-J-DS-0004 | Variable area flow meter (F04)                     |
| C999-ST-J-DS-0005 | Mass flow meter (F05)                              |
| C999-ST-J-DS-0006 | Averaging pitot tube (F06)                         |
| C999-ST-J-DS-0007 | Orifice flanges and plates (F07)                   |
| C999-ST-J-DS-0008 | Venturi flow element (F08)                         |
| C999-ST-J-DS-0009 | Vortex flowmeter (F09)                             |
| C999-ST-J-DS-0010 | Level instrument magnetic (L01)                    |
| C999-ST-J-DS-0011 | Level instrument ultrasonic/microwave (L02)        |
| C999-ST-J-DS-0012 | Level instrument displacer/float (L03)             |
| C999-ST-J-DS-0013 | Level instrument capacitive/conductive (L04)       |

|                   |                                                           |
|-------------------|-----------------------------------------------------------|
| C999-ST-J-DS-0014 | Level glass/gauge (L05)                                   |
| C999-ST-J-DS-0015 | Level switch vibrating fork (L06)                         |
| C999-ST-J-DS-0016 | Level instrument nucleonic (L07)                          |
| C999-ST-J-DS-0017 | Pressure / differential pressure indicator electric (P01) |
| C999-ST-J-DS-0018 | Pressure / differential pressure instrument (P02)         |
| C999-ST-J-DS-0019 | Fire and gas detector (S01)                               |
| C999-ST-J-DS-0020 | Thermowell (T01)                                          |
| C999-ST-J-DS-0021 | Temperature instrument electric (T02)                     |
| C999-ST-J-DS-0022 | Temperature indicator (T03)                               |
| C999-ST-J-DS-0023 | Block (On-Off) valve (V01)                                |
| C999-ST-J-DS-0024 | Control valve (V02)                                       |
| C999-ST-J-DS-0025 | Solenoid/pneumatic/hydraulic pilot valve (V04)            |
| C999-ST-J-DS-0026 | Safety/relief valve (V03)                                 |
| C999-ST-J-DS-0027 | Rupture/bursting disk (V05)                               |
| C999-ST-J-DS-0028 | Miscellaneous instrument (X01)                            |
| C999-ST-J-DS-0029 | Indicating lamp (K01)                                     |
| C999-ST-J-DS-0030 | Indicating meter (K02)                                    |
| C999-ST-J-DS-0031 | Potentiometer (K03)                                       |
| C999-ST-J-DS-0032 | Push-button/hand switch (K04)                             |
| C999-ST-J-DS-0033 | I/P and P/I converters (I01)                              |
| C999-ST-J-DS-0034 | Pneumatic controller (I02)                                |
| C999-ST-J-DS-0035 | Analyser (A01)                                            |
| C999-ST-J-DS-0036 | Rupture disk (E01)                                        |
| C999-ST-J-DS-0037 | Template - Software Product Datasheet (SPD)               |

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | XLS + PDF                                                                                 |

#### 5-46, SR-2594 - Data sheets - Mechanical

Engineering data sheet according to templates below. Delivery may be omitted if data sheets are not used as part of the engineering and/or purchase process.

Applicable design code shall always be stated.

|   |                                                             |
|---|-------------------------------------------------------------|
| - | Hydraulic marine deck crane data sheet (A1)                 |
| - | Power driven hoists (A2)                                    |
| - | Hand powered hoists (A3)                                    |
| - | Trolleys (A4)                                               |
| - | Hand powered low headroom hoists with integral trolley (A5) |
| - | Chain slings (A6)                                           |
| - | Shackles (A7)                                               |
| - | Hooks (A8)                                                  |
| - | Lifting lugs (A9)                                           |
|   |                                                             |

|                   |                                                         |
|-------------------|---------------------------------------------------------|
| -                 | Lifting eyebolts & eyenuts (A10)                        |
| C999-ST-R-DS-0011 | Centrifugal pump (RDS-001)                              |
| C999-ST-R-DS-0012 | Rotary pump (RDS-002)                                   |
| C999-ST-R-DS-0013 | Reciprocating pump (RDS-003)                            |
| C999-ST-R-DS-0014 | Controlled volume pump (RDS-004)                        |
| C999-ST-R-DS-0015 | Centrifugal compressor (RDS-005)                        |
| C999-ST-R-DS-0016 | Positive displacement rotary compressor (RDS-006)       |
| C999-ST-R-DS-0017 | Combustion gas turbine (RDS-007)                        |
| C999-ST-R-DS-0018 | Diesel engine (RDS-008)                                 |
| C999-ST-R-DS-0019 | Gear (standard type) (RDS-009)                          |
| C999-ST-R-DS-0020 | Special purpose gear (RDS-010)                          |
| C999-ST-R-DS-0021 | Coupling (RDS-011)                                      |
| C999-ST-R-DS-0022 | Oil system (RDS-012)                                    |
| C999-ST-R-DS-0023 | Hydraulic power pack (RDS-026)                          |
| C999-ST-R-DS-0024 | Centrifugal separator (RDS-014)                         |
| C999-ST-R-DS-0025 | Cyclone (standard type) (RDS-015)                       |
| C999-ST-R-DS-0026 | Cyclone (treatment of produced water) (RDS-016)         |
| C999-ST-R-DS-0027 | Pressure vessel (RDS-017)                               |
| C999-ST-R-DS-0028 | Shell and tube heat exchanger (standard type) (RDS-018) |
| C999-ST-R-DS-0029 | Shell and tube heat exchanger (RDS-019)                 |
| C999-ST-R-DS-0030 | Plate heat exchanger (standard type) (RDS-020)          |
| C999-ST-R-DS-0031 | Air cooled heat exchanger (RDS-021)                     |
| C999-ST-R-DS-0032 | Waste heat recovery unit (RDS-022)                      |
| C999-ST-R-DS-0033 | Atmospheric tank (RDS-023)                              |
| C999-ST-R-DS-0034 | Vacuum pump package (RDS-024)                           |
| C999-ST-R-DS-0035 | Hydraulic motor (RDS-025)                               |
| C999-ST-R-DS-0036 | Centrifuge (standard type) (RDS-013)                    |
| C999-ST-R-DS-0037 | Filter (RDS-027)                                        |
| C999-ST-R-DS-0038 | Fresh water maker (RDS-028)                             |
| C999-ST-R-DS-0039 | Reverse osmosis membrane (RDS-029)                      |
| C999-ST-R-DS-0040 | Reciprocating compressor (RDS-030)                      |
| C999-ST-R-DS-0042 | Exhaust bypass control device (for gas turbines)        |

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | XLS + PDF                                                                                 |

**5-47, SR-2702 - Data sheet - Noise**

The equipment supplier standard datasheet shall be delivered. The datasheet shall as a minimum contain the information specified in the datasheet template.

[C999-ST-R-DS-0041 Template - Noise data sheet](#)

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

**5-48, SR-81341 - Data sheets - Piping [Data sheets - Special Item]**

All piping special items shall be listed in the Special Item index. The special item datasheet shall include design data and drawing. Items that normally are tagged (e.g. valves) shall also have a relevant tag number.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                     |

**5-49, SR-2589 - Data sheet - Product**

The manufacturer's standard product datasheet shall be delivered.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                     |

**5-50, SR-62719 - Data sheets - Safety equipment**

Engineering data sheet according to templates below. Delivery may be omitted if data sheets are not used as part of the engineering and/or purchase process.

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| <a href="#">C999-ST-S-DS-0003</a> | Liferaft and davit (SDS-100)          |
| <a href="#">C999-ST-S-DS-0006</a> | Evacuation chute (SDS-103)            |
| <a href="#">C999-ST-S-DS-0008</a> | Fire fighting cabinet (SDS-105)       |
| <a href="#">C999-ST-S-DS-0010</a> | Lifejacket cabinet (SDS-107)          |
| <a href="#">C999-ST-S-DS-0011</a> | Survival suits cabinet (SDS-108)      |
| <a href="#">C999-ST-S-DS-0013</a> | Firewater valve skid (SDS-110)        |
| <a href="#">C999-ST-S-DS-0014</a> | Portable extinguisher (SDS-111)       |
| <a href="#">C999-ST-S-DS-0015</a> | Eye bath (SDS-112)                    |
| <a href="#">C999-ST-S-DS-0016</a> | Breathing air recharge unit (SDS-113) |
| <a href="#">C999-ST-S-DS-0017</a> | Personnel basket (SDS-114)            |
| <a href="#">C999-ST-S-DS-0018</a> | Medical basket (SDS-115)              |
| <a href="#">C999-ST-S-DS-0019</a> | Safety station cabinet (SDS-116)      |
| <a href="#">C999-ST-S-DS-0020</a> | Safety shower/eye bath (SDS-117)      |

|                 |                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1     |
| Handover format |  XLS + PDF |

**5-51, SR-2601 - Data sheets – Safety data sheet and chemical inventory**

A collection of Safety Data Sheets (SDS) shall be delivered to Company's Chemical Center, for chemicals delivered as part of equipment, as first fill or used for preservation before operation.

Exceptions are:

- Grease
- Fat
- Surface preservatives
- Coatings
- Oils in volume per equipment below 10 litres

The report shall include one SDS per unique chemical trade name.

The report shall be delivered in a file with ZIP format, containing the individual SDS files in PDF format.

A cross reference table with each unique chemical trade name, equipment tag number(s) and SDS PDF file name shall also be included, in XLS format.

SDS shall be according to local/national requirements and according to the official language where the project is delivered, or in English if accepted by local authorities.

In the case where the SDS already exists in Company's Chemical Center, then it does not need to be delivered but it shall be included in the cross reference table with

- chemical trade name and Company's unique identifier (Xref)
- equipment tag number(s)

Local language: YES

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | ZIP + PDF + XLS                                                                           |

**5-52, SR-2597 - Data sheets - Spring support**

A data sheet with technical information to the supplier shall be provided for each spring support assembly or damper/shock absorber. The data sheet shall include:

all the information necessary for the manufacture and supply of the assembly:

- Project name
- Manufacturer
- Line number
- Spring support assembly tag number
- Operating load (not relevant for dampers/shock absorbers)
- Installation load (not relevant for dampers/shock absorbers)
- All ancillary items such as rods, turnbuckles, beam attachments etc
- Supplier catalogue reference to type, figure, & size of spring/damper, etc

Note: The data sheet shall explain that installation load applies to each spring for double spring assemblies

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-53, SR-2599 - Data sheets - Weight**

Content according to ISO 19901-5 'Weight control during engineering and construction', Class A.

For equipment packages, separate weight data sheets shall be issued for each piece of equipment shipped and installed separately comprising the total equipment package.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

**5-54, SR-2603 - Declaration of conformity**

Shall be provided for equipment and / or assemblies covered by EU Directives, delivered to projects within the EEA, according to requirements of the relevant EU - directives wrt conformity assessment procedures and eventual necessary involvements of Notified Bodies i.e for EU type examinations thereto , e.g.:

- EU Directive: 2006/42/EC Machinery Directive
- EU Directive: 2004/22/EC (MID) Measuring Instruments
- EU Directive: 2014/68/EU (PED) Pressure Equipment Directive
- EU Directive: 2014/34/EU (ATEX) Product Directive,
- EU Directive: 2014/30/EU (EMC) Electromagnetic Compatibility
- EU Directive: 89/686/EEC (PPE) Personal Protective Equipment
- EU Regulation: No 1272/2008 (CLP) on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
- LVD (2014/35-EU)

The guidance of relevant directive shall be considered by the manufacturer when compiling the DoC.

The declaration of conformity shall be written up by the manufacturer of the equipment or component, as the legal binding document from the manufacturer / vendor to the purchaser / user ensuring conformity with the relevant EU directive( s).

Local language: YES for lifting appliances

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

**5-55, SR-81346 - Design accidental load report**

Design accidental load report.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-56, SR-2534 - Detail drawing with parts list**

A detail drawing with parts list to facilitate dismantling, repair and assembly of parts and components shall be included. Relevant for assemblies and smaller components within assemblies.

Parts list shall include functional part description and material description, and include real manufacturer's name and real manufacturer's part number (including variant/ordering code) for each size/dimension.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                       |

**5-57, SR-81070 - DFI Resumes**

DFI resumes shall be produced in English and in accordance with Norsok Standard Z-001, Appendix C and D. The requirement for DFI resume applies to all locations.

The Design, Fabrication and Installation (DFI) resúmes shall provide Operations with a general summary of the installation based on the most relevant information from the design, fabrication and installation phases, and contain information required for plant integrity management and maintenance planning of the facilities throughout the entire lifetime of the installation.

The document shall also serve as an aid in the consideration of measures to be taken if the condition monitoring reveals that the installation is damaged or deviates from the acceptance criteria.

Independent resumes to be made for each major unit or system of the installation, dependant of size and complexity. The Contractor shall incorporate relevant material from their sub-contractors.

The Fabrication- and Installation-parts shall mainly concentrate on non-conformances from design/fabrication criteria, specifications, etc. Further, areas should be highlighted where special attention in the operational phase is recommended due to e.g. difficult repairs, unexpected large loads or other unforeseen events. Only a brief description of the work performed shall be included. Information of foundation performance during installation being relevant for life time extension and/or removal shall be included. The required information will depend on foundation system (e.g. pile driving records, suction during penetration, drag lengths vs. tension , penetration during pre-loading). DFI resumés shall be prepared for load bearing structures, such as:

- Jackets, Gravity Based Structures, Monopiles, Transition pieces, Tension Leg Platforms, Semi submersibles, Ships, Jack-Ups, Spars, Subsea structures, Topsides and Mooring systems

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

## 5-58, SR-2609 - Documentation for dispatch, receipt, storage and preservation

### General

The supplier shall supply the documentation needed to enable the customer to evaluate the dispatch and make plans for receipt, storage and installation of the equipment.

### Documentation available to the customer prior to dispatch

Documentation for preservation, packing and transportation method shall be available to the customer prior to dispatch of the equipment.

### Documentation available to recipient prior to delivery

The following documentation shall be available to the recipient prior to delivery of the equipment:

- Procedure for receiving inspection required by the supplier
- Guidelines for lifting and handling
- Requirements for storage and preservation

### Documentation available to recipient at delivery

The following documentation shall be available to the recipient no later than at delivery of the equipment:

- Packing lists
- Instructions for unpacking, if special precautions are required during unpacking
- Completed forms for mechanical completion. This applies only if the order includes a clause stating that the supplier shall complete forms forming a part of the purchaser's system for mechanical completion
- Preservation log, if this is specified in the order
- Certificate for temporary lifting equipment

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                       |

**5-59, SR-2610 - Dropped object protection plan**

The dropped object protection plan shall identify areas, equipment and/or pipe racks designed with dropped object protection due to planned lifting routes. The dropped object plan shall include a schedule with information regarding dropped object loads for each of the protected areas/equipment.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

**5-60, SR-2613 - Electrical block diagrams**

Electrical block diagram shall show configuration of an electrical system/package and subsystems or relevant interfaces to give a functional understanding. Typical contents shall be:

- All related systems and subsystems or eventual packages and interfaces represented by blocks.
- Short description
- Location of equipment
- Tag number (when applicable)
- Interface cabling between blocks within the package and all interface cables towards other packages shall be indicated

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-61, SR-81342 - Electrical calculations / analyses**

The following studies are required to be done according to IEC 61892-2 to confirm the design of the electrical system and corresponding ratings of the equipment:

- Electrical load study
  - The electrical load study shall be done to determine major equipment ratings.
  - An allowance and contingency multiplication factor shall be applied to the estimated load to select the rating of generators and transformer
- Load flow calculations
  - Load flow calculations shall be done to check the voltage profile and circuit loading under steady state conditions. Calculations shall include:
    - All general modes (such as main power mode, essential mode, emergency modes)
    - Different network configuration (such as open bus tie breaker, closed bus tie breaker with single incomer supply)
    - Different load scenarios (maximum load, no load)
- Short circuit analysis calculations
  - Short circuit calculations shall be done to determine maximum stresses during fault conditions. The results shall be used for specifying equipment ratings and to determine setting of protection
- Protection and discrimination study
  - The protection and discrimination study shall be done to provide correct protection and discrimination.
  - The study shall include the following main subjects:
    - Network description
    - Short overview of plant, with a subchapter per voltage level and system.
    - Operational modes description
    - Full production mode, drilling mode, essential mode, emergency mode, UPS mode
    - Protection relays and functions per circuit type
    - Description of each individual protective device for the plant.

- Fuse selection
  - Fuse selection criteria, short circuit protection of consumer and contactor in
    - starter/feeder, starting current versus starting time, load current and overload protection.
  - Protection principles
    - Protection principles per system and operational mode.
    - This to include phase-phase faults and phase-earth faults in separate subsections.
    - Coordination of earth fault relays with different operating characteristic to be handled especially.
    - Protection principles per equipment type (equipment protection).
    - Protection relay templates
    - Template per make/type of protection and per type of equipment to be protected.
  - Setting tables
    - All individual setting parameters to be included. This shall also include protective relay settings on mechanical packages (e.g. firefighting system).
  - Current – time diagrams
  - Logarithms current versus time curves (for visually documenting selectivity in the system and proper protection of equipment and cables).
  - All cases where curves indicate conflict with defined principles or criteria shall be explained.
- 
- Power system dynamic study
    - The dynamic study shall be done to analyse the transient and dynamic performanc of the power system
    - Calculations shall include (as applicable) the dynamic performance when:
      - Starting/ energising largest motor/ consumer at each main switchboar
      - Stopping/deenergising the largest possible group of consumers (due to e.g. process shut down)
      - Trip of one generator (or power source), with and without load shedding.
      - Short circuit in the primary distribution system, cleared by short circuit protection
      - Other as required
    - Calculations shall be done for different preconditions as follows:
      - All power modes (such as main power mode, essential mode, emergency mode, testing of the essential and emergency generator)
      - Different network configuration (especially those giving the extreme dynamic disturbance conditions)
  - Calculations of harmonic voltages
    - Calculations shall be done to verify that harmonic distortions in all operating modes are within defined limitations
  - Switching/equipment insulation study
    - A switching/equipment insulation study shall when necessary be performed in order to specify the correct equipment insulation levels and to determine whether additional protections are required.
  - Electromagnetic compatibility (EMC):
    - General EMC planning shall be in accordance with IEC 60533, Annex B(Offshore).

or IEC 61000-2-5 (onshore).

- The above referred standards as well as the manufacturer's and supplier's instructions with regards to EMC shall be followed and taken into account in the design.

- Cable selection and sizing criteria:

- An electrical cable sizing study shall be performed in order to establish cable sizing criteria.
- The following subjects shall be taken into account when making general cable sizing criteria:
  - Consumer/ circuit nominal current.
  - Motor start current (motor circuits).
  - For voltage drop from generator terminals (in primary distribution system) or transformer secondary terminals (in secondary distribution system), stationary and transient.
  - Cables' short circuits withstand capabilities (both mechanical and thermal). To be coordinated with short circuit protection.
  - Short circuit (phase to phase) at the end of the power cable supplying small power and lighting should cause instantaneous trip of the protective device.
  - The type of cable to be used for each purpose and area shall be fully described (e.g. mud/oil resistant, fire resistant etc.).
  - Current ratings for cables and de-rating factors for ambient temperature and cable grouping.
  - The study shall as a minimum summarise the following results:
    - Cable current capacity (maximum current) per type and size of cable.

Studies shall be done according to relevant IEC standards and more detailed company specific requirements.

Arc flash study is required to be done according to IEEE Std 1584 to calculate arc incident energy.

If electrical power system design and simulation software is used, all modified or new files shall be transferred to Company as files of the software that is used. The report from the system study shall be delivered as a text file.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | TBA                                                                                       |

#### 5-62, SR-2532 - Electrical connection and wiring diagram - instrument

The equipment supplier standard drawing to be delivered.

The external connection diagram should typically include:

- Terminal/pin number
- Earthing details

Internal wiring diagrams shall be supplied when relevant e.g. to show the wiring between different electrical equipment within a package, and should typically include:

- Terminal block/socket number
- Terminal/pin number (including spares)
- Internal cable numbers with pair and core colour details
- Destination for internal cables
- Earthing details
- Equipment and equipment connections
- External cables with pair and core colour details

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

**5-63, SR-2616 - Electrical connection diagram**

The diagram shall show the electrical connection between different electrical equipment and components within a package. The diagram shall also identify all connections to Company's power supply and instrumented systems.

Electrical connection diagram shall typical include the following:

- Tag number of equipment to which the cable ends are terminated
- Signal tag number
- External cable tag number
- External cables with pair or wire number and core colour details
- Terminal block/socket number
- Earthing details
- Reference drawings (Company document number)

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-64, SR-2618 - Electrical field equipment layout drawings**

At least one field equipment layout drawing for each area or module deck level shall be produced. The size of the facility will determine the scale of the drawing, but normally a scale of 1:100 on A3 format shall be aimed for. If required several drawings per area can be necessary to achieve this scale. Equipment which is covered by platforms above shall be shown dotted or shown in separate figures.

The following content shall be included on the drawings:

- Platform/plant northing and orientation with respect of true north
- Gridlines with north and east references
- Key plan
- Scale bar
- Match lines with drawing references
- Deck/area elevations
- Location of electrical field equipment as identified in MEL
- Equipment shall be tagged according to MEL

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-65, SR-81352 - Electrical Load list**

An electrical load list shall be worked out based on the Main Equipment List and emergency and/or essential consumers clearly marked as such in the list. Load list shall include individual consumers on high and low voltage switchboards (motor control centers) as well as assumed sum load on 400/230 V level. Sum UPS load per UPS system shall be listed. Allowance and contingency requirements for the load list shall be applied.

All actual modes shall be included in the load list also emergency mode.

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|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                                 |

**5-66, SR-81353 - Electrical power system philosophy**

A document "Power System Philosophy" shall be made. This document shall outline the design and operation of the electrical power supply and distribution systems. The document shall be the guideline for the electrical system detail design, supplier equipment and software deliveries to the power systems like switchboards, generators, variable speed drives etc.

The document shall include an overview of

The overall power system

The hardwired electrical interlock/inter-tripping principles throughout the electrical distribution system

An overview of the control philosophy

The general principles for the Power Distribution Control System (PDCS)

The power management functions

The operating requirements and interface between control facilities and electrical equipment

The principles for remote access and monitoring of the electrical equipment.

The document shall further describe the various operating modes of the power system like:

Normal modes

Emergency modes

Maintenance modes

Others (as applicable)

The reliability of the grid supply shall be assessed (if applicable).

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-67, SR-61908 - Equipment room layout drawings**

Equipment room layout drawings shall be provided:

- For areas equipped with instrument equipment cabinets/racks. Examples of such areas are: Central/ local equipment rooms (with instrument equipment cabinets/racks)
- For electrical equipment room(s) in which switchgears, main distributions boards, transformers, UPS, etc. are located.
- For areas equipped with telecommunication equipment, cabinets/racks. Examples of such areas are: Telecommunication equipment rooms and Local equipment rooms (with telecom equipment cabinets/racks)

The following information shall be shown:

- Main Equipment with tag number (from all disciplines)
- Reserved space for spare equipment
- Walls and doors
- Stairs and raised floor
- Equipment list including tag number, tag description and datum point coordinates

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|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-68, SR-81357 - Emergency preparedness analysis**

The Emergency preparedness analysis report shall reflect the current operating conditions and experience and be written in a way to facilitate the use by the operating organization.

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|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-69, SR-2626 - Equipment Heat Emission**

Description of heat emission from installed equipment shall be per room/area, tag based. The heat emission shall be stated in normal, emergency and UPS operation modes.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

**5-70, SR-62718 - Equipment layout drawings**

These drawings are relevant for offshore facilities and for the process plant and well pad area for onshore facilities.

At least one equipment layout drawing for each area or module deck level shall be produced. The size of the facility will determine the scale of the drawing, but normally a scale of 1:100 on A3 format shall be aimed for. If required several drawings per area can be necessary to achieve this scale. Equipment, which is covered by platforms above, shall be shown dotted or shown in separate figures.

The following content shall be included on the drawings:

- Platform/plant northing and orientation with respect of true north
- Gridlines with north and east references
- Key plan
- Scale bar
- Match lines with drawing references
- Deck/area elevations
- Area segregation, with fire partitions indicated
- Maintenance/withdrawal areas for main components (compressor bundles, cooler internals, etc.)
- Laydown areas
- Pipe racks
- Stairs, access and escape routes
- Material handling routes
- HVAC, instrument and electrical rooms (relevant for offshore facility)
- Control room (relevant for offshore facility)
- Main structures
- Location of all equipment as identified in MEL including identification of datum point
- Equipment shall be tagged according to MEL. An equipment index shall be included on the drawing. Datum point coordinates shall be included in this index
- Hose loading station and tote tank area (relevant for offshore facility)
- Space allocation for J-tubes and umbilicals including temporary equipment (pulling arrangement). (relevant for offshore facility)
- Space for future areas/modules/equipment

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|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-71, SR-2715 - Equipment supplier piping and instrument diagram (P&ID)**

Piping and Instrument Diagram (P&ID) includes the complete set of P&IDs, typicals and legends.

Equipment supplier's drafting standard shall be used. Symbols used shall be described by a symbol legend on the P&ID, or as a separate document/drawing/P&ID sheet.

All connections external to the supply shall be shown on the P&ID, marked with a unique number (N1, N2, etc.). Reference to the interfacing external P&IDs should also be given.

All interface signals to and from the plant's safety and automation systems shall be shown with reference to the interfacing external P&IDs.

Control and monitoring functions shall be drawn on the P&ID, this also applies for control panel locally within the supply.

Identical parallel items or systems shall be drawn in full detail, i.e. typical drawings with associated tag number tables are not acceptable.

Unique plant tags shall be used as assigned by the engineering contractor. Supplier's internal tag numbers shall be shown in addition where required for use of supplier's standard documentation, preferably by use of tables on the P&ID/separate P&ID sheet, linking unique plant tag with supplier's internal tag.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format |  PDF   |

**5-72, SR-2628 - Excavation, fill and grading drawings**

All system, arrangement, layout, plan, section and detail drawings shall be included.

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-73, SR-2629 - Explosion protection certificates**

Explosion protection certificates (ATEX , EX, NEMA). Applies to electrical devices and devices with electrical connections

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                     |

**5-74, SR-2630 - Fiber optical cabling (platform / facility internal) test reports**

Test reports for fibre optical cables (platform/facility internal) shall be provided. Test per fibre.

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

**5-75, SR-2631 - Fiber optical long distance cable test report**

Test reports for Fibre optical long distance cable(s) shall be provided. Test per fibre.

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

**5-76, SR-2632 - Fiber optical long distance cable transmission budget calculations**

Fibre optical long distance cable transmission budget calculations (attenuation in dB) that have been used for design of fibre optical cable and network equipment shall be provided.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

**5-77, SR-81343 - Field instrument installation drawing Typical**

Drawing to include:

- Field instrumentation part of process hook-up
- Structure and stands for field instrumentation

An installation drawing shall indicate all details of the actual installation for the relevant instrument tag number (instruments and valves), and contain information such as:

- A title to describe the process application
- All instrument/bulk material installed by Supplier, or to be installed by Purchaser
- Connections and dimensions of signal lines/tubing
- Material of instrument bulk
- A product code and quantity of instrument bulk
- Indicate split of responsibility instrument/piping

Typical installation drawings should be used as guideline.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

**5-78, SR-2634 - Final inspection and test reports**

Final inspection reports;

A final inspection program shall be performed for the subsea system prior to delivery to Company. The inspection program shall:

- Identify status of all equipment upon delivery.
- Valve status (shut/open).
- Connection point status (permanent/temporary clamps).
- Status hatches.
- Pressure equalization system connection points.
- Verification of tubular ventilation ports.

Test reports:

- All operations to be tested during assembly shall be identified with a test procedure.
- The individual testing program operations shall be signed out by Contractor. Company shall sign the overall test program upon completion.

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

#### 5-79, SR-2636 - Fire protection data sheet (FPDS)

Fire protection data sheets shall document the fire and explosion protection and detection design. Fire protection data sheets shall be maintained throughout the plant or installation life time and be consistent with information in other engineering/operational databases.

A fire protection datasheet shall be produced for each of the defined fire detection areas.

The fire protection data sheets shall include the following main information elements:

##### Key characteristics of area barriers:

- Area classification references (zone 1, zone 2, non-hazardous by location, non-hazardous by ventilation)
- Ventilation of the area (natural, mechanical, overpressure, underpressure)
- Occupancy (permanent, intermittent, normally none, none)
- Construction of walls/floors/ceiling (none, wind shield, heat shield, steel walls, fire partitions with fire rating, explosion panels, suspended ceiling, false floor)
- Hazards in the area (e.g. crude oil, toxic gas, chemicals, fuel oil, electrical, radioactive, etc.)
- Type of fire and gas detection in the area
- Type of fire protection with application design rates

##### Basis for fire and gas detection design and fire protection:

- A listing of main equipment of the area which governs the fire and gas detection selection and location.
- A description of the basis for the selection of particular type and position of detectors including manual call points. This is an area specific detailing of the general fire and gas logic.
- A reference of area fire extinguishing facilities

##### Fire and Gas Cause & Effect:

- This part shall be according to Cause & Effect requirements addressing the specific fire and gas detection logic including means for fire extinguishing control and monitoring and other specific output actions.
- The C&E sheet shall include a listing of all area tag numbers, i.e., fire and gas detectors and output devices.

#### C999-ST-J-MT-0005 Template - Fire protection data sheet (FPDS)

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | XLS + PDF                                                                                 |

#### 5-80, SR-81344 - Fire test results reports

Materials used in areas that may be exposed to a hydrocarbon fire shall be non-combustible. If it is justified from safety point of view to make use of materials that do not meet the requirements to noncombustibility, such materials shall have limited flame-spread properties, low smoke development and heat generation. The basis for decision regarding selection of combustible materials shall be documented.

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|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

#### 5-81, SR-2650 - General Arrangement Drawing

The manufacturer's standard general arrangement drawing shall be delivered.

The content of the GA drawing must be adapted to the item described. Below are examples of expected level of detail. One or more examples may apply.

##### For Mechanical equipment:

- Dimensions
- Location and identification of piping and main components
- Necessary space for disassembly and maintenance
- Location of centre of gravity
- Thermal expansion effect, when relevant
- On the structural steel drawings, critical welds shall be included with a weld identification number serving as a cross-reference to the weld summary index
- Obstacles from other disciplines shall be included when relevant

- Total weight, wet and dry and in operational condition
- Weights, centre of gravity and main dimensions of disassembled units/components over 25 kg. Lifting lugs and runway beam for disassembling and their location shall be shown
- Identification and location of all nozzle and external pipe connections as well as requirements for flexible connections and acceptable loads and moments. Locations shall be dimensioned and tolerances shown, if necessary in separate drawings
- Identification and location of all external electrical and control monitoring connections (may be given in separate drawings describing the electrical arrangement and instrumentation)
- For pressure equipment: for projects at locations where EU regulations for pressure equipment apply, Category and Module shall be according to 2014/68/EU (PED)
- Include bolt tension requirements for pressure equipment flanges
- Identification of lubrication points
- Foundation information shall include:
  - The outer dimensions and footprint of the support frame or foundation supports
  - The size, grade and location of the foundation bolts and torque where this is necessary
  - Forces and moments transferred to load bearing structures, both under normal operation and extreme conditions
  - Details for adjustment and alignment
  - Details for cut-outs inside outer limit of foundation
  - Details for vibration dampening units (if installed)

#### For Electrical equipment:

- Panel equipment layout - position of modules, cards, vacant slots and other information necessary for expansion or installation of new equipment in the same cabinet
- Internal layout showing arrangement of auxiliary modules, cable trunks, etc.
- All equipment including junction boxes, push buttons, light fittings, socket outlets, etc.
- Dimensions
- Necessary space for disassembly and maintenance
- Location of centre of gravity
- Possible thermal expansion
- Obstacles from other disciplines shall be included when relevant

#### For Instrument equipment:

- Dimensions
- Location and identification of piping and main components
- Necessary space for disassembly and maintenance
- Location of centre of gravity
- Possible thermal expansion
- Obstacles from other disciplines shall be included when relevant
- Panel equipment layout - position of modules, cards, vacant slots and other information necessary for expansion or installation of new equipment in the same cabinet
- Internal/back layout showing arrangement of auxiliary modules, cable trunks, etc.
- All equipment including technical network cabinets, junction boxes, push buttons, light fittings, socket outlets, etc.
- Reference to part list/SPIR

#### For Telecom equipment:

A detailed drawing of the equipment shall be delivered. The drawing shall be to scale with dimensions included.

For Panel/cabinet/rack the following shall be included in addition:

- Position of modules, cards, vacant slots and other information necessary for expansion or installation of new equipment in the same cabinet/rack
- Internal/back layout showing arrangement of auxiliary modules, cable trunks, etc.

#### For HVAC equipment:

- Dimensions
- Location and identification of piping, ducting, MCTs (Multi core transit) and main components
- Necessary space for disassembly and maintenance
- Location of centre of gravity
- Possible thermal expansion
- Obstacles from other disciplines shall be included when relevant

Foundation information shall include:

- The outer dimensions and footprint of the support frame or foundation supports
- The size, grade and location of the foundation bolts and torque where this is necessary
- Forces and moments transferred to load bearing structures, both under normal operation and extreme conditions
- Details for adjustment and alignment
- Details for cut-outs inside outer limit of foundation
- Details for vibration dampening units (if installed)

#### For Lifting appliances:

General arrangement drawing of complete unit and foundation:

- Dimensions
- Location of centre of gravity
- Total weight in operational condition

#### Foundation

- The outer dimensions and footprint of the support frame or foundation support
- The size, grade and location of the foundation bolts and torque where this is necessary
- Forces and moments transferred to load bearing structures, both under normal operation and extreme conditions
- Details for adjustment and alignment

General arrangement drawing for Crane cabin, machinery room, winches, crane boom, slewing drives, main drive, hook block, wire sheave arrangements, etc.:

- Dimensions
- Location and identification of bolting, piping and main components
- Location of centre of gravity
- Total weight in operational condition

General arrangement drawing for inspections for primary steel structures e.g. pedestal/foundation, crane boom/traverse beams, A-frame, runway beams, winches, hook block, etc.

- Critical welds shall be included with a weld identification number including weld classification. NDT procedures and intervals for each weld classification shall be included.

#### For Well completion equipment:

Electrical submersible pump (ESP)

- Dimensions
- Weights, centre of gravity and main dimensions of disassembled units/components over 25 kg

#### Wellhead penetrator

- Dimensions
- Necessary space for disassembly and maintenance
- Obstacles from other disciplines shall be included when relevant
- All equipment including technical network cabinets, junction boxes, push buttons, light fittings, socket outlets, etc.
- Parts list

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

#### 5-81.1, SR-81358 - GIS Mapping - Survey reports

The results from the Topographical Survey shall be reported in a written document describing the various task and findings in a systematic way including appendices and data samples where applicable.

The general content of the report shall as a minimum include the following items:

Descriptive front page with dates and document numbers  
 Complete and systematic index, including appendices  
 Revision history with description of actions  
 Introduction  
 General Project or Survey description (abstract)  
 Scope, Objective and Responsibilities  
 Definitions and abbreviations

- References
  - Project or Survey description
  - Scope of work
  - Key maps – Overview of work area
  - Summary of results, task by task
  - Quality evaluation of achieved results
  - Geodesy
- Detailed results
  - Systematic detailed description of performed activities in same order as in Summary of results
  - Listing of data and observations
  - Used equipment and data acquisition parameters
  - Used references
  - Processing systems, methods and parameters
  - Reporting method and references
- Data Index of deliverables
  - Maps / drawings
  - Pictures
  - DTM
  - Etc.
- Appendices
  - All relevant data
  - Data samples
  - Maps

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | TBA                                                                                     |

#### 5-82, SR-81359 - Ground investigation reports

The requirement shall apply to field investigations, laboratory tests and analyses. Reference is made to

- ISO 14688, ISO 14689, ISO 17892 Geotechnical investigations and testing
- EN 1997 Geotechnical design
- BS6031 Code of practice for earthwork

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| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

#### 5-83, SR-2654 - Hardware loop typicals

Hardware loop typicals shall cover:

- Typicals for all field instrument interfaces

Drawing should contain the following information:

- Input/output from I/O-cards, barriers
- Field instrument information

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|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-84, SR-62721 - Helideck pick-up point

The following drawings shall be provided as required in FOR-2007-10-26-1181:

##### 1. Entire installation, profile view – all four quadrants

The drawings shall be prepared in accordance with the following requirements:

- Showing entire structure from sea level to highest point
- Indication of sea level
- Elevation of helideck above sea level
- Elevation of highest point above sea level
- Location of obstacle lights

- Location of turbine exhaust outlet(s)
- Location of cold emission source(s)
- Location of anemometer(s)
- Scales indicating metres and feet

## 2. Entire installation, plan view (looking from above)

The drawings shall be prepared in accordance with the following requirements:

- Reference to platform and true north
- Location of obstacle lights
- Location of turbine exhaust outlet(s)
- Location of cold emission source(s)
- Location of anemometer(s)
- Location of windsock(s)
- Scales indicating metres and feet

## 3. Helideck with surroundings (can included as a part of 2.)

The drawings shall be prepared in accordance with the following requirements:

- Reference to platform and true north
- Latitude/Longitude (WGS84) of centre helideck
- Helideck magnetic direction, degrees True
- Helideck marking
- Helideck lighting
- Helideck firefighting equipment
- HTCC
- Antenna tower
- Lowered walkway/Perimeter net
- Accesses
- Depiction of Obstacle Free Sectors (180 and 210 degree)
- Depiction of Limited Obstacle Sector (150 degree), including the extent of segment 1 and 2
- Elevation of structures in 150 LOS segment 1 and 2
- Elevation of structures close to 210 degree OFS
- Helicopter fuelling plant
- Scales indicating metres and feet

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|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

## 5-85, SR-2668 - Hydraulic circuit diagrams - Lifting appliances

The hydraulic circuit diagrams shall include:

- All components with identification
- Port sizes
- Pressure settings
- Cross reference to Circuit wiring diagrams
- Bulkhead connectors, pipes with dimensions
- Hoses id with dimensions

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| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

## 5-86, SR-2661 - HVAC Bulk items index.

The HVAC Bulk item index will include the following information for standard inline off-the-shelf HVAC items without electric, instrument or

pneumatic connection and with no regular operation or maintenance requirements.

- HVAC Bulk item number (according to ENS)
- Functional service description
- Area
- Unique ID (referenced to the Company's solution for standard documentation for equipment and materials)
- Variant/type

|                 |                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2     |
| Handover format |  XLS + PDF |

### 5-87, SR-2662 - HVAC calculations / analyses

#### Numerical Analysis

If required to clarify wind effects on air inlets and outlets and to determine possible contamination of the air intake from other sources, a numerical analysis shall be carried out, preferably computerized on software agreed with Company.

Numerical analysis shall also provide pressure coefficients for calculation of the natural ventilation and make a visualization of the natural ventilation in naturally ventilated areas.

#### Ventilation Air Volumes

Calculations carried out and documented to determine ventilation in naturally ventilated areas for different wind velocities and directions shall be transferred.

Necessary ventilation volumes shall be determined and documented with regard to potential gas leaks and other contaminations in the ventilated area.

#### Other calculations/analyses to be transferred (as required)

Consumption calculations of current and energy.

Heating and cooling capacity calculations, performance calculations for air supply/external devices, pressure drop calculations, sound level calculations.

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                |

### 5-88, SR-2664 - HVAC control philosophy

The HVAC control philosophy shall as a minimum include:

- Heating/cooling control
- Fan control
- Start/stop sequence
- Vibration monitoring
- Flow control
- Shut down
- Gas/fire/smoke control
- Operational modes
- Central control system
- Local control/indicators

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

### 5-89, SR-2665 - HVAC design philosophy

The HVAC design philosophy shall as a minimum include:

- Purpose of HVAC installation
- Ambient conditions
- Indoor conditions
- Utilities for HVAC
- Natural ventilation
- Mechanical ventilation
- Sparing philosophy
- Pressurization
- Fire damper installation (LRA & HRA)
- Smoke ventilation

- Air inlets/outlets
- Black Start
- Ductwork
- Local cooling/heating

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | DOC + PDF                                                                               |

#### 5-90, SR-2666 - HVAC layout drawings

HVAC Layout drawings shall include:

- Duct size
- Duct location
- HVAC Bulk item(s) (numbered according to ENS)
- Tagged equipment
- Ductwork and insulation classification
- Penetrations
- Inspection hatches, ladders, etc.
- Measuring points for system balancing
- Relevant instruments
- Service areas for HVAC equipment
- Walls and grid lines

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-91, SR-2667 - HVAC system description

The HVAC system description shall as a minimum include:

- System split-up
- System description
- Sparing
- Equipment description
- Utilities for HVAC/interface with other systems
- System interlock
- Pressurization
- Fire damper installation (LRA & HRA)
- Smoke ventilation
- Air inlets/outlets
- Black Start
- Ductwork
- Local cooling/heating
- Heating/cooling control
- Start/stop sequence
- Shut down
- Gas/fire/smoke control
- Operational modes
- Central control system
- Local control/indicators

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-92, SR-2669 - Hydraulic connection diagram**

The purpose of this document is to cover hydraulic distribution from ring main or a hydraulic manifold to all hydraulic connections on a mechanical package, and to include all other individual hydraulic consumers for the actual hydraulic pressure unit.

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-93, SR-2688 - Hydraulic hose list -Lifting appliances**

The hydraulic hose list shall include the following information:

- Hose id (corresponding to hose id on Hydraulic circuit diagram)
- Type (e.g. EN norm or SAE norm)
- Length in mm
- Fittings on A & B end
- Max pressure rating for the hose
- System pressure

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

**5-94, SR-2671 - Hydraulic system calculations**

For liquid systems such as heating medium, cooling medium, fire water, offloading, loading, hydraulic power systems, drain, etc., hydraulics design shall be documented by hydraulic system calculations demonstrating as a minimum:

- The required hydraulic system (network) capacity, and correct design for in-line equipment, such as control valves, hydraulic/pneumatic actuators, etc.
- For liquid systems where water hammering can be an issue, such as fire water and offloading systems, dynamic calculations shall be included as a part of the hydraulic system calculations.
- Firewater:
  - Results/evaluation from transient firewater hammer effect for ringmain high points in distribution system shall also be included.
  - Piping and nozzle diagrams as well as Commissioning test reports and results shall be included as separate files.

Hydraulic system calculation reports and corresponding executable simulation files shall be delivered.

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|-----------------|-----------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2     |
| Handover format |  PDF + ZIP |

**5-95, SR-2672 - Hydraulic systems calculations for open drain and tunnel systems**

Hydraulic system calculation reports and input files/parameters shall be delivered. The report or collection of reports shall be self-contained, i.e. provide all information required to re-produce the results.

Calculations shall include references to basis of design and explanatory text (system description, etc.). All calculations shall be described thoroughly and shown by sketches, inclusive references to third parties equipment (strainers, etc.) calculations, if any.

All hydraulic calculations shall include system characteristics, where normal operation conditions and reserves are analysed and documented. For tunnels, sensitivity calculations shall be made to identify uncertainties in roughness, and tunnel profiles, and presented as above.

The calculations shall include:

- Head loss calculations during normal operation, including definition
- Head loss calculations during various climatic conditions, such as storm rain, snow melting (if applicable), etc.
- Variation in sea level if the system has intake or discharge to sea
- Surge calculations shall be performed for all pump systems

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| Milestone       |  LCI 2     |
| Handover format |  PDF + ZIP |

**5-96, SR-61902 - Index information**

To be delivered in accordance with TR3111.

|                                                | Architectural | Civil | Electrical | HSE | HVAC | Instrumentation | Mechanical | Piping/layout | Process | Structural | Subsea | Telecommunication |
|------------------------------------------------|---------------|-------|------------|-----|------|-----------------|------------|---------------|---------|------------|--------|-------------------|
| Document index (including revisions and files) | x             |       | x          | x   | x    | x               | x          | x             | x       | x          | x      | x                 |
| Tag-Document cross reference                   | x             | x     | x          | x   | x    | x               | x          | x             | x       | x          | x      | x                 |
| Tag relations                                  | x             | x     | x          | x   | x    | x               | x          | x             | x       | x          | x      | x                 |
| Civil index                                    |               | x     |            |     |      |                 |            |               |         |            |        |                   |
| Cable index                                    |               |       | x          |     |      | x               |            |               |         |            | x      | x                 |
| Circuit and starters index                     |               |       | x          |     |      |                 |            |               |         |            |        |                   |
| Electrical field index                         |               |       | x          |     |      |                 |            |               |         |            |        |                   |
| Heat tracing cable index                       |               |       | x          |     |      |                 |            |               |         |            |        |                   |
| Ducting index                                  |               |       |            |     | x    |                 |            |               |         |            |        |                   |
| Fire and gas field equipment index             |               |       |            |     |      | x               |            |               |         |            |        |                   |
| Function index                                 |               |       |            |     |      | x               |            |               |         |            | x      |                   |
| Instrument field index                         |               |       |            |     |      | x               |            |               |         |            | x      |                   |
| Junction box index                             |               |       |            |     |      | x               |            |               |         |            |        |                   |
| Signal index                                   |               |       |            |     |      | x               |            |               |         |            | x      |                   |
| Main equipment index                           |               |       |            |     |      |                 | x          |               |         |            | x      |                   |
| Hose assembly index                            |               |       |            |     |      |                 |            | x             |         |            |        |                   |
| Manual valve index                             |               |       |            |     |      |                 |            | x             |         |            | x      |                   |
| Penetrations index*                            |               |       |            | x   |      |                 |            |               |         |            |        |                   |
| Special item index                             |               |       |            |     |      |                 |            | x             |         |            |        |                   |
| Spring support database index                  |               |       |            |     |      |                 |            | x             |         |            |        |                   |
| Telecommunication index                        |               |       |            |     |      |                 |            |               |         |            |        | x                 |
| Line list (Line index)                         |               |       |            |     |      |                 |            |               | x       |            | x      |                   |
| Subsea item equipment index                    |               |       |            |     |      |                 |            |               |         |            | x      |                   |

\* Penetration index shall give an overview of all tagged penetrations as per SR-62101

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| Milestone       |  LCI 1             |
| Handover format |  Database (TR3111) |

**5-97, SR-2673 - Installation , Operating and Maintenance Instructions for Valves**

IOM documents shall, in an organized manner, provide sufficient information to install, operate and maintain the equipment in a safe, economical and functionally correct manner.

Requirements for receipt, storage, installation, operation and maintenance of supplied valves. The document shall include, but not be limited to:

- Instructions for un-packing, handling, lifting of consignment and components.
- Requirements for storage and preservation/de-preservation/re-preservation during installation and commissioning.
- Preservation maintenance to be carried out by the user during storage, installation and in the period prior to start-up for the intended use
- Procedure and necessary documentation for installation, including any additional measures that Purchaser need to observe prior to and during installation.
- Information about valve functions, operating and maintenance instructions.
- Bolt tightening procedures, including lubrication requirements
- Procedure for maintenance of packing boxes, including recommended compression
- Procedure for dismantle and reassembly of actuator/gearbox
- Information regarding lubrication
- Technical and functional descriptions
- Consumption data
- Restrictions in use

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                     |

**5-98, SR-2675 - Installation, operation and maintenance manual (IOM manual)**

IOM documents shall, in an organized manner, provide sufficient information to install, operate and maintain the equipment in a safe, economical and functionally correct manner according to the agreed maintenance philosophy.

The equipment manufacturer's standard IOM manual shall be delivered if it fulfils the intentions of this document, either as a complete IOM manual or split in two or more separate manuals.

For assemblies/skids/packages the IOM manual shall cover the complete assembly.

An IOM manual shall normally include the following information:

**Main Data**

Information for the complete equipment showing all data necessary for the understanding of the equipment's mode of operation shall be given. Information regarding health, environment and safety shall be emphasized. Other data may be:

- Restrictions in guarantee
- Performance data
- Restrictions in use
- Main connections and requirements on connected systems
- Weight and outline dimensions

**Technical description**

Design and function shall be described to facilitate a better understanding of the different parts of the operating and maintenance instructions. If the complete equipment package consists of several systems, the main system should be described first, followed by descriptions of each subsystem and their interconnections.

**Preparations**

All preparations to be made from the moment the installation is completed until the equipment is ready for normal operation shall be described. The description shall include tests, adjustments, calibrations and necessary inspections. The sequence of the activities shall be stated as well as all tools, auxiliary equipment, consumables and spare parts that may be needed. If necessary, references to detailed technical information (e.g. performance and operational data) in other parts of the manual shall be made.

**Operating instructions*****Start, normal operation, stop and emergency stop***

The information shall be given in a logical sequence and shall include all operations and observations which the operator shall undertake. These may be:

- Check list for prestart preparations
- Prestart settings and precautions
- The starting sequence shall include all modes of operation (manual, automatic, remote control, etc.)
- Observations which shall be made during the starting sequence

- Precautions concerning interruption of the starting sequence
- Operations and observations during normal operation
- Normal stop
- Emergency stop
- Start after emergency stop

### ***Disturbance of operation***

Description of the various forms of disturbance of operation that may occur, how they can be identified and the consequences they may have for the operation, shall be given.

### ***Corrective measures***

A description shall be available of the necessary actions after a disturbance has occurred. For actions which cannot be taken by the operator, it may be necessary to refer to the maintenance instructions. The manual shall state all requirements for reports to the supplier in the form of registrations and observations.

### ***Hazards and protective measures***

A description shall be given of all known hazards that may occur during operation. This also applies to hazards which are due to lack of observation of the supplier's procedures as well as to external causes, e. g. lack of cooling water, loss of electrical power, etc. The manual shall give detailed information about protective measures, how to reduce the consequences to a minimum and what procedures to follow in the event of an accident. Product data sheets for chemical substances shall be attached.

### ***Qualification requirements and training program for operators***

The supplier shall state the qualifications required of the operator and the training programs that can be offered.

## **Maintenance**

### ***General***

Maintenance includes all inspections, measurements, adjustments and operations carried out directly on the equipment in order to ensure safe, reliable and economical operation. Maintenance documentation shall cover the maintenance which can normally be done by the user and the maintenance which is not expected to be done by the user. If the maintenance documentation shall be the basis of a maintenance system for the complete plant where the equipment is a part, then the customer shall state all necessary information and specify all special requests in the inquiry and order documentation.

### ***Structure and contents of operating instructions***

Instructions should contain a minimum of elements and shall be constructed as follows:

- Introduction, scope and possible limitations of the instruction
- Necessary safety precautions before and during maintenance
- Detailed description of the procedure to be followed with references to relevant supplementary documentation
- Necessary data and arrangement for lifting
- List of necessary tools and equipment
- Recommended spare parts and consumables
- Control and measurement points with limits during maintenance and after completion prior to restart
- Requirements for special skills and minimum crew for the maintenance
- Registrations which should be part of a specially defined maintenance log

### ***Maintenance instructions***

These shall be divided into the following separate instructions:

#### ***Routine inspection***

This part of the maintenance consists of the regular inspections carried out by the operation and/or maintenance personnel. The inspections consist of what can be measured, seen, heard or felt without interference in the equipment both during an operation and while at standstill. The supplier shall give instructions concerning inspection points based on his own experience and the selected monitoring system.

#### ***Periodic maintenance***

It shall cover all planned and expected maintenance based on operation time, calendar time or certain operational observations. This type of maintenance may e.g. include:

- Cleaning
- Lubrication schedule
- Adjustments
- Calibrations
- Replacement of wear parts

- Replenishments

### ***Corrections and minor repairs***

The most comprehensive maintenance possible on site shall be described under this clause, e.g.:

- Replacement of broken parts
- Repairs which can be done on site or in a normally equipped maintenance shop
- Dismantling parts of or the whole equipment for shipment to a special repair or overhaul shop

### ***Major repairs and modifications***

It is not normally required that this shall be covered by the instructions at the user's disposal. However the supplier shall keep and upon request provide instructions concerning overhaul and repairs at special shops. If agreed, the supplier shall also keep all documentation for modification or rebuilding of the equipment.

### ***Fault finding and correction of irregularities***

For heavy machinery, complicated equipment or if the equipment is considered critical for the total operation of the plant, the supplier shall include a fault finding diagram in his documentation. The diagram shall list possible faults and irregularities, and refer to possible causes. The diagram shall cover faults which may be discovered during operation and maintenance. Furthermore it shall be described how the fault is to be corrected, if necessary by referring to other maintenance instructions. The supplier should prepare a registration form where the results of measurements and observations can be noted systematically in order to give the supplier a better basis for diagnosis when the user requests supplier's assistance.

### ***Storing, preservation and maintenance of preservation***

This clause shall describe storing of equipment removed from use.

The description of the preparations for storage shall include preservation and other protection against external influences. The description of maintenance during storage shall include preventive and corrective measures to ensure that the functionality of the equipment is taken care of. The clause shall also describe how the equipment is prepared for operation after storage. The supplier shall also state how spare parts are to be stored and preserved.

*(reprint from NS5820, annex A2 – A6, with permission)*

Local language: YES for lifting appliances

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|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                       |

### **5-99, SR-2676 - Instrument calculations**

The following shall be transferred in separate reports:

- Instrument sizing calculations for flow meters, thermowells and flow and restriction orifices.
- Flow element sizing and anti-surge calculations for compressors.
- Load lists (Description of maximum number of instruments/spare capacity related to power supply capacity)

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| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

**5-100, SR-2677 - Instrument field equipment layout drawings**

At least one field equipment layout drawing for each area or module deck level shall be produced.

The following content shall be included on the drawings:

- Tagged field equipment including junction boxes and cabinets
- Sufficient main equipment on the drawing to easily identify the location of the field equipment
- Platform/plant northing and orientation with respect of true north
- Gridlines with north and east references
- Key plan
- Scale bar
- Match lines with drawing references
- Deck/area elevations

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| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-101, SR-2679 - Instrument/telecom. earthing distribution. schematic diagram**

The general earthing principles shall be included to ensure correct earthing of systems, equipment (cabinets, junction boxes and field devices) and cables.

This diagram shall typically include:

- Main equipment like system cabinets, termination cabinets, junction boxes and field devices
- Location of main equipment
- Signal type and function (typ. RS232, control signal) if applicable
- Typical interface, wiring and termination details from system cabinets and main earth bars to field devices
- Main earth bars for instrument and telecommunications
- Earthing electrodes
- Identification of PE bars and IE bars
- Identification of cable armour and screen

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| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-102, SR-62707 - Instrumented systems - Loading and start up procedures**

The procedure shall describe how to load an empty SCADA/SAS system (assuming total black out), where to find the last version of the system (backup), and how to start up the system. Start-up description includes in what order the system should be started, focusing on safety first.

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| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-103, SR-62703 - Instrumented systems - Performance data**

Performance of components in SCADA/SAS shall be documented. Refer to TR3034 chapter 11 and 12 for details about which parameter that shall be measured.

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| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                                 |

**5-104, SR-62601 - Interconnection cabling block diagrams**

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| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-105, SR-62729 - Jack-Up Foot Prints**

Depth and positions

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|-----------------|---------------------------------------------------------------------------------------------|
| Milestone       |  LCI 3     |
| Handover format |  XLS + PDF |

**5-106, SR-62734 - Landfall**

Duct trajectory, duct filling material (type and volume), jointing pit splicing details

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| Milestone       |  LCI 2 |
| Handover format |                                                                                         |

**5-107, SR-2685 - Landscaping drawings**

All arrangement, layout, plan, section and detail drawings shall be included.

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| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-108, SR-2687 - Level instrument arrangement drawings**

For the purpose of documenting the engineering of level measurements, a "Level measurement arrangement drawing" per vessel shall be issued, encompassing:

- Dimensions
- Nozzles (including nozzles for pressure and temperature measurements)
- Level glasses
- Location of measurement elements
- Calibration and measurement ranges
- Alarm levels
- Correlation between engineering units of measure (e.g. mm and %, with calculations)
- ENS Tag number

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| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

### 5-109, SR-2690 - Lighting and small power layout drawings

These drawings are relevant for offshore facilities and for the process plant and well pad area for onshore facilities.

At least one lighting and small power layout drawing for each area or module deck level shall be produced. The size of the facility will determine the scale of the drawing, but normally a scale of 1:100 on A3 format shall be aimed for. If required several drawings per area can be necessary to achieve this scale. Equipment which is covered by platforms above shall be shown dotted or shown in separate figures.

The lighting and small power layout drawing should be based on the equipment layout drawing, and the following electrical field equipment shall be included:

- Lighting fixture, flood lights, socket outlet and junction boxes. These shall be tagged according to ENS.

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|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

### 5-110, SR-62594 - Loop information / Loop Drawings

Information sufficient to enable generation of complete loop diagrams as graphical representations from Company's Loop system for instrument loops, fire & gas, telecom, and electrical interface to SCADA/SAS shall be provided.

Electrical signals start at the interface between starter/circuit and continue to the control system for hard wired signals. Internal wiring in electrical switchboard will not be included.

Loops in supplier packages, which comprise any local/external control systems, shall be included.

Details of non-occupied terminals, channels, amplifiers and non-used pairs shall be included.

Only external signals between equipment and field equipment shall be described in the loop system. Internal wiring shall be described if it constitutes a logical extension of the loop.

Loops shall include the following information:

- Tag number for all equipment in the loop
- Termination details for all cables between tags/components in the loop
- Cross wiring details
- Strapping details
- Component type details e.g. barriers
- Cable details like cable number, number of groups, wire colours including screens which also shall be connected
- System programming information such as switch number, port number, channel number, etc.
- Amplifier number and zone number (Public Address systems)
- Node reference
- Functions/software tags
- Signal tag including signal type
- HW typical
- Power supply to loop shall be included to first fuse

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| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-111, SR-2693 - Lubrication index**

A lubrication index shall be provided containing the following information:

- Tag code
- Location of sampling point
- Lubrication point sequence number (allocated by Company and referred to as TAS number)
- Supplier lubricant (product type)
- Company equivalent lubricant
- Quantity first fill
- Quantity normal
- Interval or monitoring frequency and parameters (particles, water content and additives)

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| Milestone       |  LCI 1 |
| Handover format | XLS + PDF                                                                               |

**5-112, SR-81126 - Manufacturing Record Book (MRB)**

MRB is a collection of necessary documents to demonstrate that the requirements with respect to design, calculation, production, testing and possible specified traceability requirements for materials and fabrication, are fulfilled.

If the documentation normally contained in MRB is issued separately, a reference to such documents is sufficient in the MRB.

MRB requirements:

- The manufacturer's standard MRB shall be delivered .
- If additional documents required by Company, than they should be submitted as separate deliverables.

An MRB may include:

(depending on the equipment it describes some documents may not be applicable)

- Introduction and MRB index
- List of certificates
- Analysis, tests, calculations, curves and tables (\*)
- Balancing certificates
- Calibration certificates
- Certificates needed for re-certification of equipment
- Certificates of conformance (\*)
- Documentation for CE marking
- Final inspection, preservation, packing and dispatch
- Final test/acceptance reports (FAT reports)
- Instrument calculations (safety and relief valves) (\*)
- Lifting certificates
- Manufacturing procedures and reports
- Material certificates (\*)
- Material testing and control
- Material traceability list
- Mechanical/structural calculations and analyses
- NDE drawings, sketches and other NDE doc.
- Non-conformance reports
- Painting procedure
- Performance / functional test procedures and reports
- Photos of equipment/inspections
- PMI report
- Pressure test certificates
- Telecommunication test report(s), Vendor reports, MC&C reports
- Third party verification reports
- Type Cert.'s/EX Certificates/Product Cert.'s. issued by third party (\*)
- Weight certificates (\*)
- Weld Summary Index and NDE log
- Welding procedures
- Welding procedure qualification records (where applicable)

For hoses and couplings the Manufacturing Record Book shall contain:

1. Pressure test certificates
2. Data sheet for couplings, type and material
3. Lifting certificates (if relevant)
4. Non-conformance reports (if relevant)
5. Final inspection and preservation

(\*) Documents that may be required as separate documents. See chapter 4 for equipment type specific requirements.

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| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

### 5-113, SR-81133 - Master grid report

The objective of Master Grid is to facilitate the availability of trusted spatial information throughout the installation life cycle.

The Master grid report shall include following information:

- Master grid ID
- Easting
- Northing
- Elevation
- Count (number of measurements for each MG)
- Root mean square (RMS) error for each MG point

Secondary Grid data shall be included in the Master Grid report as an attachment.

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| Milestone       |                                                                                               |
| Handover format |  XLS + PDF |

### 5-114, SR-2697 - Material certificates

Shall contain all material certificates (incl. welding filler material) along with traceability data.

The traceability requirements would depend on type of application, component and criticality, and reflect the requirements set in the respective governing documents.

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| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

### 5-115, SR-81361 - Material handling report

For Offshore facilities, the material handling report which shall contain the following:

- Description of all material handling equipment, e.g. offshore cranes, personnel and goods lift, forklift truck, trolleys, air film transporters, elephant cranes, A-frames, mobile cranes, etc., including tag numbers (where required), sizes and capacities.
- Description of standardized sizes of typical lifting beams, pad eyes and lifting equipment, as applicable.
- Requirements for certification and marking of lifting equipment including foundation and suspension
- Description of function, size and location, maximum allowable loads, point loads of lay down and storage areas including areas for the handling of temporary, Company provided and hired equipment., (Laydown area chart)
- Requirements for transportation routes including maximum allowable loads, point loads, width and height in the different areas. (Transport routes chart)
- Description and drawings of goods handling to/from helideck
- Description of loading hose handling including hose replacement
- Description and drawings of areas where special protection of equipment is required e.g. dropped object protection, truck barriers, swinging load protection etc.
- Description and drawings of handling for all goods to and from the LQ.
- Table /index containing all tags to be handled with corresponding identification number to the Material Handling Data Sheet.

For Onshore facilities, the material handling report which shall contain the following:

- Description of all material handling equipment, e.g. fork lift truck, trolleys, air film transporters, elephant cranes, A-frames, mobile cranes etc. including tag numbers, sizes and capacities, storage location, installation method and requirements for certification, marking and re-certification period.
- Description of function, size and location of lay down and storage.
- Description of all items above 25 kg (55 lbs.) to be handled, including tag numbers, location, weight, size, type of lifting equipment/ arrangement, lifting/ handling procedure, transport route etc. In cases where the equipment vendor has established thorough handling procedures in the maintenance manual, this can be referred to in the report. The material handling description for such equipment can be reduced to just defining the required lifting/ transportation equipment and transport route.
- Requirements for transportation ways/roads including width and height in the different areas.
- Description of areas where special protection of equipment is required e.g. dropped object protection, truck barriers, swinging load protection etc.
- Material handling drawings based on equipment arrangement drawings or 3D plots including piping and valves containing the following:
  - All equipment to be handled including lifting lugs, monorails, access ways etc.
  - Table containing all tags to be handled with corresponding tags for the lifting equipment to be used.

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| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

#### 5-116, SR-81362 - Metocean - Meteorological and oceanographical reports

The reports shall be delivered.

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF + ZIP                                                                               |

**5-117, SR-61896 - Model test reports**

Model test report shall be delivered. The report or collection of reports shall document the model test and describe the results of the testing.

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-118, SR-61893 - Mooring component certificate and fabrication documentation**

Mooring component certificates and fabrication documentation collection report shall be delivered. All certificates and other relevant documentation issued during manufacturing of mooring components shall be organised in a logical manner (including welding filler material) along with traceability data.

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| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-119, SR-62731 - Mooring Lines**

Pre-tension level

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  XLS   |

**5-120, SR-61892 - Mooring system design**

Mooring system design reports shall be delivered. The collection of reports and drawings shall provide information on mooring system layout and component design. The report shall contain a complete description of the entire mooring system:

- Arrangement drawings
- Component drawings
- Design analyses of all mooring components from onboard systems to anchors

|                 |                                                                                           |
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| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-121, SR-61891 - Mooring system procedures**

Mooring systems procedures shall be delivered. The report or collection of reports shall contain all procedures necessary to safely operate, maintain and replace any component of the mooring system.

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| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-122, SR-61890 - Motion analysis model**

A complete motion analyses model shall be delivered with all necessary information required to perform a re-analysis.

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|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  ZIP   |

**5-123, SR-61889 - Motion design reports**

Motion design reports shall be delivered. The report or collection of reports shall contain the final documentation of:

- Dimensioning environmental conditions
- Vessel response characteristics
- Extreme motion response
- Dimensioning accelerations
- Air gap / slamming / green sea analyses
- Model test verification analyses

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| Milestone |  LCI 2 |
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| Handover format |  PDF |
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#### 5-124, SR-2700 - Network topology diagram

Overall network topology shall show topology of technical network and subnetwork to give a functional understanding and a foundation for a risk and vulnerability analysis. Typical contents shall be:

- Related servers, switches, routers, firewalls and computers represented by a relevant symbol, marked with its identification and description of function
- Location of the equipment identifying the zone for the system
- Communication between units shall be indicated, also wireless interfaces
- Reference to information concerning IP/MAC addresses (restricted information)
- Reference to information concerning firewall rules (restricted information)
- Signal type, protocol and function (typ. RS232, control signal) if applicable
- Colour coding to indicate criticality level of the system

For smaller technical networks the information from the subsystem block diagram can be integrated in the overall system topology, provided the readability of the drawing are maintained.

[C999-ST-J-MT-0001 - Template - Network topology diagram](#)

|                 |                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2     |
| Handover format |  XLS + PDF |

#### 5-125, SR-62728 - Offshore Substations

Installation coordinates and records, topside completion status

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|-----------------|----------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2      |
| Handover format |  XLS + PDF |

#### 5-126, SR-2703 - Overall single line diagram

Overall single line diagrams for all voltage levels shall be provided.

The diagrams shall include all power distribution units (generators, eventual external grid, switchgears, transformers, distribution boards, rectifiers, batteries etc.) throughout the distribution system. End consumers shall be included for high voltage consumers. Only generators, transformers, switchgears, main distribution boards shall be shown on the low voltage level.

Separate single line diagrams shall be prepared showing UPSs including main and sub distribution boards as well as lighting and small power, typical 400/230 V system.

Separate earthing overall single line diagrams, including all main equipment, shall be provided for the electrical, instrument and telecommunication installations. The general earthing principles shall be included to ensure correct earthing of systems, equipment and cables. This single diagram shall typically include:

- Main earth bars for electrical, instrument and telecommunications
- Earthing electrode
- Lightning system
- Earthing of electrical main equipment as switchboards, transformers and generators. System earthing shall be included.

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-127, SR-2704 - PAGA amplifier load list

Load list for PAGA amplifiers.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

#### 5-128, SR-81363 - PAGA coverage measurements reports

PAGA coverage measurements report shall be provided.

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| Milestone |  LCI 2 |
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|-----------------|-----------|
| Handover format | DOC + PDF |
|-----------------|-----------|

#### 5-129, SR-2706 - Parameter setting tables

The document shall contain a template including all adjustable parameters, indicating which parameters are fixed by the project. For parameters which have individual setting the criteria/formula for defining/calculating the individual setting shall be given. In addition the document shall include a table listing all individual settings. This table shall on one axis list all equipment (tags) and the other all parameter requiring individual setting.

Examples of relevant equipments are: VSD (Variable Speed Drive), Softstarter, Synchronising Equipment, OLTC control (On Load Tap Changer), Insulation Monitoring equipment, Intelligent electrical devices (IED).

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                               |

#### 5-130, SR-2716 - Piping component calculations

The document shall include drawings and strength calculations of piping components, typical: weldolets, nipoflanges etc.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

#### 5-131, SR-2718 - Piping installation procedure

Applies to piping systems that require special attention during installation, typical for piping connected to strain sensitive equipment such as compressors.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

#### 5-132, SR-2711 - Pipe stress procedure

The document shall describe the design data for the pipe stress work, and ensure that all applicable codes, standards, guidelines and regulations that are relevant at the commencement of detail engineering are fulfilled. The document shall comply with requirements in TR1951 Piping Engineering which is the governing document for the procedure.

For modification projects the existing procedure for the plant may be used if this is available.

NOTE: For equipment packages where the amount and size of piping is moderate, or the piping might be mostly for support functions (cooling, lubrication, drain etc.), pipe stress procedure from the manufacturer is not necessary. For large packages with a considerable amount of larger piping, where pipe stress isometrics will be delivered, pipe stress procedure should also be delivered.

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| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

### 5-133, SR-2712 - Pipe support drawings

Detail drawings describing the support installed shall be provided for all pipe supports (pipe support assemblies and spring support assemblies).

The following information shall be included:

- Dimensioned plan, elevation, sectional and iso views as required
- Centre of gravity location and coordinates
- Weight
- Material identification and description (bill of material)
- Line numbers for all supported lines
- Reference to stress isometric if relevant
- Reference to support calculations if relevant
- Reference to connected pipe support assemblies / spring support assemblies
- The drawing title shall include the pipe support number ("PIPE SUPPORT AZZ-AA-NNNN")

NOTE: For equipment packages where the amount and size of piping is moderate, or the piping might be mostly for support functions (cooling, lubrication, drain etc.), pipe support drawings from the manufacturer are not necessary. For large packages with a considerable amount of larger piping, pipe support drawings for the main piping should be delivered. Selection should be done early in the project.

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| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                     |

### 5-134, SR-2713 - Pipe support index

Index to contain:

- Pipe support number
- Pipe support drawing number
- Line number
- Piping stress isometric drawing number
- Welded attachment (Yes/No)
- Fire Protection (Yes/No)
- Hook-up (Yes/No)
- Temporary pipe support (Yes/No)

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                                 |

### 5-135, SR-81364 - Piping and instrument diagram (P&ID)

P&IDs shall be prepared for drilling systems, main process (production, injection and export) systems, process support and utility systems and safety systems, including subsea parts of the systems (if any).

The symbols used for the P&IDs shall be explained by a legend which shall be a part of the total P&ID set. The P&IDs shall use the coding and numbering standard in ENS/TR0052, and the plant legend and drawing standard in TR1970.

All equipment, piping, valves, orifices and blinds and instrumentation shall be shown on the P&IDs. Identical/parallel items, equipment or systems shall be drawn in full detail, i.e. typical drawings with associated tag number tables are not permitted.

The number of equipment units on one P&ID shall typically be limited to (a) one vessel or compressor and (b) parallel pumps or heat exchangers. For all connections (e.g. lines and instrument signals) between P&IDs/P&ID sheets, a descriptive text and the connected drawing number shall be included.

The P&IDs shall include boundary lines for interfaces to an equipment supplier's scope. Unique numbers shall be included for the connections crossing these boundary lines. The equipment supplier prepares P&IDs for the supplier scope. The P&ID shall include a reference to the equipment supplier P&ID(s), preferably within the boundary lines. Where the equipment supplier scope is on several P&IDs/P&ID sheets, a

cross reference between connection number and P&ID/P&ID sheet shall also be included.

Regarding equipment, the following shall as a minimum be included: • Tag number • Equipment (main) data in a table on the P&ID • Elevation • Equipment internals that is important to understand the functionality such as weir plate, sections of packing/plates, heat bundle, static mixers etc. shall be shown schematically • Isolation and spading of equipment • Manholes incl. nozzle size • Insulation and heat tracing

• Open drains and drip trays • Equipment connections such as connections for instruments, purge, steam out, vent and drains • Inline equipment such as silencers, straightening vanes and strainers. A note shall describe the purpose and requirements for strainers (temporary/permanent, maximum allowable pressure drop etc) Regarding lines the following shall as a minimum be included: • Line number • Direction of flow • Requirements to layout/routing such as line slope and no pockets, symmetrical piping, branch entry to header (e.g. top of header), minimum straight length and minimum and maximum distances • Height/elevation data where required for sumps • Line size change (reducers) • Piping specification break • Insulation break • Heat tracing and heat trace break • Blind flanges, caps, plugs or other at end of headers • Spool pieces and flanges required for maintenance and operation • Underground/aboveground breaks • Floor/module breaks • Area breaks • Liquid or gas seal traps and goose necks • Line connections such as connections for instruments, hoses, sampling, chemical injection, probes, pulsation damper, cleaning, drain, vent and temporary uses (to be described in a note) Regarding valves, orifices and blinds the following shall as a minimum be included: • Tag number for all valves, orifices and blinds • For manual valves • All manual piping valves shall be tagged with nominal pipe size and valve specification reference/VDS-number (or piping special item tag number if applicable). Individual valve tag numbers shall be added on the "issued for construction" revision at the latest Locking/interlocking to secure correct operational position (e.g. KILC/KILC = mechanical key interlock open/closed or CSO/CSC car seal open/closed) • Position indication on valves where relevant (normally open or normally closed) • For actuated valves • All on/off actuated valves such as ESV, XSV, XV and HV shall be shown with nominal pipe size and VDS-number in addition to tag number • Leakage class of all actuated valves • Fail positions of all actuated valves (i.e. open/closed/maintained position) • Limit switches of actuated valves • Position indication on valves (normally open or normally closed) where relevant • Relief valve size and set pressure • Spectacle blinds and spade/spacers, shown in normal position • Special requirements to be noted Regarding instrumentation the following shall as a minimum be included: • Tag number

• Connections to local control and SAS (ESD, PSD or PCS) • Requirement for local reading of instrument • Control power (pneumatic/hydraulic fluid or electrical power) • Alarm and trip functions (H, L, HH, LL) shall be indicated and set points shall be shown for trip functions • Port identification when 3-way valves are used • Heat tracing and insulation on instruments • Type of level and flow instruments • The piping valves connecting the instruments to the process, i.e. the valves required for isolation from the process shall be shown specifically. Detailed information about the instrument hook-up, however, will be found on the instrument hook-up drawings

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|-----------------|------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1            |
| Handover format |  DGN (TR1970)+PDF |

**5-136, SR-2717 - Piping fabrication records**

The following list shows the deliverables and structure of the fabrication records for piping:

- FRB User guide – Describes the content of each deliverable in the FRB and how they relate and refer to each other. Include examples (images) of how to trace welds and material certificates from fabrication drawings/ISOs
- Index of design drawings with reference to relevant fabrication drawings (Index of design drawings to be delivered in XLS format additionally to PDF)
- Index of design-, material-, fabrication specifications, documents and data sheets (\*)
- Welding procedure specifications (\*)
- Welding procedure qualification records (\*)
- Repair procedures and specifications (\*)
- Repair and deviation reports. All alternative testing shall be documented with full traceability to the applicable welds
- Weld summary index
- Material identification system (\*)
- Material certificates (apply for pressurized Piping materials) (\*)
- Pressure test certificates/documentation (\*)
- PMI reports (\*)
- PWHT reports (\*)
- As-built Design Contractor originated design drawings, mark-ups
- As-built fabrication drawings/ISOs mark-ups
- Third Party verification reports
- Procedure for:
  - Tensioning/torquing of flange studbolts (\*)
  - Flushing and cleaning (\*)
  - Hydro testing (\*)
  - Hydro flushing of riser- and pipeline valves (\*)
  - Pneumatic flushing (\*)
  - Pressurised air shock blowing (PAS) (\*)
  - Soft Pigging (\*)
  - Chemical cleaning (\*)
  - Hot oil flushing (\*)
  - Internal cleaning of pipe after completed fabrication (\*)
  - Bending/flaring (\*)
- Chemical cleaning documentation (\*)
- Hot oil flushing documentation (\*)

(\*) Can be omitted in modifications if retained by modification Contractor

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|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-137, SR-2720 - Piping Stress Isometrics**

Piping stress isometrics shall be provided for all lines for which stress calculations or evaluation have been made, and include the following information:

- Line number
- Process data (temp. and pressure)
- Valve weights
- Equipment nozzle loads
- Stress summary
- Reference to P&ID
- Restraint loading and displacement
- Spring summary
- Calculation No.
- Separate document no with revision code on each stress iso (not stress report number)
- Special supports, typical: gap, adjustable, PTFE
- Equipment nozzle with tag no
- Pipe specification break
- Reference to adjacent isometric drawings
- Special items

- Penetrations
- Pipe stress report no
- Dimensioned pipe support locations and support numbers including spring supports, etc.
- Node numbers from calculation model (as a minimum for each pipe support, valve, equipment nozzle, interface to other lines/sheets/isometrics and location for max utilisation)

NOTE: For equipment packages where the amount and size of piping is moderate, or the piping might be mostly for support functions (cooling, lubrication, drain etc.), piping stress isometrics from the manufacturer are not necessary. For large packages with a considerable amount of larger piping, piping stress isometrics for the main piping should be delivered. Selection should be done early in the project.

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|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-138, SR-81365 - Piping stress report

The Piping Stress Report shall document that the critical lines meet the code, authority requirements and project requirements.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

#### 5-139, SR-62722 - Plot plan drawings

These drawings are relevant for offshore facilities and for the process plant for onshore facilities.

One plot plan drawing for each area/deck level shall be produced. The plot plan drawing shall cover the entire process plant/deck area. The size of the facility will determine the scale of the drawing, but normally a scale of 1:500 on an A3 format shall be aimed for.

The following content shall be included on the drawings:

- Plant/Platform Northing and orientation with respect of true north
- Gridlines with north and east references
- Scale bar
- Elevations of all decks/platforms
- Area segregation, with fire partitions indicated
- Helicopter pick-up location
- Location of cranes, with boom rests and maintenance platforms. Lifting capacity radiuses to be indicated
- Tote tank area (offshore)
- Laydown areas
- Main pipe racks
- Main stairs, access and escape routes
- Main material handling routes
- HVAC, instrument and electrical rooms (offshore)
- Control room (offshore)
- Emergency shelter (offshore)
- Main structures
- Location of all major equipment as identified in MEL
- Main equipment shall be tagged according to MEL. An equipment index shall be included on the drawing
- Space allocation for J-tubes and umbilicals including temporary equipment (pulling arrangement) (offshore)
- Space for future modules/equipment

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|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-140, SR-2723 - Pneumatic connection diagram

The diagram shall identify all pneumatic connections.

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-141, SR-81351 - Pneumatic/hydraulic hook-up drawing**

For pneumatic and hydraulic consumers the supplier shall work out hook-up drawings.

A typical hook-up drawing shall indicate details such as:

- All instrument/bulk material installed by Supplier
- Connections and dimensions of signal lines/tubing
- Material of instrument bulk

Typical hookup drawings should be used as a guideline.

The drawing shall indicate split of responsibilities between Supplier and Purchaser.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

**5-142, SR-81366 - Process safety report**

The process safety report shall be one single report for the plant (i.e. not split into several reports), and this report shall be updated whenever relevant modifications to the plant are performed.

The process safety report shall as a minimum include/describe:

- The philosophy for process safety functions, i.e. pressure protection, level protection, temperature protection and overflow protection
- Process safety functions including premises for the design of the safety function
  - Documentation of how these premises are fulfilled in design and shall be maintained, so that future modifications will not compromise the design intention.
  - Relief cases (all) for relief valves including the dimensioning 'required capacity' and the 'rated capacity'
  - Instrumented shutdown
- The structured review of the required instrumented shut down functions:
  - Documentation of the performed structured analysis utilizing SAT, SAC and SAFEs in accordance with ISO 10418/API RP 14 C
  - Documentation of the structured review carried out to determine required instrumented shutdown functions, e.g. LOPA (if applicable)
- The philosophy for leakage detection
- Listing of valves that need to be secured in the correct position as a part of the process safety design, including reasoning for securing the valve position and the choice of method
- Heat conservation philosophy for safety critical heat conservation including operating and maintenance practice to ensure proper reliability of the heat conservation systems
- Safety critical procedures (administrative control)
- Safety critical check valves
- Pipeline protection (if relevant)
- The reasoning for the chosen sectionalisation of the process
- The relief valve schedule
- PSD response time

[C999-ST-P-MU-0100 Template /guideline to Process Safety report](#)

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-143, SR-2733 - Radio link budget calculations**

Radio link budget calculations that have been used for design of radio links shall be provided.

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|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

**5-144, SR-2734 - Relay setting table**

The Relay setting table is part of the "Protective relay coordination and discrimination study" See requirement for protection and discrimination coordination study, TR3021, Electrical system design, offshore units, and TR3022, Electrical system design, onshore plants.

Where practical, the relay setting table shall be made similar as "Parameter setting tables", i.e. combination of templates and setting tables for parameters with individual setting.

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                               |

**5-145, SR-86310 - Risk analysis**

General requirement for qualitative risk assessment towards EQN SSU risk matrix (personnel risk).

Quantitative risk assessment for control of specific risk factors with major accident potential and input to design accidental loads. This includes:

- Fire risk assessment
- Ship collision risk assessment,
- Transformer explosion risk assessment (if transformers are located in confined or semi-confined space)

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

**5-146, SR-2737 - Road drawings**

All system, arrangement, layout, plan, alignment, section and detail drawings shall be included. Location, direction, type of sign post and reference to sign post data sheet shall be shown on layout drawings.

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|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                 |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-147, SR-2739 - Safety layout drawings**

The drawings shall be prepared in accordance with the requirements below.

There shall be sufficient main equipment on the drawing to easily identify the location of the equipment in question. Safety layout drawings should as far as possible use the same basis/background as other layout drawings. All equipment listed below shall be identified by:

- Tag code
- Approximate dimension and geometrical form of tag

The following safety arrangement drawings and diagrams shall be produced as follows:

- Escape route drawings; shall include
  - Primary escape routes with arrows indicating escape direction
  - Secondary escape routes with direction
  - Muster and embarkment areas
  - Evacuation means (e.g.: lifeboats, escape chutes and rafts)
  - Areas for first aid treatment
- Safety equipment layout
  - First aid equipment
  - Safety equipment (e.g.: life jackets, life buoys, rescue equipment, MOB boat)
  - Emergency showers
  - Emergency phones
- Safety sign layout
  - Location of signs
  - Sign post schedule including fixing details for signposts and signs
- Active fire protection equipment layout
  - Location of active fire protection units (e.g. deluge, sprinkler, foam, gaseous units)
  - Manual fire fighting equipment (e.g.: hydrants, hose reels, extinguishers)
  - Monitor
- Passive fire protection and blast protection
  - Location of fire divisions (fire walls, deck segregation) including size and direction of dimensioning load
  - Location of explosion resistant walls including size and direction of dimensioning load

- Location of explosion overpressure ventilation outlet
- Fire and gas detection layout
  - Fire and gas detectors with elevation and in addition direction of view including angle up/down for flame detectors
  - Manual Call buttons
  - Manual active fire protection release buttons
  - Manual ESD buttons
  - Manual Electrical Isolation buttons (MEI), isolation of high voltage electrical equipment
  - Warning lights, and other alarm devices

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|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-148, SR-81367 - Safety manual

- Supplier's documentation that demonstrates, or is required to demonstrate, that the provided equipment complies with the safety requirements and is suitable for the intended purpose as part of a safety function, and is in accordance with the relevant reference standards.
- The documentation shall detail all known aspects of installation, maintenance, configuration, programming and operation that should be observed if the component or device is to meet the safety requirements specification of the application

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                     |

#### 5-149, SR-2742 - Satellite link budget calculations

Satellite link budget calculations (signal level and attenuation in dB) that have been used for design of satellite hops shall be provided.

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| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

#### 5-150, SR-62735 - Scour Protection

As-installed details, volume, survey details

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| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-151, SR-62736 - Seabed Intervention**

Rock installation, mattress and/or rock bags, UXO free areas

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| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-152, SR-62696 - Settlement metering - calibration certificates**

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  PDF   |

**5-153, SR-62590 - Settlement and Power Quality metering - configuration parameters**

All physical dimensions and parameters which will affect the measurement result shall have documented traceability to international standards. A document providing such traceability shall be provided.

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

**5-154, SR-62591 - Settlement and Power Quality metering - data exchange specifications**

A separate data exchange document shall be issued for each interface. Data content and interface shall be agreed between relevant parties.

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

**5-155, SR-62593 - Settlement and Power Quality metering - functional design specification**

Basic documents for detailed design and implementation of the metering system(s). The functional design specification shall ensure that the metering systems will be constructed in compliance with Statutory requirements, the project specific metering philosophy, TR0814 Metering systems for fiscal, allocation or custody transfer applications, other relevant requirements and suitable for the project specific frame conditions

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| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-156, SR-62592 - Settlement and Power Quality metering - metering calculations**

A document unambiguously showing all calculations affecting the measurement result shall be provided.

The document shall provide the information needed for an independent verification of the calculations in the computer. All international standards used shall be referred to with version number, year and relevant section.

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| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-157, SR-2743 - Shutdown hierarchy**

The purpose of the "Shutdown hierarchy" diagrams is to give an overview of the different shutdown levels and present the levels in a hierarchical way. Refer to TR1055, PS4 figure 3 for a typical shutdown hierarchy for ESD.

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|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-158, SR-62595 - SIL verification/calculation/Safety Analysis Report (SAR)**

Supplier's documentation that demonstrates, or is required to demonstrate, that the provided equipment complies with the safety requirements and is suitable for the intended purpose as part of a safety function, and is in accordance with the relevant reference standards.

The documentation shall detail all known aspects of installation, maintenance, configuration, programming and operation that should be

observed if the component or device is to meet the safety requirements specification of the application

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|-----------------|---------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2     |
| Handover format |  DOC + PDF |

### 5-159, SR-2530 - Single line diagram (Supplier)

For equipment packages the single line diagram shall show the main circuits and components in the electrical distribution system. The drawing shall contain identification of and main data for the components within the equipment.

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|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

### 5-160, SR-81368 - SIS functional safety information

Documentation shall fulfil the requirements in the standards IEC61511 and IEC61508 as relevant, and be developed to suit any lifecycle of a Safety Instrumented System (SIS).

- Functional Safety management Plan (FSMP)  
FSMP shall be established addressing all activities of the SIS lifecycle, and detailing each phase due to be performed (e.g. project development or operation phase). This shall include a plan for when the activities shall be performed and responsibilities for the different activities. The document shall be made available by the overall SIS compliance responsible, i.e., integrator.
- SIL Allocation Report  
With references in analysis of hazards, risks and risks reduction, the determined Safety Instrumented Functions (SIF), allocated Safety Integrity Levels and identified SIS respectively shall be documented in a "SIL allocation report" file including an index of all SIF/SIS.
- LOPA Report  
Layer Of Protection Analysis (LOPA) is a simplified risk-based method that can be applied to allocate SIL requirement to the Safety Instrumented Functions (SIF). With reference to GL2041, LOPA is the preferred method for the SIL allocation of preventive Safety Instrumented Functions. LOPA analysis shall be documented in a report.
- Safety Requirements Specification (SRS)  
Safety Instrumented System (SIS) is developed throughout different lifecycle phases providing an extract of relevant information. The SRS shall focus on main requirements and performance parameters of the SIS while references are made to other documents in order to accomplish a complete overview of all SIS properties.
- SIL Compliance Report  
This report including Calculation and Data Dossier (CDD), shall describe methodologies, all data sources applied, calculations and reporting the status of each SIS conformance with main requirements.
- Miscellaneous SIS specific information, examples:
  - Premises for SIS operating and maintenance activities.
  - Identify particular prerequisites and assumptions made as part of SIS design which has to be complied with during the phase of operating the SIS. This shall also include description of required proof testing (to be prepared prior to and verified during commissioning, readily available to incorporate in plant maintenance program).
  - Guideline for suppliers (see also 5.210 for the delivery of Safety Manual / Safety Analysis Report).
  - Instructions to supplier of devices for the provision of information demonstrating that the provided deliverables comply with the safety requirements and is suitable for the intended purpose as part of a safety function.
  - Reports from the various validation and verification activities including a SIS validation record normally issued upon completion of the engineering (re., system integrator).
  - Functional Safety Assessment reports.  
FSA shall be planned, performed and reported at the relevant project stages as indicated by IEC 61511.

Formats for calculation files:

Reports: DOC+ PDF

Calculation files (LOPA, CDD): Excel (+TBA if commercial software applied)

|                 |                                                                                                   |
|-----------------|---------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2         |
| Handover format |  DOC/XLS + PDF |

### 5-161, SR-81369 - Site Plan

The Site plan shall be based on a digital terrain model and shall include necessary layers to present (often provided as 2D input):

- Geotechnical and geological features/strata
- Areas with registration of contaminated soil
- All plant functional areas/blocks including offsite
- Cavern, tunnel and shaft systems

- Areas defined for future plant development
- Areas that will have to be controlled or restricted during plant operations
- Levelled areas as a result of cut and fill
- Protective structures at sea, towards river and hinterland
- Plant road system including escape routes
- Plant main interconnecting pipe racks
- Plant fence lines and gates
- Outside plant local infrastructure and plant battery limits (roads, railways, port, pipelines, cables and overhead lines, etc.)
- Permanent lay down and rig areas for future construction and turnaround activities
- Construction lay down areas and areas for temporary construction workshops, offices, accommodation, parking and holding areas
- Areas for permanent and temporary disposal of surplus materials
- Neighbouring settlements and use of land
- Areas that shall remain protected or with restriction to access (like nature reserves, historical monuments, archaeological sites)
- Property borders
- Industrial zoning as per authority approvals

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-162, SR-2749 - Slewing ring/Foundation bolts tension table - Lifting appliances

A table showing pre-tensioning / extension for each slewing ring / pedestal adapter / foundation bolts after final assembly shall be delivered. For bolts using pre-tensioning, the table shall include length measurements before and after pre-tensioning including allowable tolerances.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

#### 5-163, SR-2750 - Software documentation - Lifting appliances

The Software documentation shall specifically identify the target systems that have been tested, by listing of specific HW type, serial numbers, and specific SW version identification.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

#### 5-164, SR-2751 - Spare Parts Interchangeability Register (SPIR)

A spare parts interchangeability record (SPIR) shall be provided for all parts potentially requiring replacement/repair. The SPIR shall support the repair strategy for the equipment units. For bulk and other equipment unit with repair strategy "scrap and replace" only the complete replacement equipment shall be listed in the SPIR.

Content shall be in accordance with TR1005/Package Specification Template (PST)/Technical requisition-Spare Part Handling.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | XLS (TR1005)                                                                              |

#### 5-165, SR-2755 - Structural analysis model

If engineering contractor or 3rd party verification body have made a global structural analysis model in SESAM format, then a zip file with input files on js format and FEM files shall be delivered with a short description of each input file. It shall be possible to import the zip file into SESAM Manager and run the entire analysis in SESAM Manager. A description on how to import the zip file and run the analysis shall be delivered.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | ZIP                                                                                       |

#### 5-166, SR-81147 - Structural design report

Structural design reports and input files/parameters shall be delivered. The report or collection of reports shall be self contained, i.e. provide all information required to re-produce the results. The structural design report shall have specific and detailed references to drawings and relevant part of regulations and referenced standards.

NOTE: For WTG, Design Calculation and statements about the construction load must be included in the structural design report.

|           |                                                                                           |
|-----------|-------------------------------------------------------------------------------------------|
| Milestone |  LCI 2 |
|           |                                                                                           |

|                 |     |
|-----------------|-----|
| Handover format | PDF |
|-----------------|-----|

### 5-167, SR-62724 - Structural fabrication drawings

Fabrication drawings for primary and secondary loadbearing structural members including supports for appurtenances (e.g. caissons, J-tubes) shall be delivered including welds with reference to weld summary index.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

### 5-168, SR-81345 - Structural fabrication records

The following list shows the deliverables and structure of the fabrication records for structural steel and aluminium:

- As-built Users Guide
- Index of design drawings with reference to fabrication drawings
- Index of material, design, fabrication, specifications and documents, used by Contractor
- Welding procedure specifications
- Welding procedure qualification records
- Repair procedures and specifications
- Weld summary index
- Material specification system
- Assembly procedures
- Production test reports
- PWHT reports
- Repair and deviation reports
- As-built Design Contractor originated design drawings, mark-ups
- List of fabrication drawings containing Main Weld numbers
- Documentation of rubber coating of j-tubes shall include the following:
  - Detailed design calculations of thermal insulation requirements, and the development of the insulation aspects of the product, during its lifetime expectancy in service. These calculations shall apply for the components and field joints, and take into consideration all the necessary properties including application and installation.
  - Detailed information about properties of the coating and coating system qualification
  - All materials data, test certificates and product data sheets (PDS)
  - Detailed coating procedure, as a minimum including the information listed in the APS
  - Detailed field jointing procedure.
  - Detailed repair procedure.
  - Detailed procedures for handling and storage of line-pipe.
  - Detailed Quality plans / Inspection and Test Plan (ITP). All witness and hold points shall be identified
  - Test records and results
  - Inspection reports and records.
  - Repair and recoating records
  - All relevant coating application variables
  - The personnel qualification record shall constitute proof that the personnel designated to carry out the work are properly qualified to do so.

The following list shows the deliverables and structure of the fabrication records for Concrete structures:

- FRB User guide – Describes the content of each deliverable in the FRB and how they relate and refer to each other. Include examples (images) of how to trace welds and material certificates from fabrication drawings
- Index of Concrete fabrication and detail drawings
- Index of material, design, fabrication specifications and documents used by Contractor
- Index of Construction sequence drawings, e.g. dry dock, inshore, tow-to field and installation
- Reinforcement bar lists
- Concrete mix specification (cement, aggregate, inhibitors, etc.)
- Test records of compression- and tension capacity of actual fabricated concrete
- Material certificates reinforcement

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

### 5-169, SR-2759 - Structural fire protection drawings

Drawings shall include the following minimum information:

- Extent and thickness of fireproofing, including description of coating/paint for fire protection systems

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

#### 5-170, SR-2760 - Structural load plans

Structural load plans shall be produced.

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-171, SR-2762 - Structural steel and aluminium structural design report (Civil)

Structural design reports and input files/parameters shall be delivered. The report or collection of reports shall be self-contained, i.e. provide all information required to re-produce the results.

The static analysis and calculations shall have specific and detailed references to drawings and relevant part of regulations and referenced standards.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

#### 5-172, SR-2763 - Structural steel and aluminium. Main, secondary and outfitting drawings (Civil)

The following drawings shall be delivered:

- Arrangement
- Typical
- Sections and details

The drawings shall contain:

- Dimensions
- Plate thicknesses and section properties
- Weld type and size
- Material properties
- Reference drawings number
- Reference to tag number

Structural load plans shall be produced.

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-173, SR-61880 - Structural steel and aluminium. Main, secondary and outfitting drawings

The following drawings shall be delivered:

- General notes and specifications
- Isometric view (one isometric view per module. Shall cover only main steel and include elevation, grid lines, keyplan, north and east references, northing and orientation with respect of true north)
- General Arrangement (plan and elevation view)
- Plan, Sections and details
- Standard drawings (e.g. grating, railing, staircase, ladder)

Each structural drawing shall contain the following information:

- Dimensions
- Plate thicknesses and section properties
- Weld type and size
- Material properties

- Reference drawings number
- Reference to tag number (if relevant)
- Weight and CoG

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-174, SR-2764 - Structural steel fire protection drawings (Civil)

Drawings shall include the following minimum information:

- Extent and thickness of fireproofing, including description of coating/paint for fire protection systems
- Structural details related to the fire protection
- Material properties

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-175, SR-62730 - Suction Anchors

Penetration records, positions

|                 |                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2     |
| Handover format |  XLS + PDF |

#### 5-176, SR-2768 - System and Operation documents

##### **System documents**

**Description:** The objective of the System documents is to describe the systems at a plant for learning purpose. The System document is a compilation of technical information (LCI), functional descriptions, reason for choice of design and describes the System characteristics, regulate how to operate and protect the System in various conditions. This shall apply to all disciplines within all systems.

The System documents (S-documents) apply for all systems, subsystems and assemblies. One document shall be produced for each system.

The main target group for System documents are mainly operational and maintenance personnel at a plant.

The System documents shall be produced in local language and preparation and publication shall be done per **GL0469** - Guideline for development of system and operating documents (SO documents).

The index structure of the System documents shall be as follows:

- 1 Objective and target group
- 2 **System description**
  - 2.1 Introduction
  - 2.2 Design basis
  - 2.3 Process description
  - 2.4 Process control
- 3 **System operation (Opr) (Link to main Operation document for the actual system)**
- 4 **System protection**
  - 4.2 System control
  - 4.3 Equipment protection
- 5 Technical data and drawings (som vedlegg)
- 6 Additional information
  - 6.1 Definitions and abbreviations
  - 6.2 Changes from previous version
  - 6.3 References

##### **Operation documents**

**Description:** The objective of the operating documents is to describe how to operate a system and its equipment in a safe, reliable and effective way.

Operation documents (O-documents) apply for all systems, subsystems and assemblies. One **Main Operating document** shall be produced for each system.

The “**Main Operating document**” shall contain a compilation (links to detailed O-documents) of operating procedures according to the index structure shown below.

The operating documents (check lists or operating rules) are formed as action points in tables.

The black start operating documents shall describe the complete sequence starting with "black" installation and **ending with main power established**. All involved auxiliary systems shall be included and each document shall be related to the **Main operating document** for each system.

The initial scenario shall be APS for offshore installations (**Abandon Platform Shutdown**) or Plant evacuation for onshore plants e.g. after a gas leakage, where gas may have entered non-hazardous areas and rooms. The two alternatives: Black start of emergency power /Essential power and black start of UPS shall be described. In case of cable from shore or other independent unit, such as a national grid, and this power is used as a source of emergency power, this alternative method of black start shall also be described. All Operating documents related to Black-start shall be provided with a unique Node number.

The main target group for Operational document is mainly operational personnel at a plant.

The Operation documents shall be produced in local language and preparation and publication shall be done according to **GL0469 - Guideline for development of system and operating documents (SO documents)**.

The index structure of the main operating document shall be as follows:

**Link to S-document for the actual system**

- 3 System operation**
  - 3.1 Normal operation
  - 3.2 Normal start-up
  - 3.3 Normal shut down
  - 3.4 Special operations
  - 3.5 Operational routines

Local language: YES

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  DOC   |

### 5-177, SR-2770 - System Duct & Instrumentation Diagrams (D&ID)

The complete System Duct & Instrumentation Diagram (D&ID) shall be in accordance with the plants' process typicals and drafting standard.

The level of detail within packages shall be identical to that outside.

Tag number shall be shown for all tagged components.

System Duct & Instrument Diagram (D&ID) shall be provided by system and include the following information:

- All HVAC equipment with their tag number and all HVAC bulk items with their item number
- Equipment data summary with tag number for all main equipment such as filters, fans, coils, etc.
- All ductwork identified with system no., sizes, duct classes, insulation classes
- All inline equipment
- Air flow to main areas
- Area breaks and duct class breaks
- All instrumentation/F&G reflecting the control functions
- All instrument locations shall be indicated and completed with tag numbers
- Connections to other systems e.g. sea water, heating, cooling, drain, etc.
- Airflow in and out of diagram with references

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1                |
| Handover format |  DGN/DWG (TR1970)+PDF |

### 5-178, SR-81370 - System topology diagrams

System topology diagram shall show the structure of systems and subsystems to give a functional understanding.

System topology diagram shall as a minimum be produced for the following systems:

- Safety and Automation System
- Turbine control system
- Fiscal metering system

If it is not possible to present all detailed information in a system on one topology drawing, the information shall be split in different detail levels as follows:

- Overall topology diagram
- Detailed topology diagram

Typical contents of a detailed topology diagram shall be:

- All related functional units and subunits represented by blocks including unit tagno and description
- Location of units
- Interface and network between units shall be indicated
- Interface from units to other external systems
- Protocol shall be indicated for serial links and for network connections to external system

By units is meant but not limited to:

- Logic solver
- Server
- Client
- Network component (Router, Switch, Firewall)
- Remote IO

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-179, SR-62596 - Tag and signal I/O list

|                 |                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2      |
| Handover format |  XLS + PDF |

#### 5-180, SR-61877 - Technical tag hierarchy (TTH)

A technical tag hierarchy shall be established according to GL0592 Preparation of technical hierarchies

|                 |                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2             |
| Handover format |  Database (TR3111) |

#### 5-181, SR-2777 - Telecommunication field equipment layout drawings

At least one Telecommunication field equipment layout drawing for each area or module deck level shall be produced. The size of the facility will determine the scale of the drawing, but normally a scale of 1:100 on A3 format shall be aimed for. If required several drawings per area can be necessary to achieve this scale. Equipment which is covered by platforms above shall be shown dotted or shown in separate figures.

The following content shall be included on the drawings:

- All tagged telecommunication field equipment like PAGA loudspeakers, flashing lights, Ex telephones, fixed radios, CCTV cameras, antennas, junction boxes, etc.
- Other telecommunication equipment installed outside telecommunication equipment rooms
- Telecommunication outlets
- Platform/plant northing and orientation with respect of true north
- Gridlines with north and east references
- Key plan
- Scale bar
- Match lines with drawing references
- Deck/area elevations

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-182, SR-2779 - Telecommunication power supply load list

Load list for telecommunication power supply.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                               |

### 5-183, SR-2780 - Telecommunication signal level diagram

Signal level diagrams shall be made for:

- The feeder arrangement of all radio systems including transceivers ports and antennas
- Audio and video entertainment distribution network (coaxial cable)
- Interconnection signal lines between subsystems and to other systems
- External lines where signal level is not set by standard

Levels shall be given in dBm in conjunction with standardised impedances. If impedance is non-standard or undefined, voltage levels shall be given.

Where applicable, impedances and wire configuration should be indicated. (2-wire, 4-wire, coax, E&M lines, etc.).

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

### 5-184, SR-81371 - Telecommunication system topology diagram

The following telecommunication system topology diagrams shall be provided:

- Overall telecommunication topology diagram
- Telecommunication topology diagram per telecommunication system

The overall telecommunication system topology diagram shall show an overall configuration of all telecommunication systems to give a functional understanding. Typical contents shall be:

- All related telecommunication systems/subsystems represented by blocks
- Location
- Interface and wiring between blocks shall be indicated

Telecommunication topology diagram per telecommunication system shall show the relation between functional units within a telecommunication system/subsystem. Typical information shall be:

- The function of each unit (block): Short description, supplied with function identification code if applicable
- Interface between blocks and interface to other equipment/systems
- Signal type and function (Ethernet, 2/4 W E&M, G.703, RS232, control signals, etc.) if applicable
- Location of the equipment, either by text labelling of each block or by blocks located in dotted area boxes

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-185, SR-2782 - Test procedures - Lifting appliances**

- FAT procedure with acceptance criteria/test results (incl. noise test data)
- Final test procedure with acceptance criteria/test result (commissioning test result)
- Procedures for annual inspection by enterprise of competence, with acceptance criteria
- Test procedures with acceptance criteria for all safety systems (e.g. AOPS, MOPS, GOP, CT, ART)

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                     |

**5-186, SR-2783 - Third Party verifications**

Third Party verification report

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

**5-187, SR-81845 - Type Certificate**

Type certificate provides independent proof of performance and safety in accordance with international standards and systems.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format |  PDF   |

**5-188, SR-2785 - UHF/VHF radio coverage**

UHF/VHF radio (platform/facility internal) coverage chart/test report shall be provided.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

**5-189, SR-2787 - Underground piping and cables drawings**

All system, arrangement, layout, plan, alignment, section and detail drawings shall be included. The drawings shall fully cover all construction and temporary underground piping and cable systems and their status if the system is not fully removed.

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-190, SR-2788 - Underground piping hydraulic system calculation**

Hydraulic system calculation reports and input files/parameters shall be delivered. The report or collection of reports shall be self-contained, i.e. provide all information required to re-produce the results.

The design shall be documented by calculations. Calculations shall include references to basis of design (fire water quantities, maximum rainfall, etc.) and explanatory text (system description, etc.)

The calculations shall include:

- Head loss calculations during fire situations.
- Head loss calculations during various climatic conditions, such as storm rain, snow melting (if applicable) etc.
- Surge calculations for start/stop of pumps, valve operations, etc. shall be performed for all pump systems
- For drain systems with water traps, sensitivity calculations shall be made to identify uncertainties in head losses in manholes.

If existing calculation models exist, these models shall be updated.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                       |

**5-191, SR-2789 - Underground rock facilities drawings**

All system, arrangement, layout, plan, alignment, section and detail drawings shall be delivered including drawings showing details for rock support.

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

**5-192, SR-2790 - Utility consumption index**

Consumption data e.g. for diesel oil, compressed air, heating/cooling media etc., the following generalised index shall be used:

- Equipment tag no.
- Type of consumption
- Volume m<sup>3</sup> and time unit
- Net weight (kg) and time unit
- Specific weight (kg)
- Storage temperature °C
- Storage humidity %
- Storage max pressure (barg)
- Storage capacity m<sup>3</sup>
- Storage location/area
- Specification
- Supplier
- Data sheet
- Notes

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                                |

**5-193, SR-2791 - Utility consumption report**

For all utility systems the following shall be included in the utility consumption report:

- For the total system:
  - Total system capacity (duty, flow rate and/or other parameter relevant for capacity)
  - Maximum coincident consumer load (duty, flow rate and/or other parameter relevant for capacity)
  - Description of utility characteristic/quality prior to distribution to consumers (pressure, temperature, composition and/or other relevant parameters)
  - Storage capacity
- For the consumers:
  - Tag number
  - Continuous or intermittent consumer
  - Required consumption, both maximum, normal and minimum consumption
  - Description of utility characteristic/quality at consumer

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | XLS + PDF                                                                                 |

**5-194, SR-81347 - Valve and operator calculations**

Actuator sizing calculations shall be provided for all actuated valves

For actuated on/off valves the document shall in a tabulated format describe actuator design and sizing according ISO12490, or similar standards approved by Company, and shall comprise:

- Valve torque/thrust requirements
- Actuator torque/thrust output
- Safety factors used
- Other relevant information related to design and sizing

For all accumulators pre-charge graphs shall be made showing the pre-charge pressure of nitrogen under different ambient temperatures. The graph shall cover the specified operating temperature range in steps of 5° C.

The document shall for control and choke valves describe information related to valve and actuator design and sizing in a tabulated format. Calculations for control and choke valves shall be carried out based on IEC 60534-2, ISA 75.01, or by similar standards approved by Company.

Required information for all control and choke valves:

- Actuator load calculations
- Capacity (Cv) as function of travel
- Noise calculations, including calculation basis and results, for each specified flow condition
- Body and trim exit fluid velocity head calculations

The following additional information is required for control and choke valves in liquid service applications:

- Cavitation index data and choked flow parameter data both as a function of travel specified for the selected control valve and application
- Size Scale Effect (SSE) and Pressure Scale Effect (PSE) correction data for the cavitation index data
- Body and trim exit fluid velocity calculations, including number of discrete pressure drop stages required, for each specified flow condition

The following shall be provided for safety relief valves:

- Information regarding valve design and sizing in a tabulated format
- Calculation of pin size for buckling pin relief valves

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

#### 5-195, SR-2793 - Valve and operator drawings

Drawings of the following are required:

- Detail / cross sectional drawings (details of manual/bare stem valve/actuator/control panel, etc.)
- Arrangement drawings of assemblies (assemblies of valve/gearbox/actuator/control panel, etc.)

Arrangement drawings and detail/cross sectional drawings may be supplied as separate drawings or combined in one drawing. Drawings shall show all components in the same scale.

Detail/cross sectional drawings shall at least include:

- VDS reference (Valves)
- All welds including hard facing and overlaying (Valves)
- Bore (Valves)
- Outline dimensions
- Weight, as built
- Lifting lugs
- Parts list including all parts with functional part description and material standard used (real manufacturer's part number is not required on the drawings). MDS reference to be included when specified in the requirements

Arrangement drawings of assemblies shall at least include:

- Outline dimensions
- Material selection for adaptor stool, coupling (connection between valve and actuator shafts), actuator/valve connection bolts and valve stem if modified from specified requirement (including CR reference)
- Weight, as built (weights shall be listed separately for valve, actuator, control panel or cabinet and total assembly)
- Principles for assembly (maintenance envelopes)
- All power and signal connection points with entry details

For valves not specified according to TR2000 (e.g. control, choke and safety relief valves), real manufacturer's part number shall be included on the valve drawing or a separate BOM.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 1 |
| Handover format | PDF                                                                                       |

#### 5-196, SR-81350 - Valve and operator test reports

The following test reports are required:

- Fugitive emission test reports when specified by Purchaser

- Test reports from qualification of non-collapsible choke valves when specified by Purchaser
- For intelligent positioner with 4-20 mA input and HART or Fieldbus communication and diagnostic possibilities, a documented footprint/valve signature from FAT shall be delivered in a file with ZIP format (containing the data in native format) in addition to PDF.
- FAT reports
- FAT reports for actuators

Valve and operator test reports shall be delivered in PDF format with the addition described above for the intelligent positioner.

|                 |                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2     |
| Handover format |  PDF + ZIP |

#### 5-197, SR-2795 - Weight control database

Content to be in accordance with TR2352 "Weight control requirements for topsides and substructures". Handover format is plant specific.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | TBA                                                                                     |

#### 5-198, SR-2796 - Weight report

Weight report according to TR2352 "Weight control requirements for topsides and substructures" shall be delivered.

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | PDF                                                                                     |

#### 5-199, SR-2798 - Wireless network coverage

This document describes use of WSN (Wireless Sensor Network) in the process plant and shall include:

- WSN topology
- WSN standard
- Coverage chart/maps of WSN with identified sensor and access point locations (gateways).
- Expected latency time (normal/max)
- Expected battery lifetime (normal/min)
- Type and ENS tag number of sensors connected to one gateway
- Spare availability (number of sensors) to one gateway
- A frequency plan for co-existence of WLAN and WSN with specification of dedicated channels for WSN
- Any requirements for radio silence due to special operations (e.g. well perforation)
- Recommended precautions due to radio silence
- Recommended precautions due to loss of one gateway

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

#### 5-200, SR-62600 - Wiring and Termination Diagram

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2                |
| Handover format |  DGN/DWG (TR1970)+PDF |

#### 5-201, SR-2799 - WLAN coverage

Wireless Local Area Network (WLAN) coverage chart/test report shall be provided.

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format | DOC + PDF                                                                                 |

#### 5-202, SR-61904 - Working environment status

Measurements and documentation on noise, chemicals, lighting, etc. shall be prepared during normal operating conditions (as-built documentation on working environment).

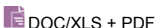
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|--|--|

|                 |                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------|
| Milestone       |                                                                                             |
| Handover format |  XLS + PDF |

### 5-203, SR-2655 - Working environment summary report

The report shall include:

- Updated WEHRA
- WEAC
- Assumptions with relevance to operations, e.g. use of PPE

|                 |                                                                                                 |
|-----------------|-------------------------------------------------------------------------------------------------|
| Milestone       |  LCI 2         |
| Handover format |  DOC/XLS + PDF |

### 5-204, SR-62726 - WTG/Substation foundation

Installation coordinates and verticality, pile drive records, grouting documentation (curing details)

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 2 |
| Handover format |  XLS   |

### 5-205, SR-62727 - WTG Installation

Cable termination, bolt tensioning details

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Milestone       |  LCI 3 |
| Handover format |  PDF   |

## 6 Equipment package pre-defined SDRLs

This chapter contains pre-defined equipment package Supplier Document Requirements Lists (SDRL) for a selection of equipment packages.

### 6.1 Supplier documentation for WTG

#### SR-81100 - Supplier documentation for WTG

This chapter gives an overview of LCI deliverables for the different equipment associated with a WTG package delivery. It should be read in conjunction with chapter 2, that gives an overview of Company's general requirements (related to scoping, planning, required quality and handover formats of LCI). In general, the WTG supplier shall provide documentation that describes the WTG design and functionality to a detail that allows for efficient and safe operation, maintenance and replacement of all wearable components.

WTG Engineering LCI deliverables

#### Multi discipline

| Information item                         | ID       | Handover Format | Milestone |
|------------------------------------------|----------|-----------------|-----------|
| 3D CAD model - WTG                       | SR-81130 | 3D CAD          | LCI 2     |
| Type certificate                         | SR-81845 | PDF             | LCI 1     |
| Helideck Certification (HCA Certificate) |          | PDF             | LCI 2     |
| Commissioning procedures                 | SR-81360 | DOC+PDF         | LCI 2     |

#### Structural

| Information item                                                        | ID       | Handover Format | Milestone |
|-------------------------------------------------------------------------|----------|-----------------|-----------|
| Structural steel and aluminium. Main, secondary and outfitting drawings | SR-61880 | DGN/DWG+PDF     | LCI 2     |
| <a href="#">Structural design report</a>                                | SR-81147 | PDF             | LCI 2     |
| <a href="#">Material certificates</a>                                   | SR-2697  | PDF             | LCI 2     |

#### Electrical

| Information item | ID | Handover Format | Milestone |
|------------------|----|-----------------|-----------|
|                  |    |                 |           |

|                                                            |          |              |       |
|------------------------------------------------------------|----------|--------------|-------|
| <a href="#">Black start philosophy</a>                     | SR-81095 | DOC + PDF    | LCI 2 |
| <a href="#">Circuit / Wiring diagram</a>                   | SR-2575  | PDF          | LCI 2 |
| <a href="#">Electrical block diagrams</a>                  | SR-2613  | DGN/DWG +PDF | LCI 2 |
| <a href="#">Electrical calculations / analyses</a>         | SR-81342 | TBA          | LCI 1 |
| <a href="#">Electrical Load list</a>                       | SR-81352 | XLS + PDF    | LCI 2 |
| <a href="#">Electrical power system philosophy</a>         | SR-81353 | DOC + PDF    | LCI 2 |
| <a href="#">Electrical field equipment layout drawings</a> | SR-2618  | DGN/DWG +PDF | LCI 2 |
| <a href="#">Overall single line diagram</a>                | SR-2703  | DGN/DWG +PDF | LCI 1 |
| <a href="#">Parameter setting tables</a>                   | SR-2706  | XLS + PDF    | LCI 2 |
| <a href="#">Relay setting table</a>                        | SR-2734  | XLS + PDF    | LCI 2 |

## Notes

- SR-2706 Shall be delivered for all equipment requiring setting of adjustable parameters

## HSE (Health Safety and Environment)

| Information item                                                                                                                                                                                                             | ID       | Handover format | Milestone |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------|-----------|
| <a href="#">Area classification drawings</a>                                                                                                                                                                                 | SR-2560  | DGN/DWG +PDF    | LCI 2     |
| <a href="#">Data sheets - Safety equipment</a>                                                                                                                                                                               | SR-62719 | XLS + PDF       | LCI 1     |
| <a href="#">Data sheets – Safety data sheet and chemical inventory</a>                                                                                                                                                       | SR-2601  | ZIP + PDF + XLS | LCI 1     |
| Design assessment with<br>Safety Barrier Identification and assessment                                                                                                                                                       |          | DOC + PDF       | LCI 2     |
| Safety Strategy                                                                                                                                                                                                              |          | DOC + PDF       | LCI 2     |
| Emergency preparedness analysis (Evacuation and escape<br>procedures)                                                                                                                                                        | SR-81357 | DOC + PDF       | LCI 2     |
| Human Factors Assessment                                                                                                                                                                                                     |          | PDF             | LCI 2     |
| Country specific Compliance review<br>Note: for UK including including PUWER Assessment /<br>LOLER assessment/<br>LOLER/PUWER/PSSR/CDM/Working at Height Regs /<br>Welfare regs / Electrical regs / Fire Safety Case / study |          | PDF             | LCI 2     |
| WEHRA – Working Environment Health Risk assessment<br>(including Manual Handling review)                                                                                                                                     |          | PDF             | LCI 2     |
| Safety critical / Environmental critical systems report                                                                                                                                                                      |          | PDF             | LCI 2     |
| Signage / signals report                                                                                                                                                                                                     |          | PDF             | LCI 2     |

## HVAC (Heating, ventilating and air-conditioning)

| Information item                              | ID      | Handover format | Milestone |
|-----------------------------------------------|---------|-----------------|-----------|
| System Duct & Instrumentation Diagrams (D&ID) | SR-2770 | DGN/DWG + PDF   | LCI 1     |
| Data sheet – HVAC                             | SR-2592 | XLS +PDF        | LCI 1     |
| HVAC control philosophy                       | SR-2664 | DOC + PDF       | LCI 2     |
| HVAC design philosophy                        | SR-2665 | DOC + PDF       | LCI 1     |
| HVAC layout drawings                          | SR-2666 | DGN/DWG + PDF   | LCI 2     |
| HVAC system description                       | SR-2667 | DOC + PDF       | LCI 2     |

## Telecommunication

| Information item                                                                  | ID      | Handover<br>Format | Milestone |
|-----------------------------------------------------------------------------------|---------|--------------------|-----------|
| <a href="#">Antenna tower layout drawings</a>                                     | SR-2558 | DGN/DWG+PDF        | LCI 2     |
| <a href="#">Coaxial cable test reports</a>                                        | SR-2578 | DOC + PDF          | LCI 2     |
| <a href="#">Data and telephone cabling network test reports</a>                   | SR-2588 | DOC + PDF          | LCI 2     |
| <a href="#">Electrical connection diagram</a>                                     | SR-2616 | DGN/DWG+PDF        | LCI 2     |
| <a href="#">Fiber optical cabling (platform / facility internal) test reports</a> | SR-2630 | DOC + PDF          | LCI 2     |
| <a href="#">Fiber optical long distance cable test report</a>                     | SR-2631 | DOC + PDF          | LCI 2     |

|                                                   |          |             |       |
|---------------------------------------------------|----------|-------------|-------|
| Loop information / Loop Drawings                  | SR-62594 | DGN/DWG+PDF | LCI 2 |
| PAGA amplifier load list                          | SR-2704  | DOC + PDF   | LCI 2 |
| PAGA coverage measurements reports                | SR-81363 | DOC + PDF   | LCI 2 |
| Telecommunication field equipment layout drawings | SR-2777  | DGN/DWG+PDF | LCI 2 |
| Telecommunication power supply load list          | SR-2779  | DOC + PDF   | LCI 2 |
| Telecommunication signal level diagram            | SR-2780  | DGN/DWG+PDF | LCI 2 |
| Telecommunication system topology diagram         | SR-81371 | DGN/DWG+PDF | LCI 2 |
| UHF/VHF radio coverage                            | SR-2785  | DOC+PDF     | LCI 2 |
| WLAN coverage                                     | SR-2799  | DOC + PDF   | LCI 2 |

**Notes:**

- SR-2578, SR-2588, SR-2630, SR-2631, SR-2705 DB, SR-2785, SR-2799 to be completed during Commissioning

**Instrumentation**

Engineering deliverables from instrumentation, including all automation disciplines

| Information item                                             | ID       | Handover Format | Milestone |
|--------------------------------------------------------------|----------|-----------------|-----------|
| Alarm C&H (Context & Hiding)                                 | SR-2554  | XLS + PDF       | LCI 2     |
| Alarm classification                                         | SR-2555  | XLS + PDF       | LCI 2     |
| Automation and SCADA functional specifications               | SR-62589 | DOC + PDF       | LCI 2     |
| Cable Index                                                  | SR-61902 | XLS + PDF       | LCI 2     |
| Cause & effect (C&E)                                         | SR-2572  | XLS + PDF       | LCI 1     |
| Control Diagram / programming Logic Diagrams                 | SR-62598 | DGN/DWG+PDF     | LCI 2     |
| Control Sequence Diagrams                                    | SR-62599 | DGN/DWG+PDF     | LCI 2     |
| Data sheets - Instrument field equipment                     | SR-2593  | XLS + PDF       | LCI 1     |
| Equipment room layout drawings                               | SR-61908 | DGN/DWG+PDF     | LCI 2     |
| Fire protection data sheet (FPDS)                            | SR-2636  | XLS + PDF       | LCI 1     |
| Instrument/telecom. earthing distribution. schematic diagram | SR-2679  | DGN/DWG+PDF     | LCI 2     |
| Instrumented systems - Loading and start up procedures       | SR-62707 | DOC + PDF       | LCI 2     |
| Instrumented systems - Performance data                      | SR-62703 | XLS + PDF       | LCI 2     |
| Loop Information / Loop Drawings                             | SR-62594 | DGN/DWG+PDF     | LCI 2     |
| Network topology diagram                                     | SR-2700  | XLS + PDF       | LCI 2     |
| System topology diagrams                                     | SR-81370 | DGN/DWG+PDF     | LCI 2     |
| Tag and signal I/O list                                      | SR-62596 | XLS + PDF       | LCI 2     |
| Wireless network coverage                                    | SR-2798  | DOC + PDF       | LCI 2     |
| Wiring and Termination Diagram                               | SR-62600 | DGN/DWG+PDF     | LCI 2     |

**WTG Equipment LCI deliverables****WTG Electrical Equipment**

| ID      | Title                          | Doc type | Milestone | Handover format | HV Switchgear | UPS and Battery banks | Electrical Yaw System | Electric Pitch System | Converter System | Generator |
|---------|--------------------------------|----------|-----------|-----------------|---------------|-----------------------|-----------------------|-----------------------|------------------|-----------|
| SR-2530 | Single line diagram (Supplier) | XJ       | LCI 2     | PDF             | X             | X                     | X                     | X                     | X                | X         |
| SR-2531 | Certificate of conformance     | VB       | LCI 2     | PDF             | X             | X                     | X                     | X                     | X                | X         |
| SR-2534 | Detail drawing with parts list | XS       | LCI 1     | PDF             | X             | X                     | X                     | X                     | X                | X         |
| SR-2575 | Circuit / Wiring diagram       | XK, XT   | LCI 2     | PDF             | X             | X                     | X                     | X                     | X                | X         |
|         |                                |          |           |                 |               |                       |                       |                       |                  |           |



|          |                                                             |    |       |     |   |   |   |   |   |   |
|----------|-------------------------------------------------------------|----|-------|-----|---|---|---|---|---|---|
| SR-2751  | Spare Parts Interchangeability Register (SPIR)              | MC | LCI 1 | XLS | X | X | X | X | X | X |
| SR-2589  | Data sheet - Product                                        | DS | LCI 1 | PDF | X | X | X | X | X | X |
| SR-2650  | General Arrangement Drawing                                 | XD | LCI 2 | PDF | X | X | X | X | X | X |
| SR-2675  | Installation, operation and maintenance manual (IOM manual) | MA | LCI 1 | PDF | X | X | X | X | X | X |
| SR-81126 | Manufacturing Record Book (MRB)                             | VA | LCI 2 | PDF | X | x | X | X | X | X |

| ID       | Title                                                       | Doc type | Milestone | Handover format | Harmonic filter, resistor, reactor and capacitors | HV cables and HV Connectors | Switchgear, distribution boards | Transformer | Auxiliary Power System | Navigation and Aviation Aids |
|----------|-------------------------------------------------------------|----------|-----------|-----------------|---------------------------------------------------|-----------------------------|---------------------------------|-------------|------------------------|------------------------------|
| SR-2530  | Single line diagram (Supplier)                              | XJ       | LCI 2     | PDF             |                                                   |                             | X                               |             | X                      | X                            |
| SR-2531  | Certificate of conformance                                  | VB       | LCI 2     | PDF             | X                                                 | X                           | X                               | X           | X                      | X                            |
| SR-2534  | Detail drawing with parts list                              | XS       | LCI 1     | PDF             | X                                                 | X                           | X                               | X           | X                      | X                            |
| SR-2575  | Circuit / Wiring diagram                                    | XK, XT   | LCI 2     | PDF             | X                                                 |                             | X                               | X           | X                      | X                            |
| SR-2751  | Spare Parts Interchangeability Register (SPIR)              | MC       | LCI 1     | XLS             | X                                                 |                             | X                               | X           | X                      | X                            |
| SR-2589  | Data sheet - Product                                        | DS       | LCI 1     | PDF             | X                                                 | X                           | X                               | X           | X                      | X                            |
| SR-2650  | General Arrangement Drawing                                 | XD       | LCI 2     | PDF             | X                                                 |                             | X                               | X           |                        | X                            |
| SR-2675  | Installation, operation and maintenance manual (IOM manual) | MA       | LCI 1     | PDF             | X                                                 |                             | X                               | X           | X                      | X                            |
| SR-81126 | Manufacturing Record Book (MRB)                             | VA       | LCI 2     | PDF             | X                                                 | X                           | X                               | X           | X                      | X                            |

\* Additionally to the WTG as a whole, MRB must include documentation from main electrical equipment from sub-suppliers as transformers or generator. This is including FAT reports that facilitates a future main component predictive maintenance and diagnosis.

#### WTG Instrumentation

| ID      | Title                          | Doc type | Milestone | Handover format | Fire & Gas detectors | Indicators | Instrument junction boxes | Level gauges | Level instrumentation (transmitters and assembly, bridles, collimators) |
|---------|--------------------------------|----------|-----------|-----------------|----------------------|------------|---------------------------|--------------|-------------------------------------------------------------------------|
| SR-2589 | Data sheet - Product           | DS       | LCI 1     | PDF             | X                    | X          |                           | X            | X                                                                       |
| SR-2534 | Detail drawing with parts list | XS       | LCI 1     | PDF             | X                    | X          |                           | X            | X                                                                       |

|          |                                                               |    |       |     |   |   |   |   |   |
|----------|---------------------------------------------------------------|----|-------|-----|---|---|---|---|---|
| SR-2609  | Documentation for dispatch, receipt, storage and preservation | MA | LCI 1 | PDF | X | X | X | X | X |
| SR-2532  | Electrical connection and wiring diagram - instrument         | XP | LCI 2 | PDF | X |   |   |   | X |
| SR-2650  | General Arrangement Drawing                                   | XD | LCI 2 | PDF | X |   | X |   |   |
| SR-2675  | Installation, operation and maintenance manual (IOM manual)   | MA | LCI 1 | PDF | X | X |   | X | X |
| SR-81126 | Manufacturing Record Book (MRB)                               | VA | LCI 2 | PDF | X |   |   | X | X |
| SR-81367 | Safety manual                                                 | MB | LCI 1 | PDF |   |   |   |   | X |
| SR-2751  | Spare Parts Interchangeability Register (SPIR)                | MC | LCI 1 | XLS | X | X |   | X | X |
| SR-62696 | Settlement metering - Calibration certificates                | VB | LCI 2 | PDF | X |   |   |   |   |

| ID       | Title                                                         | Doc type | Milestone | Handover format | Online analyser assembly | Other electrical instruments | Pressure and temperature transmitters |
|----------|---------------------------------------------------------------|----------|-----------|-----------------|--------------------------|------------------------------|---------------------------------------|
| SR-2589  | Data sheet - Product                                          | DS       | LCI 1     | PDF             | X                        | X                            | X                                     |
| SR-2534  | Detail drawing with parts list                                | XS       | LCI 1     | PDF             | X                        | X                            | X                                     |
| SR-2609  | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             | X                        | X                            | X                                     |
| SR-2532  | Electrical connection and wiring diagram - instrument         | XP       | LCI 2     | PDF             | X                        | X                            | X                                     |
| SR-2650  | General Arrangement Drawing                                   | XD       | LCI 2     | PDF             |                          |                              |                                       |
| SR-2675  | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             | X                        | X                            | X                                     |
| SR-81126 | Manufacturing Record Book (MRB)                               | VA       | LCI 2     | PDF             | X                        |                              |                                       |
| SR-81367 | Safety manual                                                 | MB       | LCI 1     | PDF             | X                        | X                            | X                                     |
| SR-2751  | Spare Parts Interchangeability Register (SPIR)                | MC       | LCI 1     | XLS             | X                        | X                            | X                                     |
| SR-62696 | Settlement                                                    | VB       | LCI 2     | PDF             | X                        |                              | X                                     |

|  |                                           |  |  |  |  |  |  |
|--|-------------------------------------------|--|--|--|--|--|--|
|  | metering -<br>Calibration<br>certificates |  |  |  |  |  |  |
|--|-------------------------------------------|--|--|--|--|--|--|

## WTG Mechanical

| ID       | Title                                                         | Doc type | Milestone | Handover format | Crane and lifting appliances | Main Bearing | Pitch Bearings | Hydraulic Power Unit | System Accumulators and pressure relief valves | Heat exchanger, Cooler, Condenser |
|----------|---------------------------------------------------------------|----------|-----------|-----------------|------------------------------|--------------|----------------|----------------------|------------------------------------------------|-----------------------------------|
| SR-2571  | Calculations, curves and tables                               | CA       | LCI 2     | PDF             | x                            | X            | X              | X                    | X                                              | X                                 |
| SR-2531  | Certificate of conformance                                    | VB       | LCI 2     | PDF             | X                            | X            | X              | X                    | X                                              | X                                 |
| SR-2702  | Data sheet - Noise                                            |          | LCI 2     | PDF             | X                            | X            | X              | X                    | X                                              |                                   |
| SR-2589  | Data sheet - Product                                          | DS       | LCI 1     | PDF             | X                            | X            | X              | X                    | X                                              | X                                 |
| SR-2599  | Data sheets - Weight                                          | DS       | LCI 2     | PDF             | X                            | X            | X              | X                    | X                                              | X                                 |
| SR-2534  | Detail drawing with parts list                                | XS       | LCI 1     | PDF             | X                            | X            | X              | X                    | X                                              | X                                 |
| SR-2609  | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             | X                            | X            | X              | X                    | X                                              | X                                 |
| SR-2616  | Electrical connection diagram                                 | XP       | LCI 2     | DGN/DWG+ PDF    | X                            |              |                | X                    | X                                              |                                   |
| SR-2715  | Equipment supplier piping and instrument diagram (P&ID)       | XB       | LCI 1     | PDF             |                              | X            | X              | X                    | X                                              |                                   |
| SR-2650  | General Arrangement Drawing                                   | XD       | LCI 2     | PDF             | X                            | X            | X              | X                    | X                                              | X                                 |
| SR-2675  | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             | X                            | X            | X              | X                    | X                                              | X                                 |
| SR-2693  | Lubrication index                                             | LA       | LCI 1     | XLS + PDF       | X                            | X            | X              | X                    | X                                              |                                   |
| SR-81126 | Manufacturing Record Book (MRB)                               | VA       | LCI 2     | PDF             | X                            | X            | X              | X                    | X                                              | X                                 |
| SR-2751  | Spare Parts Interchangeability Register (SPIR)                | MC       | LCI 1     | XLS             | X                            | X            | X              | X                    | X                                              | X                                 |

| ID      | Title                                | Doc type | Milestone | Handover format | Mechanical/hydraulic gear | Pump | Tank, Container (atmospheric) |
|---------|--------------------------------------|----------|-----------|-----------------|---------------------------|------|-------------------------------|
| SR-2571 | Calculations, curves and tables      | CA       | LCI 2     | PDF             | X                         | X    | X                             |
| SR-2531 | Certificate of conformance           | VB       | LCI 2     | PDF             | X                         | X    | X                             |
| SR-2702 | Data sheet - Noise                   |          | LCI 2     | PDF             | X                         | X    |                               |
| SR-2589 | Data sheet - Product                 | DS       | LCI 1     | PDF             | X                         | X    | X                             |
| SR-2599 | Data sheets - Weight                 | DS       | LCI 2     | PDF             | X                         | X    | X                             |
| SR-2534 | Detail drawing with parts list       | XS       | LCI 1     | PDF             | X                         | X    | X                             |
| SR-2609 | Documentation for dispatch, receipt, | MA       | LCI 1     | PDF             | X                         | X    | X                             |



|          |                                                             |    |       |              |   |   |   |
|----------|-------------------------------------------------------------|----|-------|--------------|---|---|---|
|          | storage and preservation                                    |    |       |              |   |   |   |
| SR-2616  | Electrical connection diagram                               | XP | LCI 2 | DGN/DWG+ PDF | X | X |   |
| SR-2715  | Equipment supplier piping and instrument diagram (P&ID)     | XB | LCI 1 | PDF          | X | X |   |
| SR-2650  | General Arrangement Drawing                                 | XD | LCI 2 | PDF          | X | X | X |
| SR-2675  | Installation, operation and maintenance manual (IOM manual) | MA | LCI 1 | PDF          | X | X | X |
| SR-2693  | Lubrication index                                           | LA | LCI 1 | XLS + PDF    | X | X |   |
| SR-81126 | Manufacturing Record Book (MRB)                             | VA | LCI 2 | PDF          | X | X | X |
| SR-2751  | Spare Parts Interchangeability Register (SPIR)              | MC | LCI 1 | XLS          | X | X | X |

## WTG HVAC (Heating, ventilating and air-conditioning)

| ID       | Title                                                       | Doc type | Milestone | Handover format | Air conditioners. | Air handling units | Cooling and refrigeration units. | Domestic water heaters. |
|----------|-------------------------------------------------------------|----------|-----------|-----------------|-------------------|--------------------|----------------------------------|-------------------------|
| SR-2571  | Calculations, curves and tables                             | CA       | LCI 2     | PDF             | X                 | X                  | X                                |                         |
| SR-2575  | Circuit / Wiring diagram                                    | XK, XT   | LCI 2     | PDF             | X                 | X                  | X                                | X                       |
| SR-2589  | Data sheet - Product                                        | DS       | LCI 1     | PDF             | X                 | X                  | X                                | X                       |
| SR-2599  | Data sheets - Weight                                        | DS       | LCI 2     | PDF             | X                 | X                  | X                                | X                       |
| SR-2534  | Detail drawing with parts list                              | XS       | LCI 1     | PDF             | X                 | X                  | X                                | X                       |
| SR-2715  | Equipment supplier piping and instrument diagram (P&ID)     | XB       | LCI 1     | PDF             |                   |                    | X                                |                         |
| SR-2650  | General Arrangement Drawing                                 | XD       | LCI 2     | PDF             | X                 | X                  | X                                | X                       |
| SR-2675  | Installation, operation and maintenance manual (IOM manual) | MA       | LCI 1     | PDF             | X                 | X                  | X                                | X                       |
| SR-81126 | Manufacturing Record Book (MRB)                             | VA       | LCI 2     | PDF             | X                 | X                  | X                                | X                       |
| SR-2751  | Spare Parts Interchangeability Register (SPIR)              | MC       | LCI 1     | XLS             | X                 | X                  | X                                | X                       |
| SR-2790  | Utility consumption                                         | LA       | LCI 2     | XLS + PDF       | X                 | X                  | X                                | X                       |

| ID      | Title                                                         | Doc type | Milestone | Handover format | Ducts/Grilles/Registers and Diffusers | DX evaporators and condensers | Electrical heating batteries | F&G-controlled dampers. | Fans | Filters and filter-coalesces. |
|---------|---------------------------------------------------------------|----------|-----------|-----------------|---------------------------------------|-------------------------------|------------------------------|-------------------------|------|-------------------------------|
| SR-2571 | Calculations, curves and tables                               | CA       | LCI 2     | PDF             |                                       | X                             | X                            | X                       | X    |                               |
| SR-2575 | Circuit / Wiring diagram                                      | XK, XT   | LCI 2     | PDF             |                                       | X                             | X                            | X                       | X    |                               |
| SR-2589 | Data sheet - Product                                          | DS       | LCI 1     | PDF             |                                       | X                             | X                            | X                       | X    | X                             |
| SR-2599 | Data sheets - Weight                                          | DS       | LCI 2     | PDF             |                                       | X                             | X                            | X                       | X    | X                             |
| SR-2534 | Detail drawing with parts list                                | XS       | LCI 1     | PDF             |                                       | X                             | X                            | X                       | X    | X                             |
| SR-2609 | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             | X                                     | X                             |                              | X                       | X    | X                             |
| SR-2715 | Equipment supplier piping and instrument diagram (P&ID)       | XB       | LCI 1     | PDF             |                                       | X                             |                              |                         |      |                               |
| SR-2650 | General Arrangement Drawing                                   | XD       | LCI 2     | PDF             |                                       | X                             | X                            | X                       | X    | X                             |
| SR-2675 | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             |                                       | X                             | X                            | X                       | X    | X                             |
| SR-2696 | Manufacturing Record Book (MRB)                               | VA       | LCI 2     | PDF             |                                       | X                             | X                            | X                       | X    | X                             |
| SR-2751 | Spare Parts Interchangeability Register (SPIR)                | MC       | LCI 1     | XLS             |                                       | X                             | X                            | X                       | X    | X                             |
| SR-2790 | Utility consumption index                                     | LA       | LCI 2     | XLS + PDF       |                                       | X                             | X                            | X                       | X    |                               |

| VTC instrumented systems, included SCADA/SAS |  |     |  |          |          |                            |       |
|----------------------------------------------|--|-----|--|----------|----------|----------------------------|-------|
|                                              |  | Doc |  | Handover | Computer | Panels,<br>cabinets<br>and | Power |

| ID       | Title                                                         | type | Milestone | format | equipment | consoles | supply |
|----------|---------------------------------------------------------------|------|-----------|--------|-----------|----------|--------|
| SR-2634  | Detail drawing with parts list                                | XS   | LCI 1     | PDF    | X         | X        | X      |
| SR-2609  | Documentation for dispatch, receipt, storage and preservation | MA   | LCI 1     | PDF    |           | X        | X      |
| SR-2532  | Electrical connection and wiring diagram                      | XP   | LCI 2     | PDF    |           | X        |        |
| SR-2650  | General Arrangement Drawing                                   | XD   | LCI 2     | PDF    |           | X        |        |
| SR-2675  | Installation, operation and maintenance manual (IOM manual)   | MA   | LCI 1     | PDF    |           | X        |        |
| SR-81126 | Manufacturing Record Book (MRB)                               | VA   | LCI 2     | PDF    |           | X        |        |
| SR-2751  | Spare Parts Interchangeability Register (SPIR)                | MC   | LCI 1     | XLS    |           | X        |        |

**Equipment notes**

Panels, cabinets and consoles; e.g. termination cabinets, operator panels, SCADA/SAS control units and non SCADA/SAS control units

**WTG Safety Equipment**

| ID          | Title                                                         | Doc type | Milestone | Handover format | Chutes and rafts | Deluge and sprinkler | Dry chemical unit | Equipment for rescue | General fire fighting equipment | Life saving equipment | Water mist and gaseous extinguishing/inerting system |
|-------------|---------------------------------------------------------------|----------|-----------|-----------------|------------------|----------------------|-------------------|----------------------|---------------------------------|-----------------------|------------------------------------------------------|
| SR-2531     | Certificate of conformance                                    | VB       | LCI 2     | PDF             | X                |                      |                   |                      |                                 | X                     |                                                      |
| SR-61912 DB | Data sheet – Safety equipment                                 | DS       | LCI 1     | PDF             | X                | X                    |                   |                      |                                 |                       | X                                                    |
| SR-2534     | Detail drawing with parts list                                | XS       | LCI 1     | PDF             |                  | X                    | X                 |                      | X                               |                       | X                                                    |
| SR-2609     | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             |                  | X                    | X                 | X                    | X                               |                       | X                                                    |
| SR-2675     | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             |                  | X                    | X                 |                      | X                               |                       | X                                                    |
| SR-81367    | Safety manual                                                 | MB       | LCI 1     | PDF             |                  | X                    | X                 |                      |                                 |                       | X                                                    |
| SR-2751     | Spare Parts Interchangeability Register (SPIR)                | MC       | LCI 1     | XLS             |                  | X                    | X                 |                      |                                 |                       | X                                                    |

**Equipment notes**

- **Deluge and sprinkler; Including valves and accessories**
- **Equipment for rescue team members;** Equipment for fire brigade and rescue team members
- **General fire fighting equipment;** Including manual fire extinguisher and foam trolley
- **Life saving equipment;** Including survival suits and life jackets

**WTG Telecommunication**

| ID | Title | Doc type | Milestone | Handover format | Access panel/control unit/keyboard | Audio/video field equipment | Cabling distribution network equipment | Central telecommunication equipment | Fiber optical long distance cable transmission |
|----|-------|----------|-----------|-----------------|------------------------------------|-----------------------------|----------------------------------------|-------------------------------------|------------------------------------------------|
|----|-------|----------|-----------|-----------------|------------------------------------|-----------------------------|----------------------------------------|-------------------------------------|------------------------------------------------|



|          |                                                                    |        |       |     |   |   |   |   | system |
|----------|--------------------------------------------------------------------|--------|-------|-----|---|---|---|---|--------|
| SR-2531  | Certificate of conformance                                         | VB     | LCI 2 | PDF |   |   |   | x | x      |
| SR-2534  | Detail drawing with parts list                                     | XS     | LCI 1 | PDF | x |   |   | x | x      |
| SR-2575  | Circuit / Wiring diagram                                           | XK, XT | LCI 2 | PDF |   |   |   | x | x      |
| SR-2589  | Data sheet - Product                                               | DS     | LCI 1 | PDF |   |   | x | x | x      |
| SR-2609  | Documentation for dispatch, receipt, storage and preservation      | MA     | LCI 1 | PDF | x | x |   | x | x      |
| SR-2632  | Fiber optical long distance cable transmission budget calculations | CA     | LCI 2 | PDF |   |   |   |   | x      |
| SR-2650  | General Arrangement Drawing                                        | XD     | LCI 2 | PDF |   |   | x | x | x      |
| SR-2675  | Installation, operation and maintenance manual (IOM manual)        | MA     | LCI 1 | PDF |   |   | x | x | x      |
| SR-81126 | Manufacturing Record Book (MRB)                                    | VA     | LCI 2 | PDF |   |   |   | x | x      |
| SR-2733  | Radio link budget calculations                                     | CA     | LCI 2 | PDF |   |   |   | x |        |
| SR-2751  | Spare Parts Interchangeability Register (SPIR)                     | MC     | LCI 1 | XLS | x |   |   | x | x      |

| ID      | Title                                                         | Doc type | Milestone | Handover format | Radio link | Telecommunication field equipment | Telecommunication management equipment |
|---------|---------------------------------------------------------------|----------|-----------|-----------------|------------|-----------------------------------|----------------------------------------|
| SR-2531 | Certificate of conformance                                    | VB       | LCI 2     | PDF             | x          |                                   |                                        |
| SR-2534 | Detail drawing with parts list                                | XS       | LCI 1     | PDF             | x          |                                   | x                                      |
| SR-2575 | Circuit / Wiring diagram                                      | XK, XT   | LCI 2     | PDF             | x          |                                   |                                        |
| SR-2589 | Data sheet - Product                                          | DS       | LCI 1     | PDF             | x          | x                                 | x                                      |
| SR-2609 | Documentation for dispatch, receipt, storage and preservation | MA       | LCI 1     | PDF             | x          | x                                 | x                                      |
| SR-2650 | General Arrangement Drawing                                   | XD       | LCI 2     | PDF             | x          | x                                 | x                                      |
| SR-2675 | Installation, operation and maintenance manual (IOM manual)   | MA       | LCI 1     | PDF             | x          | x                                 | x                                      |
|         |                                                               |          |           |                 |            |                                   |                                        |



|          |                                                |    |       |     |   |   |   |
|----------|------------------------------------------------|----|-------|-----|---|---|---|
| SR-81126 | Manufacturing Record Book (MRB)                | VA | LCI 2 | PDF | x | x |   |
| SR-2733  | Radio link budget calculations                 | CA | LCI 2 | PDF | x |   |   |
| SR-2751  | Spare Parts Interchangeability Register (SPIR) | MC | LCI 1 | XLS | x | x | x |

### Equipment notes

- **Access panel/control unit/keyboard;** Access panel/control unit/keyboard for CCTV, PAGA, etc.
- **Audio/video field equipment;** Audio/video equipment (non EX) like amplifiers, loudspeakers, CD/DVD players, TVs, etc.
- **Cabling distribution network equipment;** Distribution frames/patch panels, outlets, etc.
- **Central equipment (racks) for telecommunication systems:** PAGA, Telephone system, Data network, Multiplexers, Radio systems, Audio/video entertainment, CCTV, Meteorological observation, Marine radar/AIS, Telecommunication power supply, Navigation systems, Positioning systems, etc.
- **Fiber optical long distance cable transmission system;** Transmission systems for long distance fiber optical cables. May be part of WDM/SDH/PDH multiplexers or data network equipment
- **Telecommunication field equipment;** Non Ex field equipment like fixes radios, antennas, splitters, meteorological sensors, telephones, etc.
- **Telecommunication field equipment (EX);** Ex field equipment like PAGA loudspeakers, flashing lights, telephones, antennas, splitters, meteorological sensors, etc.
- **Telecommunication management equipment;** Telecommunication interface units for telecommunication management system

## 7 Additional information

### 7.1 Definitions and abbreviations

| Definition              | Description                                                                                                                                                                                                                                                                                                   |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Can                     | Statements of possibility and capability, whether material, physical or causal                                                                                                                                                                                                                                |
| Brownfield project      | Modification projects on already existing facilities                                                                                                                                                                                                                                                          |
| Design freeze           | Ref. to ARIS PD03- Projects on facilities in operation                                                                                                                                                                                                                                                        |
| Greenfield project      | New development projects and tie-in projects to existing installations                                                                                                                                                                                                                                        |
| Local Language          | The official language of the country where the Plant is/will be operated                                                                                                                                                                                                                                      |
| May                     | Indicates a course of action permissible within the limits of the document                                                                                                                                                                                                                                    |
| Ready for installation  | Ref. to ARIS PD03 - Projects on facilities in operation                                                                                                                                                                                                                                                       |
| Variant                 | Unique and unambiguous Manufacturer's Part No (Real Manufacturer's Part No).                                                                                                                                                                                                                                  |
| Shall (requirement)     | Requirement strictly to be followed in order to confirm to the document and from which no deviation is permitted, unless a deviation permit is approved                                                                                                                                                       |
| Should (recommendation) | Indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) possibility or course of action is deprecated but not prohibited |

| Abbreviation | Description                                     |
|--------------|-------------------------------------------------|
| ALARP        | As low as reasonably practicable                |
| AOPS         | Automatic overload system                       |
| ART          | Active rope tension/tensioning                  |
| ASDS         | Adjustable speed drive system                   |
| ASV          | Annulus safety valve                            |
| ATEX         | Explosion protection directive/certificate      |
| AVEVA Plant  | PDMS Plant Design Management System 3D CAD tool |

|       |                                                                         |
|-------|-------------------------------------------------------------------------|
|       | Everything3D. Plant Design Solutions, 3D CAD tool                       |
| ATS   | Array temperature sensing                                               |
| C&E   | Cause & effect                                                          |
| C&H   | Context & hiding                                                        |
| CAD   | Computer aided design                                                   |
| CAP   | Critical action panel                                                   |
| CIV   | Chemical injection valves                                               |
| CCR   | Central control room                                                    |
| CCTV  | Closed-circuit television                                               |
| CoG   | Center of gravity                                                       |
| CR    | Concession request                                                      |
| CT    | Constant tension                                                        |
| D&ID  | Duct & instrument diagram                                               |
| DAS   | Distributed acoustic sensing                                            |
| dB    | Decibel                                                                 |
| DFI   | Design, fabrication and installation                                    |
| DGV   | Gas lift valve                                                          |
| DHSV  | Down hole safety valve                                                  |
| DoC   | Declaration of Conformity                                               |
| DTS   | Distributed temperature testing                                         |
| E3D   | Everything 3D                                                           |
| EAT   | Electrical, Automation and Telecommunication                            |
| EDSA  | Electrical power system Design, Simulation and power Analytics software |
| EERS  | Evacuation, escape and rescue strategy                                  |
| EN    | European norm                                                           |
| ENS   | Engineering numbering system/TR0052                                     |
| ESD   | Emergency shut down                                                     |
| ESP   | Electrical submersible pump                                             |
| ESV   | Emergency shut-down valve                                               |
| EU    | European Union                                                          |
| EX    | Explosion protection certificate                                        |
| F&G   | Fire & gas                                                              |
| FAT   | Factory acceptance test                                                 |
| FES   | Fire and explosion strategy                                             |
| FISCO | Fieldbus intrinsically safe concept                                     |
| FPDS  | Fire protection data sheet                                              |
| FR05  | Identifier for Functional requirements document "Project Development"   |
| FSA   | Functional safety assessment                                            |
| GA    | General arrangements                                                    |
| GBS   | Gravity based structure                                                 |
| GIS   | Geographical information system                                         |

|            |                                                                           |
|------------|---------------------------------------------------------------------------|
| GOP        | Gross overload protection                                                 |
| GRP        | Glass fibre reinforced plastic                                            |
| HAZID      | Hazard identification study                                               |
| HAZOP      | Hazard and operability study                                              |
| HPU        | Hydraulic power units                                                     |
| HSE        | Health, safety, security and the environment                              |
| HVAC       | Heating ventilation air-conditioning                                      |
| ICV        | In flow control valve                                                     |
| IEC        | International Electrotechnical Commission (standard)                      |
| IFC        | Issued for construction                                                   |
| IOM manual | Installation, operation and maintenance manual                            |
| IS         | Intrinsically safe                                                        |
| ISO        | - International standardization organisation<br>- Isometric (drawing)     |
| LCI        | Life cycle information                                                    |
| LOPA       | Layer of protection analysis                                              |
| MC&C       | Mechanical completion and commissioning                                   |
| MDF        | Main distribution frames                                                  |
| MDS        | Material data sheets                                                      |
| MEL        | Main equipment list                                                       |
| MOB boat   | Man over board boat                                                       |
| MOPS       | Manual overload system                                                    |
| MRB        | Manufacturing record book                                                 |
| MSF        | Module support frame                                                      |
| NDE        | Non-destructive examination                                               |
| NDT        | Non-destructive Test                                                      |
| NEMA       | Explosion protection certificate                                          |
| OSAT       | On site acceptance test                                                   |
| P&ID       | Piping & instrument diagram                                               |
| PAGA       | Public address and general alarm                                          |
| PD03       | Identifier for Project Development work process for Modification projects |
| PDMS       | Plant design management system (from AVEVA). 3D CAD tool.                 |
| PED        | Pressure equipment directive                                              |
| PFD        | - Process flow diagram<br>- Probability of failure on demand              |
| PMI        | Positive material identification                                          |
| PO         | Purchase order                                                            |
| PPE        | Personal Protective Equipment                                             |
| PTFE       | Polytetrafluoroethylene                                                   |
| PVT        | Pressure volume temperature                                               |
| PWHT       | Post weld heat treatment                                                  |
|            |                                                                           |

|            |                                                                          |
|------------|--------------------------------------------------------------------------|
| RASTI      | Rapid Speech Transmission Index                                          |
| RCM        | Reliability centered maintenance                                         |
| RFC        | Ready for commissioning                                                  |
| RFO        | Ready for operation                                                      |
| ROV        | Remotely operated vehicle                                                |
| RRM        | Risk reducing measures                                                   |
| SAS        | Safety and automation system                                             |
| SCD        | System control diagrams                                                  |
| SCI        | System configuration index                                               |
| SDS        | Safety Data Sheet                                                        |
| SIF        | Safety instrumented function (IEC61511/IEC61508)                         |
| SIL        | Safety integrity level                                                   |
| SIS        | Safety instrumented systems                                              |
| SIT report | System integration test (report)                                         |
| SO         | System and operation manuals                                             |
| SPIR       | Spare parts interchangeability register                                  |
| SPS        | Subsea production system                                                 |
| SRS        | Safety requirements specification                                        |
| STI        | Speech transmission index                                                |
| STIPA      | Speech transmission index public address                                 |
| TAC        | Technical Acceptance Certificate (TR2393 – Commissioning Requirements)   |
| TAS        | Condition Analysis System ( <i>Norwegian "Tilstandsanalyse system"</i> ) |
| UPS        | Uninterruptable power supply                                             |
| VDS        | Valve data sheet                                                         |
| WEAC       | Working environment area chart                                           |
| WEHRA      | Working Environment Health Risk Assessment                               |
| WLAN       | Wireless local area network                                              |
| WOCS       | Work over control system                                                 |
| WPQR       | Weld procedure qualification record                                      |
| WPS        | Welding procedure specification                                          |
|            |                                                                          |

## 7.2 Changes from previous version

This document is completely revised.

## 7.3 References

| Reference                  | Description                                                       |
|----------------------------|-------------------------------------------------------------------|
| CLP No1272/2008            | Classification, labeling and packaging of substances and mixtures |
| DNVGL-ST-0145              | Offshore substations                                              |
| EMC directive (2014/30/EU) | Electromagnetic compatibility directive                           |
| EN1997                     | Eurocode 7: Geotechnical design                                   |

|                                  |                                                                                                |
|----------------------------------|------------------------------------------------------------------------------------------------|
| IEC 61508                        | Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems      |
| IEC 61511                        | Functional safety - Safety instrumented systems for the process industry sector, part 1        |
| ILO C152                         | International labour organization Convention No. 152                                           |
| ISO 19901-5                      | Weight control during engineering and construction                                             |
| LVD (2014/35/EU)                 | Low voltage directive                                                                          |
| Machinery directive (2006/42/EC) | Essential health and safety requirements for machines                                          |
| NORSOK 5820                      | Supplier's documentation of equipment                                                          |
| NORSOK R-003                     | Norsok standard R-003: Safe use of lifting equipment                                           |
| NORSOK R-005                     | Norsok standard R-005: Safe use of lifting and transport equipment in onshore petroleum plants |
| NORSOK Z-001                     | Documentation for operation (DFO)                                                              |
| PED (2014/68/EU)                 | Pressure equipment directive                                                                   |
| PPE (89/686/EEC)                 | Personal Protective Equipment                                                                  |
| prEN 13852-3                     | Light offshore cranes                                                                          |
| GL0139                           | ALARP principles                                                                               |
| GL0469                           | Guideline for development of system and operation documents                                    |
| GL0583                           | Tagging Philosophy                                                                             |
| GL0592                           | Preparation of technical hierarchies                                                           |
| GL2041                           | Safety instrumented systems (SIS) - Guidance on management of lifecycle requirements           |
| GL4284                           | Revising life cycle information documentation                                                  |
| TR0052                           | engineering numbering system (ENS)                                                             |
| TR0038                           | Valve Actuators                                                                                |
| TR0814                           | Metering systems for fiscal, allocation or custody transfer applications                       |
| TR1005                           | SPIR registration                                                                              |
| TR1055                           | Performance Standards for Safety Systems and Barriers – Offshore                               |
| TR1727                           | Offshore Cranes                                                                                |
| TR1827                           | Civil and structural for onshore plants                                                        |
| TR1951                           | Piping Engineering                                                                             |
| TR1970                           | 2D CAD standards and symbols (LCI)                                                             |
| TR2000                           | Piping and Valve Material Specification                                                        |
| TR2231                           | AVEVA Plant CAD model requirements                                                             |
| TR2329                           | Process flow diagrams and Piping and Instrument diagrams                                       |
| TR2352                           | Weight control requirements for topsides and substructures                                     |
| TR2393                           | Commissioning requirements                                                                     |
| TR3021                           | Electrical system design, offshore units                                                       |
| TR3022                           | Electrical system design, onshore plants                                                       |
| TR3034                           | Safety and Automation System                                                                   |
| TR3110                           | Life cycle information (LCI), technical requirements and standards                             |
| TR3111                           | LCI Requirements - Data content and transfer                                                   |