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TR2381 LCI Requirements substitution for Wind

Operation and maintenance

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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

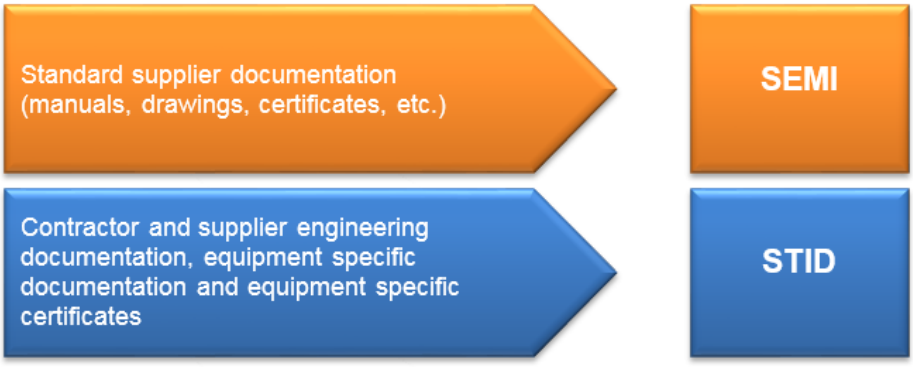
EU legislations and delivered to projects within the EEA. For wind facilities outside EU, equivalent declaration to EU Declaration of conformity shall be delivered.

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
Investment projects (PD)	12 weeks after contract award	12 weeks before RFC	3 weeks before RFC	4 weeks after RFO/TAC
Modification projects (PD03)	12 weeks after contract award or covered by frame agreement	Design freeze	Ready for installation	As-built (4 weeks after RFO)
Purchase Order (PO) equipment delivery	N/A	12 weeks after PO award	4 weeks before Factory Acceptance Test (FAT) (excluding FAT Report)	Delivery of equipme

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)**
1 - Existing and new Safety critical documentation (SR-62406), with or without mark-ups **2 - Existing documentation, with or without mark-ups** **3 - New documentation with mark-ups**	Yes	As-built + reference to M5 or project ID	As-built + reference to M5 or project ID Example: As-built L.O085C.014	OF
1 - New documents without mark-ups on IFC (or equivalent) as reason for issue	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 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
3D CAD model - offshore, onshore and subsea	SR-61919	5-1	3D CAD (TR2231)	LCI 2
Additional studies	SR-2730	5-5	DOC + PDF	LCI 2
Contractor's LCI execution strategy	SR-2686	5-39	DOC + PDF	LCI 0
Index information	SR-61902	5-123	Database (TR3111)	LCI 1
Master grid report	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
Acoustic/thermal insul. and fire protection plan	SR-2551	5-3	DGN/DWG (TR1970)+PDF	LCI 2
Architectural layout drawings	SR-2559	5-14	DGN/DWG (TR1970)+PDF	LCI 2
Data sheets - Mechanical	SR-2594	5-50	XLS + PDF	LCI 1
Data sheets - Weight	SR-2599	5-59	PDF	LCI 2
Fire test results reports	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
Buildings architectural drawings	SR-2567	5-23	DGN/DWG (TR1970)+PDF	LCI 2
Concrete structural design report	SR-2580	5-35	PDF	LCI 2
Concrete structures geometry drawings	SR-2581	5-36	DGN/DWG (TR1970)+PDF	LCI 2
Concrete structures reinforcement drawings	SR-2582	5-37	DGN/DWG (TR1970)+PDF	LCI 2
Excavation, fill and grading drawings	SR-2628	5-83	DGN/DWG (TR1970)+PDF	LCI 2
GIS Mapping - Survey reports	SR-2652	5-105	TBA	LCI 2
Ground investigation reports	SR-2653	5-106	PDF	LCI 2
Landscaping drawings	SR-2685	5-132	DGN/DWG (TR1970)+PDF	LCI 2
Metocean - Meterological and oceanographical reports	SR-2699	5-141	PDF + ZIP	LCI 2
Road drawings	SR-2737	5-183	DGN/DWG (TR1970)+PDF	LCI 2
Site Plan	SR-2748	5-193	DGN/DWG (TR1970)+PDF	LCI 2
Structural steel and aluminium structural design report (Civil)	SR-2762	5-206	PDF	LCI 2
Structural steel and aluminium. Main, secondary and outfitting drawings (Civil)	SR-2763	5-207	DGN/DWG (TR1970)+PDF	LCI 2
Structural steel fire protection drawings (Civil)	SR-2764	5-209	DGN/DWG (TR1970)+PDF	LCI 2
Underground piping and cables drawings	SR-2787	5-229	DGN/DWG (TR1970)+PDF	LCI 2
Underground piping hydraulic system calculation	SR-2788	5-230	PDF	LCI 2
Underground rock facilities drawings	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
Black start philosophy	SR-81095	5-17	DOC + PDF	LCI 2
Cable ladder/trays >=300 mm Layout drawings	SR-2569	5-24	PDF	LCI 2
Cable routing	SR-62659	5-23	PDF	LCI 2
Certificate of conformance	SR-2531	5-29	PDF	LCI 2
Circuit / Wiring diagram	SR-2575	5-31	PDF	LCI 2
Data sheets - Electrical	SR-81331	5-42	XLS + PDF	LCI 1
Electrical block diagrams	SR-2613	5-69	DGN/DWG (TR1970)+PDF	LCI 2
Electrical calculations / analyses	SR-2614	5-70	TBA	LCI 1
Electrical field equipment layout drawings	SR-2618	5-74	DGN/DWG (TR1970)+PDF	LCI 2
Electrical Load list	SR-2620	5-75	XLS + PDF	LCI 2
Electrical power system philosophy	SR-2621	5-76	DOC + PDF	LCI 2
Equipment room layout drawings	SR-61908	5-81	DGN/DWG (TR1970)+PDF	LCI 2
Lighting and small power layout drawings	SR-2690	5-134	DGN/DWG (TR1970)+PDF	LCI 2
Overall single line diagram	SR-2703	5-154	DGN/DWG (TR1970)+PDF	LCI 1
Parameter setting tables	SR-2706	5-157	XLS + PDF	LCI 2
Relay setting table	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
3D Noise Simulation Model	SR-61918	5-2	TBA	LCI 2
ALARP register	SR-2556	5-9	XLS + PDF	LCI 2
Area classification drawings	SR-2560	5-15	DGN/DWG (TR1970)+PDF	LCI 2
Data sheets - Safety equipment	SR-62719	5-50	XLS + PDF	LCI 1
Data sheets – Safety data sheet and chemical inventory	SR-2601	5-56	ZIP + PDF + XLS	LCI 1
Design accidental load report	SR-2604	5-62	DOC + PDF	LCI 2
Dropped object protection plan	SR-2610	5-67	PDF	LCI 2
Emergency preparedness analysis	SR-2624	5-77	DOC + PDF	LCI 2
Helideck pick-up point	SR-62721	5-84	DGN/DWG (TR1970)+PDF	LCI 2
Risk analysis	SR-2736	5-182	DOC + PDF	LCI 2
Safety layout drawings	SR-2739	5-185	DGN/DWG (TR1970)+PDF	LCI 2
SIS functional safety information	SR-2746	5-192	DOC/XLS + PDF	LCI 2
Working environment status	SR-61904	5-245	XLS + PDF	
Working environment summary report	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
Air flow diagrams	SR-2553	5-6	DGN/DWG (TR1970)+PDF	LCI 1
Area Duct and Instrumentation Diagrams (D&ID)	SR-2561	5-17	DGN/DWG (TR1970)+PDF	LCI 1
Data sheets - HVAC	SR-2592	5-48	XLS + PDF	LCI 1
Equipment Heat Emission	SR-2626	5-79	DOC + PDF	LCI 2
HVAC Bulk items index.	SR-2661	5-111	XLS + PDF	LCI 2
HVAC calculations / analyses	SR-2662	5-112	DOC + PDF	LCI 2
HVAC control philosophy	SR-2664	5-113	DOC + PDF	LCI 2
HVAC design philosophy	SR-2665	5-114	DOC + PDF	LCI 1
HVAC layout drawings	SR-2666	5-115	DGN/DWG (TR1970)+PDF	LCI 2
HVAC system description	SR-2667	5-116	DOC + PDF	LCI 2
System Duct & Instrumentation Diagrams (D&ID)	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
Alarm C&H (Context & Hiding)	SR-2554	5-7	XLS + PDF	LCI 2
Alarm classification	SR-2555	5-8	XLS + PDF	LCI 2
Automation and SCADA functional specifications	SR-62589	5-16	DOC + PDF	LCI 2
Cable routing	SR-62659	5-23	PDF	LCI 2
Cause & effect (C&E)	SR-2572	5-27	XLS + PDF	LCI 1
Consequence analysis logic solver	SR-2583	5-38	DOC/XLS + PDF	LCI 2
Control Diagram / programming Logic Diagrams	SR-62598	5-37	PDF	LCI 2
Control Sequence Diagrams	SR-62599	5-38	PDF	LCI 2
Cyber security self-assessment report	SR-81075	5-40	PDF	LCI 1
Data sheets - Instrument field equipment	SR-2593	5-49	XLS + PDF	LCI 1
Equipment room layout drawings	SR-61908	5-81	DGN/DWG (TR1970)+PDF	LCI 2
Field instrument installation drawing Typical	SR-2633	5-88	PDF	LCI 2
Fire protection data sheet (FPDS)	SR-2636	5-90	XLS + PDF	LCI 1
Hardware loop typicals	SR-2654	5-107	DGN/DWG (TR1970)+PDF	LCI 2
Instrument calculations	SR-2676	5-126	PDF	LCI 2
Instrument field equipment layout drawings	SR-2677	5-127	DGN/DWG (TR1970)+PDF	LCI 2
Instrument/telecom. earthing distribution. schematic diagram	SR-2679	5-128	DGN/DWG (TR1970)+PDF	LCI 2
Instrumented systems - Loading and start up procedures	SR-62707	5-102	DOC + PDF	LCI 2
Instrumented systems - Performance data	SR-62703	5-103	XLS + PDF	LCI 2
Interconnection cabling block diagrams	SR-62601	5-104	DGN/DWG (TR1970)+PDF	LCI 2
Level instrument arrangement drawings	SR-2687	5-133	DGN/DWG (TR1970)+PDF	LCI 2
Loop information / Loop Drawings	SR-62594	5-110	DGN/DWG (TR1970)+PDF	LCI 2
Network topology diagram	SR-2700	5-150	XLS + PDF	LCI 2
Pneumatic/hydraulic hook-up drawing	SR-2724	5-173	PDF	LCI 2
Settlement and Power Quality metering - configuration parameters	SR-62590	5-153	DOC + PDF	LCI 2
Settlement and Power Quality metering - data exchange specifications	SR-62591	5-154	DOC + PDF	LCI 2
Settlement and Power Quality metering - functional design specification	SR-62593	5-155	DOC + PDF	LCI 2
Settlement and Power Quality metering - metering calculations	SR-62592	5-156	DOC + PDF	LCI 2

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

3.8 Marine Technology

Maintain table

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

3.9 MC/Commissioning

Deliverables from MC/Commissioning

Maintain table

Information item	ID	Ref.	Handover Format	Milestone
Commissioning procedures	SR-2533	5-33	DOC + PDF	LCI 2

3.10 Mechanical

Engineering deliverables from mechanical.

Maintain table

Information item	ID	Ref.	Handover Format	Milestone
Data sheets - Mechanical	SR-2594	5-50	XLS + PDF	LCI 1
Pneumatic connection diagram	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
Weight control database	SR-2795	5-238	TBA	LCI 2
Weight report	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									X		X		
SR-2531	**Certificate of conformance**	VB	LCI 2	PDF	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	
SR-2575	**Circuit / Wiring diagram**	XK, XT	LCI 2	PDF		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	
SR-2589	**Data sheet - Product**	DS	LCI 1	PDF	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	
SR-2675	**Installation, operation and maintenance manual (IOM manual)**	MA	LCI 1	PDF	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	

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 (TR1005)	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

SR-62639 - Equipment notes

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 ar	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-2751	Spare Parts Interchangeability Register (SPIR)	MC	LCI 1	XLS (TR1005)	X		X	X		X	X	X	X	X	X	

- **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 hosts;** 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 gasous 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			
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			
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		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 (TR1005)	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)	Comodity 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		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 >=300 mm Layout drawings

For the following, individual layout drawings shall be provided: Cable ladders/trays > =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 >=300mm
- Cable tray <300 mm if purpose to connect Cable ladders >=300mm
- 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
- Typicals
- 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.

C999-ST-S-DS-0003	Liferaft and davit (SDS-100)
C999-ST-S-DS-0006	Evacuation chute (SDS-103)
C999-ST-S-DS-0008	Fire fighting cabinet (SDS-105)
C999-ST-S-DS-0010	Lifejacket cabinet (SDS-107)
C999-ST-S-DS-0011	Survival suits cabinet (SDS-108)
C999-ST-S-DS-0013	Firewater valve skid (SDS-110)
C999-ST-S-DS-0014	Portable extinguisher (SDS-111)
C999-ST-S-DS-0015	Eye bath (SDS-112)
C999-ST-S-DS-0016	Breathing air recharge unit (SDS-113)
C999-ST-S-DS-0017	Personnel basket (SDS-114)
C999-ST-S-DS-0018	Medical basket (SDS-115)
C999-ST-S-DS-0019	Safety station cabinet (SDS-116)
C999-ST-S-DS-0020	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 pr 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) resumés 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 completi
- 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 becoordinated with short circuit protection.
    - Short circuit (phase to phase) at the end of the power cable supplying small power and lighting should causeinstantaneous 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.

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

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.

Milestone	LCI 2
Handover format	DOC + PDF

5-69, SR-2626 - Equipment Heat Emission

Description of heat emission from installed equipment shall be pr 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

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

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.

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.

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.

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.

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
- Iidentification 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 submergible 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

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

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

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

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.

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

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

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

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

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)

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

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

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.

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.

Milestone	LCI 2
Handover format	XLS + PDF

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

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

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

Depth and positions

Milestone	LCI 3
Handover format	XLS + PDF

5-106, SR-62734 - Landfall

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

Milestone	LCI 2
Handover format	

5-107, SR-2685 - Landscaping drawings

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

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

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.

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

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)

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.

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.

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.

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.

Milestone	LCI 2
Handover format	DOC + PDF

5-116, SR-81362 - Metocean - Meterological and oceanographical reports

The reports shall be delivered.

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.

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.

Milestone	LCI 2
Handover format	PDF

5-119, SR-62731 - Mooring Lines

Pre-tension level

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

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.

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.

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

Milestone	LCI 2

Handover format	PDF

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

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 eathing 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.

Milestone	LCI 2

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.

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.

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 posistion (e.g. KILO/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 note 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

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/torqueing 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

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.

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

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.

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.

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)

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.

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

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

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.

Milestone	LCI 2
Handover format	PDF

5-150, SR-62735 - Scour Protection

As-installed details, volume, survey details

Milestone	LCI 2
Handover format	PDF

5-151, SR-62736 - Seabed Intervention

Rock installation, mattress and/or rock bags, UXO free areas

Milestone	LCI 2
Handover format	PDF

5-152, SR-62696 - Settlement metering - calibration certificates

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.

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.

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

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.

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.

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

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.

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 Mangager. 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
- Typicals
- 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 (**A**bandon **P**latform **S**hutdown) 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 m3 and time unit
- Net weight (kg) and time unit
- Specific weight (kg)
- Storage temperature ^{o}C
- Storage humidity %
- Storage max pressure (barg)
- Storage capacity m^3
- 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 discreet 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).

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 verticallity, 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
Structural design report	SR-81147	PDF	LCI 2
Material certificates	SR-2697	PDF	LCI 2

Electrical

Information item	ID	Handover Format	Milestone

Black start philosophy	SR-81095	DOC + PDF	LCI 2
Circuit / Wiring diagram	SR-2575	PDF	LCI 2
Electrical block diagrams	SR-2613	DGN/DWG +PDF	LCI 2
Electrical calculations / analyses	SR-81342	TBA	LCI 1
Electrical Load list	SR-81352	XLS + PDF	LCI 2
Electrical power system philosophy	SR-81353	DOC + PDF	LCI 2
Electrical field equipment layout drawings	SR-2618	DGN/DWG +PDF	LCI 2
Overall single line diagram	SR-2703	DGN/DWG +PDF	LCI 1
Parameter setting tables	SR-2706	XLS + PDF	LCI 2
Relay setting table	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
Area classification drawings	SR-2560	DGN/DWG +PDF	LCI 2
Data sheets - Safety equipment	SR-62719	XLS + PDF	LCI 1
Data sheets – Safety data sheet and chemical inventory	SR-2601	ZIP + PDF + XLS	LCI 1
Design assessment with Safety Barrier Identification and assessment		DOC + PDF	LCI 2
Safety Strategy		DOC + PDF	LCI 2
Emergency preparedness analysis (Evacuation and escape procedures)	SR-81357	DOC + PDF	LCI 2
Human Factors Assessment		PDF	LCI 2
Country specific Compliance review Note: for UK including including PUWER Assessment / LOLER assessment/ LOLER/PUWER/PSSR/CDM/Working at Height Regs / Welfare regs / Electrical regs / Fire Safety Case / study		PDF	LCI 2
WEHRA – Working Environment Health Risk assessment (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 Format	Milestone
Antenna tower layout drawings	SR-2558	DGN/DWG+PDF	LCI 2
Coaxial cable test reports	SR-2578	DOC + PDF	LCI 2
Data and telephone cabling network test reports	SR-2588	DOC + PDF	LCI 2
Electrical connection diagram	SR-2616	DGN/DWG+PDF	LCI 2
Fiber optical cabling (platform / facility internal) test reports	SR-2630	DOC + PDF	LCI 2
Fiber optical long distance cable test report	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	Auxilirary 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 - Calibration 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

	index							

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	

WTG Instrumented systems, included SCADA/SAS

		Doc		Handover	Computer	Panels, cabinets 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 gasous 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 submergible 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 - 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 - 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 *(Norwegian "Tilstandsanalyse system")*
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