



## Design and Documentation

Drawings and documents are required to define the concept through to final commissioning for the equipment identified in each specific project.

The following list indicates, through the assignment of document levels, when drawing and document production may start. It does not necessarily mean that all activities at one level will be complete before the next level starts. This list identifies every document that can be produced by AM Sensors as a design activity.

### Document List

#### Level 1 – Contract Phase

- L2.1 Task Review
- L2.2 Risk Register
- L2.3 Design Quality Plan
- L2.4 Overall Programme
- L2.5 Technical Specification
- L2.6 Requirements Capture & Acceptance

#### Level 2 – System Phase

- L2.1 Block System Diagram
- L2.2 Technical Files for CE marking
- L2.3 Design Review Records (As required)
- L2.4 Technical Queries (As required)

#### Level 3 – Design Phase

- L3.1 Block cable diagram
- L3.2 Circuit Diagrams
- L3.3 Piping and Instrumentation Diagrams
- L3.4 Cable schedule
- L3.5 Sub-System Procurement Specifications
- L3.6 Design Substantiation Report including Optioneering & Project Implementation Strategy
- L3.7 Company Technical Standard & Procurement Specification Compliance
- L3.8 Calculations



## Level 4 – Production Phase

- L4.1 Assembly Drawings (as build)
- L4.2 Components Lists (as build)

## Level 5 – Assembly and Test Phase

- L5.1 Inspection Plans
- L5.2 Schedule of Recommended Spares
- L5.3 Site Installation & Test Schedule
- L5.4 Operating Instructions
- L5.5 O & M Manuals

## Description

The following is a brief description of each of the above drawings and documents.

- L1.1 The **Task review** is a joint Projects / Design review of the customer contract or Task Instruction to ensure compliance with the AMS task quotation and ensure a complete understanding of the task requirements.
- L1.2 The **Risk Register** is a list of identified risks to successful completion of the task within budget and program. It lists individual risks and perceived effects (both to program and budget) of those risks to the task.
- L1.3 The **Design Quality Plan** is a major reference document for the project design. It identifies the key documents that are to be produced and the procedures that will be used to produce them.
- L1.4 The **Overall Programme** is a high level schedule of planned activities of the contract, with estimated times for achieving each of them. It is a major reference used by project and design teams.
- L1.5 A **Technical Specification** is produced when the customer has not directly specified the technical requirements of a specific project or task. This document covers the System Description, Nuclear and Environmental Safety Implications, Extent of Supply, Technical, Manufacture and Works Testing, Site Installation, Testing and Commissioning, Quality Assurance, Documentation and Health & Safety Requirements.
- L1.6 **The Requirements Capture & Acceptance** document will record all of the customer's requirements and the corresponding AMS compliance. This document will then form the basis for commercial and technical progress of the task, and will be periodically reviewed to ensure requirements are being met. Where a requirement will not be met the customer will be informed, and written agreement should be provided to allow the requirement to be removed from this document.



- L2.1 **Block System Diagram** provides a high level overview of the proposed new system and defines its interfaces with existing plant.
- L2.2 **Technical Files** will be opened to record information that justifies the design in terms of compliance with the requirements for CE marking of equipment. This will include, but not be limited to, Electromagnetic Compatibility (EMC), Low Voltage Equipment Directives (LVD), and Pressure Equipment Directives (PED). A file to cover the Construction Design Management (CDM) regulations will also be produced. These files effectively form an index to all documents e.g. calculations, drawings, schedules, specifications, etc. that substantiate compliance with the regulations.
- L2.3 **Design Review Records.** Records will be kept for all design reviews undertaken. They will form the Minutes of the Meeting and will be submitted to the customer.
- L2.4 **Technical Queries** - This document will be a formal record of queries raised and their responses. They will be raised on an as required basis but will not be used in place of concessions against the customer requirements.
- L3.1 **Block Cable Diagram** identifies cable runs, sequence of interconnections and cable numbers without regard to the geographical layout of the various items. It will be the primary electrical drawing on the family tree and as such will have the top-level components list associated with it.
- L3.2 **Circuit Diagrams** will be a symbolic representation of the functional requirement of all plant motions, depicting all its essential parts without regard to the physical layout of the various items. The connections to and the device identity of the electrical components will be shown.
- L3.3 **Piping and Instrumentation Diagrams** can be produced to be incorporated directly into Plant Operating and Maintenance Instructions.
- L3.4 **Cable schedule** will list all cables with associated information including length, type, duty, voltage, glands and number of cores.
- L3.5 **Sub-System Procurement Specifications** will define the technical and documentation requirements of any bought out non-proprietary item that is not adequately defined by a part number or drawing. It will also identify ALL certification requirements. These will be mainly for, but not limited to electrical items.
- L3.6 **Design Substantiation Report including Optioneering & Project Implementation Strategy.** This report will give details of the design and the design criteria, and demonstrate how the design criteria set out by the customer are met. The report will substantiate the design and demonstrate how the design is compliant with good engineering practice, EN/BS codes and customer specific standards. It will also mention any deviations from the customer specification. The report will also include design documents as attachments/references such as drawings, calculations, schedules, information on proprietary equipment, welding, Non-

Destructive Testing, pressure test and fabrication procedures etc. The Design Substantiation Report will collate together all documentation supporting the design, including O&M information and recommended spares. The implementation strategy adopted will be determined by the safety case and operational requirements of the project.

- L3.7 Company Technical Standard & Procurement Specification Compliance.** Where applicable, compliance with EDF Energy's Company Technical Standards (CTS's) and associated Procurement Specifications (PSPEC's) can be provided as an appendix to the Design Substantiation Report or as a stand-alone document.
- L3.8 Calculations** will be performed as required by individual projects to substantiate the design. A register will also be maintained.
- L4.1 An Assembly Drawing** will be updated to show how sub-assemblies and parts are assembled. Parts may include detailed parts, bought out parts, fasteners and sections. All items are labelled with part number, drawing number where applicable and quantity. Overall dimensions are included. New pipework fabrications will also be shown on this drawing.
- L4.2 Components Lists** will be produced for the Mechanical Design Set Out, Assemblies and Sub-Assemblies. They will list, but not be limited to, all drawings, proprietary parts, schedules, procurement specifications, painting specifications, weld and NDT procedures and inspection plans associated with each assembly or sub-assembly. They will provide the ordering information, device reference and part number for each component. They will list a QA level for each component along with the certification requirements.
- L5.1 Inspection Plans** will be produced, where required by the QA level, for mechanical and electrical equipment. It is a quality check list describing the manufacturing route, relevant specifications and inspection requirements for assemblies and parts. All assemblies and parts will be assigned a quality level relating to the level of importance. The inspection plans will be used by AMS, or subcontract personnel, to ensure all inspection requirements are satisfied, leading to the issue of appropriate certification.
- L5.2 Schedule of Recommended Spares (Operational and Commissioning).** Commissioning Spares are a list of spares recommended by AMS that should be available for use during the commissioning period. The recommended spares list identifies a list of spares recommended by AMS for use during the operational life of the equipment.
- L5.3 Site Installation and Test Schedules** define the sequence of activities required to assemble or reassemble after works and test the equipment or plant delivered to site. Included in the schedules are safety requirements, document lists with issue chart, inspection and witness mark-ups (and signature box) and document review.

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