

Integration Quality Assurance

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OUTLINE

- Responsibilities
- Personnel Training and Qualification
- Receipt Inspection
- Pre-Installation Inspection and Tests
- Installation Readiness Reviews
- Installation
- Installation QA/QC
- Documents, Records, Configuration Management
- Control of Nonconforming Equipment
- Summary

RESPONSIBILITIES

- Logistics Manager / SDSD
 - Initial Receipt of Equipment and Material
 - Storage of Equipment and Material
 - Issue Equipment and Material to Responsible Party for delivery to SURF
 - Perform visual quality check once items are delivered to SURF
- Consortia Leaders, Cryogenics and Cryostat Management
 - Appointment of QA Representatives
 - Arrange shipment for Equipment and Material to the SD Warehouse
 - Pre-Installation Inspections and Tests as required
 - In-process Inspections and Tests
 - Final Inspections and Tests

RESPONSIBILITIES

- Quality Assurance Representatives
 - Oversee the installation inspection and tests for Quality performance.
 - Provide periodic assessment of field inspection, oversight, testing, commissioning, and acceptance.
 - Review the inspection and test data for accuracy and completeness.
 - Interface with the LBNF DUNE QA Manager on Consortia installation QA related matters.
 - Make or arrange for inspections to be performed by the Consortia

RESPONSIBILITIES

- Quality Assurance Representatives
 - Monitor the status of all required testing based on the Testing Plan and Log
 - Check certifications of materials and equipment delivered to the site, spot check workmanship, observe testing procedures. Review rework items list, testing plan and log, etc.
 - Issue Nonconformance Report for deficiencies observed or the Consortia has not been corrected within 24 hours or entered in a Rework Items List

RESPONSIBILITIES

- Quality Assurance Representatives
 - Monitor the Rework Items List maintained by the Subcontractor's QC Manager.
 - Coordinate Pre-final and Final Inspections



RESPONSIBILITIES

- Quality Assurance Manager
 - Responsible for development, implementation, assessment, and improvement of the QA program
 - Periodically reporting on the performance of the quality system to the LBNF Project Manager and DUNE Technical Coordinator for their review and as a basis for improvement of the quality system
 - Participating in the Installation Readiness Reviews
 - Perform Progress Reviews to verify QC program being implemented and validation of equipment quality

PERSONNEL TRAINING AND QUALIFICATION

- The DUNE Consortia Leaders shall identify the resources to ensure that their team members are adequately trained and qualified to perform their assigned work.
- Before allowing personnel to work independently, they are responsible to ensure that their team members have the necessary experience, knowledge, skills, and abilities.
- Personnel qualifications are based on the following factors:
 - previous experience, education, and training
 - performance demonstrations or tests to verify previously acquired skills
 - completion of training or qualification programs
 - on-the-job training

RECEIPT INSPECTION

- Logistics Manager will match shipment against the Bill of Materials
- Verify that there is no shipping damage
- Verify signed off QC Plan indicating equipment has been shipped from fabrication facilities with satisfactory inspections and tests.
- Process equipment in accordance with the logistics procedures
- If nonconforming conditions are identified document on a Nonconformance Report, segregate equipment from satisfactory equipment and notify the Responsible Consortia Technical Lead.



PRE-INSTALLATION INSPECTION AND TESTS

- The DUNE Consortia Leaders shall identify the pre-installation inspections and tests that may be required prior to installation in the cryostat.
- Inspection and test plans shall be developed.
- Inspection and tests shall be performed in accordance with approved procedures by qualified personnel
- Location for the pre-installation inspections and tests shall be determined prior to equipment being released from the warehouse



INSTALLATION READINESS REVIEW

- Review committee will include, as appropriate, JPO members, such as the Review Office, Compliance Office (CO) and LBNF/DUNE Systems Engineering, ESH and QA representatives.
- Installation Readiness Review deliverables:
 - Installation plans and procedures, including QC plans
 - Engineering Analysis, per Compliance Office requirements
 - Scheduling and personnel needs, floor space requirements, facility requirements
 - Review of hazard analyses

INSTALLATION

- DUNE Consortia members are responsible for the quality of their work, and are responsible for procuring the resources and support systems to enable their staff to complete their work with high quality.
- Fabrication work on the DUNE Project shall be performed to established technical standards and administrative controls using approved instructions and procedures.

INSTALLATION

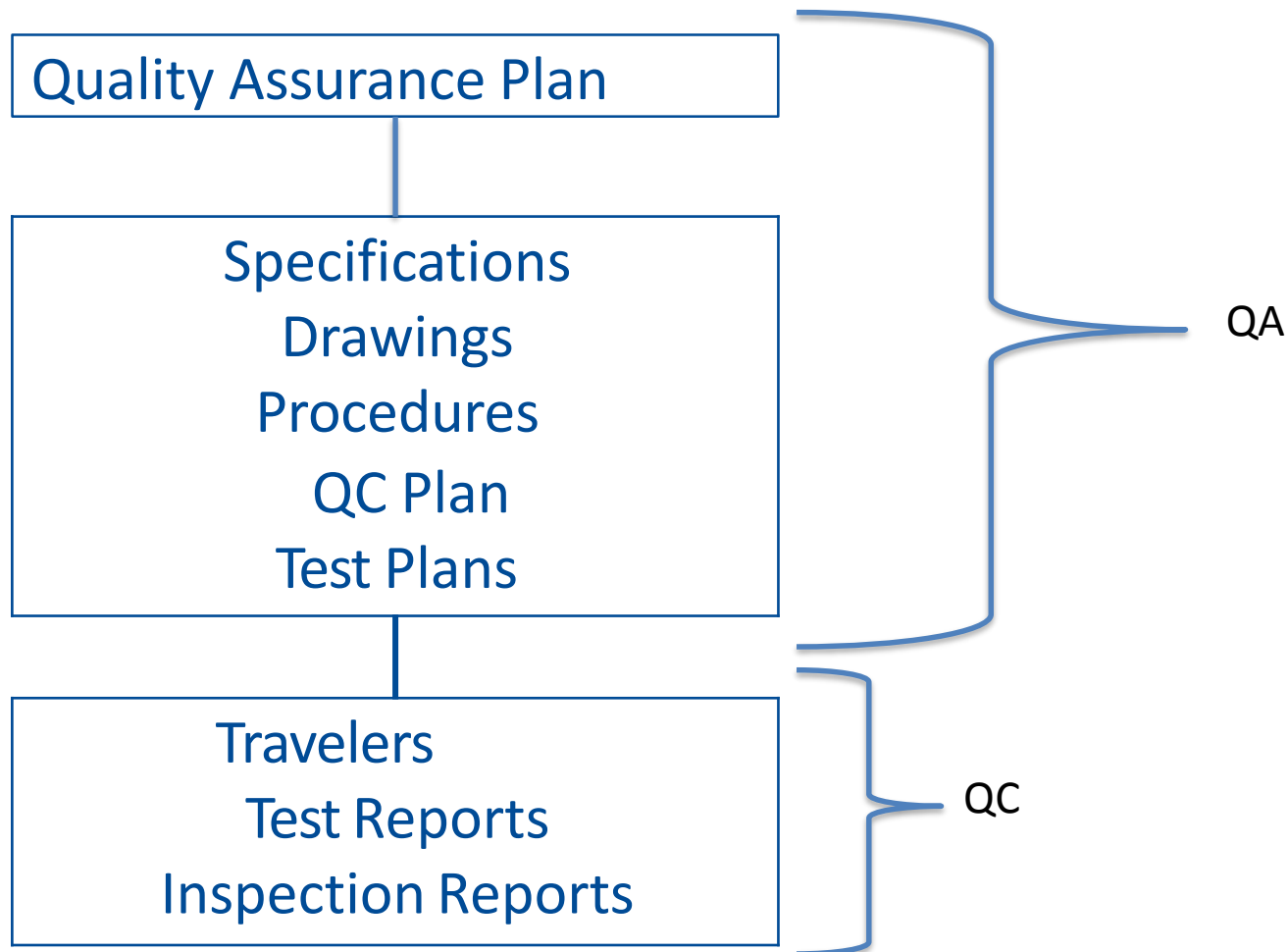
- Fabrication work processes with QA inspections and tests shall be documented on Travelers or similar document
- The Consortia will define a system of controls to ensure that items are handled, stored, shipped, cleaned, and preserved to prevent them from deteriorating, being damaged, or becoming lost.
- Equipment used for process monitoring or data collection shall be calibrated and maintained

INSTALLATION QA/QC

- Inspection and testing will be performed and documented in accordance with approved procedures by qualified personnel
- QC Plan shall be developed to document critical installation steps, inspection and test activities
- Consortia QA Rep will oversee inspection and testing activities

DOCUMENT, RECORDS, CONFIGURATION MANAGEMENT

- Document Hierarchy



DOCUMENT, RECORDS, CONFIGURATION MANAGEMENT

- Engineering and scientific documents (including drawings) are prepared by DUNE personnel to define the design, manufacture and construction.
- Before these documents are put into effect they are reviewed and signed by the, DUNE Consortia Leader or designee.
- The DUNE Consortia documents are stored in the CERN EDMS.

CONTROL OF NONCONFORMING EQUIPMENT

- Procedure and accompanying documentation under development
- If a nonconforming condition is identified and cannot be corrected within 24 hours, the equipment should be segregated if possible or otherwise identified as nonconforming, a description of the nonconformance with a recommended disposition should be forwarded to the Consortia Technical Lead for approval or alternate disposition.
- Dispositions:
 - Accept As Is
 - Rework
 - Repair
 - Scrap

CONTROL OF NONCONFORMING EQUIPMENT

- Dispositions:
 - Accept As Is – Equipment does not meet the specification requirements but meets the functionality requirements
 - Rework – Equipment is brought back into compliance with all specification requirements.
 - Repair – Equipment is worked on to meet its functionality but does not meet all specification requirements
 - Scrap – Equipment is not used on project. Either discarded or can be used for another purpose but must be identified so it is not inadvertently used.

CONTROL OF NONCONFORMING EQUIPMENT

➤ Rework/Scrap –

- ☐ Equipment that is identified as nonconforming and the disposition is made and completed within 24 hours no documentation is required.
- ☐ If it takes more than 24 hours to determine these dispositions, equipment should be segregated or marked as nonconforming and the nonconformance be documented requesting disposition
- ☐ Rework shall be inspected and accepted using original procedures
- ☐ Close out of the nonconformance can be performed by the Installation coordinator or QA Representative

CONTROL OF NONCONFORMING EQUIPMENT

➤ Accept As Is/Repair –

- ☐ Nonconformance will be documented with the recommended disposition
- ☐ Forward to the Consortia Technical Leader for approval of disposition or alternate disposition. Consortia Technical Leader may have to reach out to SMEs.
- ☐ Disposition should take into consideration if it affects any other interfaces. If it will, Technical Lead notifies the applicable Consortia for agreement.
- ☐ For Fabrication facilities, the other Facilities shall be notified of the issue and the subsequent disposition.
- ☐ The change may be incorporated into the process
- ☐ Shall be inspected and accepted using original procedures
- ☐ Close out of the nonconformance can be performed by the Consortia Technical Lead or the QA Representative.

SUMMARY

- LBNF/DUNE QA Plan is being revised to incorporate Integration responsibilities and unique QA/QC processes currently not covered by the QA Plan for this phase of work
- This covers receipt inspection, pre-installation inspection and tests, installation and control of nonconforming equipment
- Comments and feedback would be appreciated so we have an effective QA Plan
- Contact: Kfahey@fnal.gov or 630-840-2693