INSPECTION TECHNICAL PROCEDURE

I-129

MECHANICAL EQUIPMENT INSTALLATION INSPECTION

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Table of Contents

1.0 PURPOSE 1

2.0 OBJECTIVES 1

3.0 INSPECTION REQUIREMENTS 2
- 3.1 Adequacy and Effectiveness of Construction Implementing Procedures 2
- 3.2 Adequacy and Effectiveness of Construction Activities 2
- 3.3 Adequacy and Effectiveness of the Training and Qualification of Personnel 2
- 3.4 Adequacy and Effectiveness of the System of Records 2

4.0 INSPECTION GUIDANCE 3
- 4.1 Adequacy and Effectiveness of Construction Implementing Procedures 3
- 4.2 Adequacy and Effectiveness of Construction Activities 3
- 4.3 Adequacy and Effectiveness of the Training and Qualification of Personnel 4
- 4.4 Adequacy and Effectiveness of the System of Records 5

5.0 REFERENCES 5

6.0 LIST OF TERMS 5

INSPECTION TECHNICAL PROCEDURE I-129, REV. 0
MECHANICAL EQUIPMENT INSTALLATION INSPECTION

1.0 PURPOSE

This inspection procedure provides guidance to assess the Contractor's activities for the installation of specialized or large mechanical equipment. This guidance is based on the requirements set forth in the Safety Requirements Document (SRD), the Integrated Safety Management Plan (ISMP), and the Quality Assurance Manual (QAM).

This inspection procedure assesses the adequacy and effectiveness of the following:

- Procedures and programs implementing installation activities for major special or large mechanical equipment
- Contractor work activities implementing the installation of special or large mechanical equipment
- Training and qualification of personnel implementing the program and procedures
- System of records demonstrating the management and accomplishment of the required equipment installation activities.

2.0 OBJECTIVES

This procedure is intended to provide inspection requirements and guidance for inspectors to verify the Contractor has established and implemented effective programs and procedures to ensure specialized or large important-to-safety mechanical equipment is installed in accordance with the design and manufacturer's requirements. This includes programs and procedures for: (1) implementing design and manufacturer's requirements regarding the installation of special or large mechanical equipment; (2) managing and providing oversight to ensure the equipment installation activities have been adequately addressed by specifications, drawings, and procedures; and (3) managing and providing oversight to ensure the as-constructed condition of the facility equipment is in accordance with the design and manufacturers' requirements.

This procedure is used as a component of a complete construction inspection program. This and other inspection procedures will be used on an ongoing basis, as needed, to provide assurance construction activities are being conducted as required by authorization basis commitments and Contractor procedures. Although, during the construction phase, it is expected a significant portion of this inspection procedure will be accomplished at least once for each major Contractor/subcontractor involved with the activities covered by this procedure, it is not expected completion of the entire procedure will be accomplished during any one inspection and/or every time the inspection procedure is used.

3.0 INSPECTION REQUIREMENTS

3.1 Adequacy and Effectiveness of Construction Implementing Procedures

3.1.1 The inspector should verify the Contractor/subcontractors with responsibilities in the area of installing special or large important-to-safety mechanical equipment have approved procedures describing the administrative controls and work processes to be implemented which ensure the design and equipment manufacturer's requirements regarding installation are accomplished as required. (QAM, Policy Q-05.1, Sections 3.1.1 and 3.3; ISMP, Table 1-3, item 5; and SRD Safety Criteria (SC) 4.1-2 and 7.3-5)

3.1.2 The inspector should verify procedures provide for inspections to ensure important quality-related aspects of the equipment installation work are verified and documented. (QAM, Policy Q-05.1, Section 3.5.1; SRD, SC 4.1-2 and 7.3-7; and ISMP, Table 1-3, items 5 and 8)

3.1.3 The inspector should verify the Contractor has established procedures for ensuring craft and inspection personnel performing installation work are qualified to perform their assigned work. (QAM, Policy Q-02.2, Section 3.3.2; and ISMP, Table 1-3, item 2)

3.2 Adequacy and Effectiveness of Construction Activities

The inspector should verify work is being accomplished under controlled conditions in accordance with the Contractor's approved procedures. (QAM, Policy Q-05.1, Section 3.1.1; SRD, SC 4.1-2 and 7.3-5; and ISMP, Table 1-3, item 5)

3.3 Adequacy and Effectiveness of the Training and Qualification of Personnel

The inspector should verify craft and quality control (QC) personnel involved in the performance of installation and inspection activities are qualified to perform their job functions. (QAM Policy Q-02.2, Sections 3.2.2, 3.3.1, and 3.3.3; and SRD, SC 7.3-3)

3.4 Adequacy and Effectiveness of the System of Records

The inspector should verify records reflect the achievement of required equipment installation quality; are as specified by approved procedures; have been reviewed for accuracy and assurance the recorded information meets project requirements; have been approved; and are stored and maintained sufficient to support technical requirements and contractual regulatory compliance. (QAM, Policy Q-17.1, Sections 3.1.2, 3.3.1, and 3.6.1; SRD, SC 4.0-3, 4.1-2, and 7.3-4; and ISMP, Table 1-3, item 4)

4.0 INSPECTION GUIDANCE

4.1 Adequacy and Effectiveness of Construction Implementing Procedures

4.1.1 The inspector should review the equipment manufacturers' technical manuals, the design drawings covering the installation of special or large mechanical equipment, and the Contractor's procedures for accomplishing the installation activities. Examples of these equipment types are large pumps and heating, ventilation, and air conditioning (HVAC) fans, large HVAC filters and housings, backup power supply diesel engines and generators, and Low-activity Waste (LAW) and High-Level Waste (HLW) melters. This listing is not meant to be a complete list of important mechanical equipment, and the inspector should use judgement regarding the sample selection, while concentrating on critical equipment. The objective of these inspections is to ensure the design and manufacturer's requirements related to the equipment are accomplished through execution of appropriate procedures. For example, the inspector may select, from the list of important-to-safety mechanical equipment, two large pumps, two large HVAC fans and motors, one emergency diesel engine, and the associated electrical generator for these examinations. The intent of this selection is to obtain a cross-section of important-to-safety equipment for examination. The Contractor's procedures for installation of this equipment should implement the design drawing requirements and the equipment manufacturer's technical manuals.

4.1.2 The inspector should review the Contractor's procedures, for the equipment selected in Section 4.1.1 above, to ensure inspections and tests are scheduled and provided to verify the installed condition of the selected equipment conform to design and manufacturer's requirements. Procedures should contain appropriate acceptance criteria.

4.1.3 No additional guidance is necessary.

4.2 Adequacy and Effectiveness of Construction Activities

Prior to performing work observation inspections in the field, the inspector should review the Contractor's procedures for accomplishing equipment installation, the manufacturer's installation requirements in the equipment technical manuals, and the design drawings detailing the equipment installation for the equipment selected in Section 4.1.1, above. During the field observations, the inspector should carry a copy of the drawings, technical manual requirements, and the procedure(s) pertinent to the planned observations.

During the field observations, the inspector should interview a sample of the craft and QC personnel performing the observed activities. The interviews should focus on determining whether job and procedure knowledge is satisfactory. The names and job functions of those interviewed should be obtained and later used to verify proper implementation of personnel qualification requirements, as specified in Sections 4.3 and 4.4, below.

For the equipment selected in paragraph 4.1.1, above, the inspector should verify the Contractor is performing the installation activities as required. The expectation is the inspector will observe work performance on at least a subset of the equipment listed in paragraph 4.1.1, above.

Inspections should be performed to verify the selected equipment is located, installed, assembled, and connected to conform to the latest approved-for-construction drawings, installation specifications, technical manual requirements, and procedures. Work observation activities should determine for example:

- Leveling and alignment conform to drawing requirements
- Clearances and tolerances conform to drawing requirements
- Location, routing, and support of cables and sensing lines conform to drawing requirements
- Thread engagement and tightness of threaded connections and fastenings conform to engineering or technical manual requirements
- Freedom of movement conforms to drawing requirements
- Identifications and markings conform to Contractor procedures for marking
- Physical integrity is maintained - no loose or damaged parts
- Lubrication of bearings and periodic rotation of rotating equipment conform to technical manual requirements
- Environmental and pressure seals remain in tact; no leaking fluids are visible
- Equipment is suitably protected from contamination or damage from construction debris
- Installation of mountings and supports is according to procedures; bolt torque conforms to drawing or engineering requirements.

4.3 Adequacy and Effectiveness of the Training and Qualification of Personnel

The inspector should review the Contractor's procedures specifying the requirements for education, experience, training, and certification of craft and QC personnel associated with the equipment installation and inspection activities. If not accomplished during performance of Section 4.2 above, the inspector should interview and collect the names of at least the following personnel:

- Three craftspersons involved in implementing the equipment installation requirements

- Three QC personnel involved in verifying the accomplishment of specified equipment installation requirements.

During the interviews, the inspector should verify the personnel were sufficiently knowledgeable of applicable installation requirements.

The inspector should also examine the training and qualification records of the craft and QC personnel interviewed. The inspector should determine whether the records demonstrate conformance with the Contractor's requirements for personnel training, qualification, and certification as applicable.

4.4 Adequacy and Effectiveness of the System of Records

The inspector should sample and examine the completed records which result from the accomplishment of the selected equipment installations (see paragraph 4.1.1, above). This inspection should focus on verifying the records conform to applicable procedure requirements.

The records of installation accomplishment, and for the training and qualification of personnel, should be examined to verify approval by proper authority; installation in accordance with procedure requirements; and the acceptable performance of the documented activity.

5.0 REFERENCES

Integrated Safety Management Plan (ISMP), 24590-WTP-ISMP-ESH-01-001, Rev. 1, Bechtel National, Inc., 2002.

Quality Assurance Manual (QAM), 24590-WTP-QAM-QA-01-001, Rev. 0a, Bechtel National, Inc., 2002.

Safety Requirements Document (SRD), Volume I, 24590-WTP-SRD-ESH-01-001-01, Rev. 0, Volume 2, 24590-WTP-SRD-ESH-01-001-02, Rev 0d, Bechtel National, Inc., 2002.

6.0 LIST OF TERMS

HLW	High-Level Waste
HVAC	heating, ventilation, and air conditioning
ISMP	Integrated Safety Management Plan
LAW	Low-Activity Waste
QAM	Quality Assurance Manual
QC	quality control
RPP	River Protection Project
SC	Safety Criteria
SRD	Safety Requirements Document

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