

NRC INSPECTION MANUAL

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INSPECTION PROCEDURE 46061

STRUCTURAL MASONRY CONSTRUCTION

PROGRAM APPLICABILITY: 2512

46061-01 INSPECTION OBJECTIVES

01.01 Determine by review whether quality assurance plans, instructions, and procedures have been established.

01.02 Determine by observation of ongoing or completed work if licensee commitments are being met.

01.03 Determine by reviewing portions of the as-built facility if construction was consistent with NRC requirements and licensee commitments.

Inspection Schedule

<u>Inspection</u>	<u>May Be Started</u>	<u>Must Be Started</u>	<u>Must Be Completed</u>
First	Before masonry work is started	Before work is 30% complete	Before work is 75% complete
Second	After work is 50% complete	After work is 75% complete	When work is completed + 3 mo.

It is intended that the requirements of this procedure be applied to construction initiated after issuance of this procedure or, as deemed appropriate, to completion of remaining inspection followup of licensee actions on IE Bulletin 80-11, Masonry Wall Design. It is anticipated that this inspection procedure will be performed at least twice. The first inspection, conducted at the start of masonry construction, should emphasize program and procedure reviews and observation of work, Sections 02.01 and 02.02 below. The second inspection, conducted at the end of masonry construction, should concentrate on as-built inspections and documentation reviews, Section 02.03 below.

46061-02 INSPECTION REQUIREMENTS

02.01 Review of QA Program

- a. Ascertain whether quality assurance plans, instructions, and procedures have been established and whether they conform to the QA program described in the SAR. The QA program should cover those aspects of the masonry walls that are safety-related. Masonry walls of concern are either

located in proximity to safety-related components or have safety-related components attached to these walls.

- b. Review the licensee's FSAR and response to IE Bulletin 80-11 for consistency to the quality assurance plans and instructions and procedures.
- c. Determine if the procedures, plans, and specifications incorporate licensee commitments and NRC recommendations, including IE Bulletin 80-11 on masonry wall design.

02.02 Observation of Work. Observe ongoing work or completed work in the above activities to determine if the licensee's commitments are being met.

If the site requires special inspection of masonry activities, then ensure that the special inspection requirements are being satisfied. Make sure that the special inspection activities are not limited to work surveillances only, but also include inspection recommendations outlined in ACI 531R-79 and the QC procedures.

The inspection attributes should cover, as necessary, control of specific materials and specific processes or activities listed below to ensure that materials and construction methods meet the design drawings and specifications.

a. Control of Specific Materials

- 1. concrete block
- 2. reinforcing steel or other steel shapes used to anchor or reinforce the masonry walls
- 3. mortar and grout mix materials

b. Control of Specific Processes or Activities

- 1. workmanship (e.g., mortar and grout placement, block placement, proper bonding, minimal voids and shrinkage, rebar location in concrete block cell and along wall, and adequate anchorage and proper splicing of rebar)
- 2. production and testing of mortar and grout
- 3. production, testing, and evaluation test results of masonry prisms, if applicable

02.03 Review of As-Built Portions. Review portions of the as-built facility for the applicable activities listed in Section 02.02 to determine if construction was consistent with NRC requirements and licensee commitments. Review selected QA records to determine whether the applicable quality requirements have been met. Review selected nonconformance reports for this area to determine whether deficiencies were properly evaluated and, if necessary, design changes properly made.

46061-03 INSPECTION GUIDANCE

General Guidance. Applicable portions of the SAR, the SER, and NRR/licensee questions and answers should be reviewed to determine those licensee commitments relative to construction and inspection requirements. The inspector should then utilize these documents during the review of the construction specifications. The implementing QA/QC and construction procedures subsequently should be reviewed with the applicable

specification and QA manual in mind. Most of this review can be completed during inspection preparation after these procedures have been obtained from the site.

Before observing the activities in Section 02.02, above, review the pertinent construction and QC procedures as well as applicable codes, standards and regulatory guides. The American Concrete Institute (ACI) 531R-79, Commentary on Building Code Requirements for Concrete Masonry Structures, and the International Conference of Building Officials (ICBO), Uniform Building Code (UBC), should be utilized during the conduct of this inspection; however, the licensee's specific documents control the construction and inspection procedures.

03.01 Specific Guidance. Inspection Requirement 02.01. The construction specification must translate the design requirements into details sufficient to define the acceptance testing requirements and it should specify the personnel and interface responsibilities required to define, control, and resolve field problems or design problems that are evidenced during construction.

QA/QC procedures must provide for effective inspections to ensure that work is performed in accordance with specification requirements. Inspections should require verification of specified controls and should not be accomplished merely by surveillance. Laboratory and field testing procedures must provide for verification of correct material usage, correct selection of reference standards, and should prohibit discretionary selection of inspection and testing parameters on the part of inspectors. Construction procedures must reference the required inspection hold points and also must address the quality assurance department authority to stop work.

46061-04 REFERENCES

ACI 531-79, Building Code Requirements for Concrete Masonry Structures.

ACI 531R-79, Commentary On Building Code Requirements for Concrete Masonry Structures (ACI 531-79).

ASTM C90-70, Specification for Hollow Load-Bearing Concrete Masonry Units.

ASTM C129-73, Specification for Hollow Non-Load-Bearing Concrete Masonry Units.

ASTM C145-71, Specification for Solid Load-Bearing Concrete Masonry Units.

ASTM C270-73, Specification for Mortar for Unit Masonry.

ASTM C476-71, Specification for Mortar and Grout for Reinforced Masonry.

ICBO UBC, Uniform Building Code.

IE Bulletin No. 80-11, Masonry Wall Design.

SAR, Chapters 3 and 17, including pertinent codes and standards referenced in the Chapters.

Regulatory Guide 1.38, Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water-Cooled Nuclear Power Plants.

Regulatory Guide 1.58, Qualification of Nuclear Power Plant Inspection, Examination and Testing Personnel.

Regulatory Guide 1.88, Collection, Storage and Maintenance of Nuclear Power Plant Quality Assurance Records.

Regulatory Guide 1.123, Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants.

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