
INSPECTION PROCEDURE 69020 APPENDIX C

INSPECTION OF STRUCTURAL STEEL AND SUPPORTS AT NON-POWER PRODUCTION AND UTILIZATION FACILITIES

Effective Date: March 25, 2025

PROGRAM APPLICABILITY: IMC 2550

69020.C-01 INSPECTION OBJECTIVES

- 01.01 To determine if work and related activities associated with safety-related structural steel and supports for structures at non-power production and utilization facilities (NPUF) are being performed in accordance with regulatory requirements, the licensing basis, specifications, drawings, and work procedures.
- 01.02 To determine if the applicant/licensee's system for preparing, reviewing, and maintaining records relative to safety-related structural steel and supports activities is functioning properly, and to determine if the records reflect work accomplishment consistent with specifications and procedures.
- 01.03 To verify the as-built condition of safety-related structures meet the specified design requirements, specifications, and drawings. For work related to foundations and buildings, also refer to Appendix A of this inspection procedure (IP). For work related to concrete structures, also refer to Appendix B of this IP.
- 01.04 To determine if the implementation of the quality assurance program (QAP) related to work activities for safety-related structural steel and supports is effective and to verify that deviations from requirements are appropriately resolved.

69020.C-02 INSPECTION REQUIREMENTS

- 02.01 For the structural steel and supports for seismic structures selected for inspection, determine if adequate procedures in the following areas are compatible with the QAP and prescribe adequate methods to meet the applicable specifications:
 - a. use of specified materials and components
 - b. installation and erection
 - c. inspection, testing, non-destructive examination (NDE), and records
- 02.02 Determine if the applicant/licensee has an established audit program (including plans, procedures, and audit schedule) for assessing the adequacy of work control functions and requirements in their licensing basis for structural steel and supports for seismic structures. Determine if examination, inspection, and test personnel associated with performing tests and inspections of structural steel and supports for seismic structures are qualified and/or certified to perform their assigned work.

- 02.03 Determine if the following structural steel and supports for structures are being controlled and accomplished in accordance with the requirements of the documents reviewed in 02.01, above:
- a. use of specified materials and components
 - b. installation and erection
 - c. inspection, testing, NDE, and records
 - d. configuration management
- 02.04 Review the documentation generated for the structural steel and supports for seismic structures. Determine if the applicant/licensee/contractor system for documenting safety-related work is functioning properly. Records should be complete, reviewed by quality control, engineering personnel, or designee, and readily retrievable. Review safety-related records in the following areas:
- a. receipt inspection and material certification (if applicable)
 - b. installation inspection
 - c. nonconformance/deviation record(s)
 - d. training/qualification records of craft, and quality inspection personnel (as required)
 - e. configuration management records

69020.C-03 INSPECTION GUIDANCE

General Guidance

Inspectors should review the facility description in the safety analysis report (SAR) or equivalent and be familiar with the safety-related seismic structures, and associated structural steel and supports, being constructed at the site. The purpose of these as-built inspections is to verify that the assumptions and critical attributes reviewed during the licensing review process remain valid; the design was appropriately translated to construction specifications; the licensee/applicant constructed the facility in accordance with these specifications; and any changes made to the design described in the SAR comply with the licensee's configuration management program.

Inspectors should also be familiar with the licensee's QAP and use IP 69021, "Inspections of Quality Assurance Program Implementation During Construction of Non-Power Production and Utilization Facilities," to perform "vertical slice" inspections as described in the body of this IP. Inspectors should complete this appendix by inspecting the attributes listed in this appendix for structural steel and supports work on-site at the time of the inspection with a focus on safety-related structures. Inspectors should also coordinate this appendix with inspection of foundations and buildings (IP 69020, Appendix A), and structural concrete (IP 69020, Appendix B) for efficiency, if possible.

Inspectors should contact the applicant/licensee prior to the on-site inspection to help determine which structures and associated structural steel and supports are to be inspected. Observation during in-progress construction of the buildings is desirable but not required. If necessary, inspectors may select completed structural steel and supports for inspection. Inspectors should not attempt to inspect all the buildings on the site but may expand the scope of inspection if significant concerns with the applicant/licensee's control of structural steel and supports construction arise.

Inspectors should collect applicant/licensee procedures, building specifications, and work completion records in advance, if possible. If unable to review these documents in advance of the on-site inspection, then the licensee should be notified that these documents, and any other relevant documents, should be available when the inspector(s) arrives at the site.

Inspectors should choose one or more safety-related structural steel and supports and review the areas listed in Sections 02.01 through 02.04 to the extent practical and may use their judgment in determining which areas to concentrate on if time is limited. However, inspectors should gain an understanding of the applicant/licensee's program to the extent necessary to determine if the licensee conforms to regulatory requirements. Not all the items in the inspection requirements section will be applicable or required in all situations for all safety-related structures and associated programs.

03.01 Inspection Requirement 02.01

Review the construction specifications related to structural steel and supports activities and determine if the specified technical requirements conform to the commitments contained in the licensing basis. Determine if appropriate and adequate procedures in the following areas are compatible with the quality assurance program, and prescribe adequate methods to meet the construction specifications:

1. Use of specified materials and components,
2. Installation and erection, and
3. Inspection, testing, NDE, and records.

03.02 Inspection Requirement 02.02

- a. Review applicant/licensee's established audit program (including plans, procedures, and audit schedule) for assessing the adequacy of work control functions and requirements in their licensing basis, for structural steel and supports construction activities.
- b. Review audit program to verify if examination, inspection, and test personnel associated with performing tests and inspections of structural steel and supports construction activities are qualified and/or certified to perform their assigned work.
- c. Verify records establish that the required audits were performed and that deficiencies identified during audits were appropriately resolved.

03.03 Inspection Requirement 02.03

Determine if the following applicable structural steel and supports construction activities are being controlled and accomplished in accordance with the requirements of the documents reviewed in 02.01, above:

- a. Use of Specified Materials and Components. Verify the following:
 1. Type and grade of materials are as indicated in specifications and drawings.
 2. Certificates of conformance or mill test reports meet the proper specifications or physical and chemical requirements, including impact tests.

3. The items selected for review during this inspection should include the following, as appropriate for the specific site design:
 - a) steel plates and shapes;
 - b) pipes and tubes;
 - c) forgings and castings;
 - d) bolts and studs;
 - e) weld filler-metal;
 - f) coatings; and
 - g) other related materials.
- b. Installation and Erection. Verify that the following items are implemented:
 1. The component or support is being erected in accordance with the most current specifications and drawings.
 2. The layout crew's instruments and tapes are calibrated.
 3. Fit up and alignment meet the tolerances in the specifications and drawings.
 4. Components are being properly handled (including bending or straightening).
 5. Specified clearances are being maintained.
 6. Edge finishes and hole sizes are within tolerances.
 7. Anchor bolts, embedded weldments, liner plate anchors, concrete anchors, and studs are of the proper material and grade and have been properly located, tested and examined.
 8. Connection joints in structures are usually the area of installation problems and also are generally not given the same engineering attention as other structural steel items. Therefore, it is important to select, for review, a few connections in each structure or supports:
 - a) For bolted connections, ensure that the bolts, nuts, and washers are of the specified type and grade; torque wrenches are calibrated in accordance with approved procedures; other test and measuring equipment used in the bolting process are calibrated; and thread engagement is as specified.
 - b) For friction type connections, ensure that the craft personnel follow the procedures properly, so that the bolts will have the required bolt tension. For instance, when the turn of nut method is used, make sure enough bolts are brought to a "snug tight" condition, to ensure that the parts of the joint are brought into good contact with each other.
 - c) For sliding-type connections, ensure the craft personnel follow the procedures properly so that the bolts are not over-tightened and so that bolts are not at the end of slots, preventing movement of the connection.

9. The items selected for review during this inspection should include the following, control of specific processes or activities as appropriate for the specific site design:
 - a) repair;
 - b) cutting, forming, bending, and aligning;
 - c) erection and bracing;
 - d) welding - For cross flange welding on loaded members, be sure that the procedures or engineering evaluations ensure that the structural integrity of the loaded beams or columns affected will not be compromised. (If applicable, construction codes may reference American Welding Society (AWS) D1.1, Structural Welding Code); and
 - e) bolting - Ensure that the procedures will provide the required bolt tension. For instance, when the turn of nut method is used, the procedures should make sure enough bolts are brought to a "snug tight" condition so that the parts of the joint are brought into good contact with each other.
- c. Inspection, Testing, NDE, and Records. For inspection, testing, NDE, and records, verify the following items:
 1. Inspections are performed at the specified frequency, in accordance with appropriate codes, specifications and procedures, and adequate acceptance criteria are specified.
 2. Accurate records are developed in accordance with procedures.
 3. Proper and calibrated equipment is used as required.
 4. Personnel conducting testing and NDE are qualified as required.
 5. The items selected for review during this inspection should include the following, control of specific processes or activities as appropriate for the specific site design:
 - a) heat treatment;
 - b) post weld heat treatment;
 - c) impact testing;
 - d) examination;
 - e) radiography; and
 - f) other NDE methods.
- d. Configuration management. For the activities observed during Inspection Requirement 02.03, verify if changes occurred during these construction activities, the applicant/licensee properly controlled and documented these changes for engineering review, approval, and subsequent incorporation into the final as-built drawings. Verify these actions were completed in accordance with their procedures and quality assurance program.

03.04 Inspection Requirement 02.04

Determine if the applicant/licensee/contractor system for documenting work on safety-related structural steel and supports activities, is functioning properly.

- a. Receipt Inspection and Material Certification. Records confirm that required material characteristics, performance tests, nondestructive tests, and other specification requirements were met. Verify the acceptability receipt inspections specification requirements, and for storage, verify that controls, markings, protection, and segregation are maintained.
- b. Installation Inspection. Records confirm that specified materials and components were installed as specified and that the required construction inspections were performed, and acceptance criteria are defined.
- c. Nonconformance/Deviation Record. Records include current status of these items. Nonconformance reports include the status of corrective action or resolution, (e.g., determine if adequate corrective action is being taken when moisture density test results are not within tolerance or acceptance criteria.)
- d. Training/Qualification Records of Craft, and Quality Inspection Personnel. Records establish that quality inspection personnel are adequately qualified for their assigned duties and responsibilities and that craft personnel have been trained in their assigned tasks.
- e. Configuration Management Records. Review and evaluate a selected sample of configuration management records, and determine if:
 1. Records associated with design and field changes, as well as related work and IP changes, reflect that timely review and evaluation of design and field change documents have been performed by personnel who are qualified.
 2. Records of periodic inspections ensure that only the most recent approved documents, including design changes, were used in the field.
 3. Design changes are subject to adequate design control, including consideration of the impact of the change on the overall design and on as built records.
 4. Records of nonconformance's to design requirements include preparation of a nonconformance report even if the nonconformance is resolved through the design-change process.

03.05 Additional Guidance

Note: Personnel Interviews. Informal interviews with field-craft and inspection personnel may be randomly conducted to determine how well employees know the requirements of their work activity. Determine if enough qualified quality control inspection personnel are at the construction site, commensurate with the work in progress, and adequately performing their assigned duties through the established organizational structure.

Prevalent Errors and Concerns. Prevalent errors and recent concerns are areas in which the inspector should be alert to potential generic issues. These areas include:

- a. Storage of structures and support components should ensure that contact with ground surfaces is avoided.
- b. Inattention to damage and normal wear and tear of protective coverings may lead to substandard or unacceptable weather protection. The licensee's maintenance of protection (canvas or plastic covering) should be reviewed.
- c. In the area of maintenance of material identification, damage by handling or weather frequently makes paper tags illegible. Paper tags are usually considered to be inadequate.
- d. The use of galvanized bolts and nuts in bolted connections may require thread lubricant, to ensure that minimum torque or pretension requirements are met. There may be frequent adjustments of the minimum torque value.
- e. Piece-work traceability of structural steel and American Society of Testing and Materials (ASTM) A325/A490 bolting material has been a problem in the recent past.
- f. Deficient alignment or fit up for welded connections has caused improper welding practices.
- g. There have been instances of cutting or edge finishes not being in accordance with specifications or drawings.
- h. Instances of weld undercut have gone undetected by construction quality inspections.
- i. Uncalibrated torque wrenches have been used. There should be provisions for the evaluation or reverification of the activities performed by the uncalibrated torque wrench since the last calibration.
- j. Difficulties in using the turn of nut method, for bolted connections, in defining the initial "snug tight" condition, and inadequate gauge marks to determine the amount of additional turns after "snug tight." Actual observation may be the only means of verifying the proper implementation the turn of nut method.
- k. Welding across the flange of loaded members without engineering evaluation is only to be done under controlled conditions.

69020.C-04 RESOURCE ESTIMATE

Completion of this appendix requires 40–80 hours of direct inspection. Inspection preparation, including review of applicable licensing basis, safety analysis report (SAR), and codes and standards, is not included in this estimate.

69020.C-05 PROCEDURE COMPLETION

This inspection procedure appendix is complete when one inspection sample is complete. Refer to Section 69020-05, "Procedure Completion," of IP 69020, "Inspection of Safety-Related Items

(and Services) During Construction of Non-Power Production and Utilization Facilities,” for details on what constitutes a completed inspection sample. Inspectors are not expected to complete every activity in the appendices of this IP. Instead, inspectors should prioritize inspection activities based on 1) importance of the activity to safety, 2) availability of the onsite activity at the time of the inspection, and 3) available inspection resources. This appendix need not be completed if there are no safety-related items (or services) covered by this appendix at an NPUF.

69020.C-06 REFERENCES

Refer to licensing basis requirements for applicable codes and standards for each fuel facility.

American Welding Society (AWS) D1.1, “Structural Welding Code”

END

List of Attachments:

Revision History for IP 69020 Appendix C

Attachment 1 – Revision History for IP 69020 Appendix C

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number (Pre-Decisional, Non-Public)
N/A	ML24264A195 03/25/25 CN 25-005	Procedure was rewritten for conformance with changes to IMC 2550 and is now a standalone appendix to IP 69020.	N/A	N/A