INSPECTION OF THE ITAAC-RELATED WELDING AND NONDESTRUCTIVE EXAMINATION PROGRAMS

PROGRAM APPLICABILITY: IMC 2503

65001.B-01 INSPECTION OBJECTIVES

This inspection procedure (IP) is focused on assessing the generic welding attributes associated with welding activities and is intended to be used together with the IP applicable to the technical activity being inspected. Corresponding technical inspection requirements are addressed in the companion IP related to the planned inspection activity.

The inspection of generic welding characteristics generally includes verification of programmatic controls that ensure adequacy of welder and welding procedure qualification, quality assurance (QA), process controls, postweld heat treatment (PWHT), nondestructive examination (NDE), and records. Accordingly, the objectives of this IP are as follows:

01.01 To ensure that the welding activities are completed in conformance with applicable Code requirements.

01.02 To evaluate the weld quality and condition of structures, systems, and components (SSC) and other equipment subject to welding.

01.03 To determine whether records establish an adequate basis for the acceptance of inspection, test, analysis, and acceptance criteria (ITAAC) associated with welding.

01.04 To verify that the welding and NDE programs meet requisite design and QA requirements.

01.05 To evaluate the adequacy of the implementation of the QA program requirements and corrective action program related to welding activities.

65001.B-02 INSPECTION REQUIREMENTS AND GUIDANCE

The application of this IP is intended for piping, support and component welding performed in accordance with the American Society of Mechanical Engineers (ASME) Code; for structural welding and component support welding performed in accordance with the American Welding Society (AWS) Structural Welding Codes (for example AWS D.1.1 and AWS D1.6; and storage tank fabrication welding in accordance with other codes such as API 650, “Welded Tanks for Oil Storage,” and AWWA D100, “Welded Steel Tanks for Water Storage.”

To ensure that the inspection objectives are met, it is expected that this procedure will be applied on an ongoing basis, as needed. Implementation of this procedure will provide assurance that welding activities selected for inspection are effectively being accomplished. Inspectors implementing this procedure should be familiar with the applicable Code edition requirements, as well as the facility licensing basis documents, and QA program. The inspector should be familiar with welding techniques, their limitations, and evaluations.

Review the ITAAC Matrix for the licensed facility to be inspected to determine the ITAAC residing in Column [B] for "Welding." Selection of inspection samples should include a sufficient variety of welding processes and material combinations and should include each contractor performing ITAAC-related welding. For the samples selected, assess the adequacy of the associated welding program by implementing the following inspections.

02.01 Program and Procedures Review. Verify the following:

a. All contractors/subcontractors with responsibilities in the selected area of welding have approved procedures describing administrative controls and work processes.

b. Procedures prescribe adequate methods of QA to ensure the as-built condition of SSCs meets engineering requirements.

Guidance. Ensure that QA procedures include appropriate acceptance criteria for determining that the prescribed activities are satisfactorily accomplished. The procedures should specify the base metals, welding filler materials, fluxes, gases, and backing materials are of the specified type and grade, have been properly inspected, tested, identified, and are traceable to test reports or certifications.

c. Procedures require that equipment and gauges used for process monitoring are calibrated and maintained at prescribed time intervals.

d. Procedures are established for ensuring that craft personnel are qualified to perform their assigned work.

e. Procedures are established for ensuring that QA inspection personnel performing quality related welding and examination activities are qualified to perform their assigned work.

Guidance. Quality Control (QC) personnel require specific training in their area and eye exams. Additionally, verify the written practice for qualification of NDE inspectors implements the requirements of American National Standards Institute (ANSI)/American Society for Nondestructive Testing (ASNT) CP-189 for ASME Section XI or ASNT Recommended Practice No. SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing" for ASME Section III.

f. Procedures are established for the storage, issuance, and control of welding filler metal.

Guidance. The disbursement of welding materials must be carefully controlled. Unused materials should be scrapped or returned to the storage area in accordance with approved procedural controls. Controls should include maintaining identification and re-baking of coated electrodes when applicable. Coated electrodes and fluxes have specific temperature requirements and should preferably be kept in unopened containers. The storage area

should be kept locked and only authorized personnel allowed entry. The inspector should review the procedure and perform a walk-down of the storage room.

02.02 Welding Procedure Qualification. Verify the following:

a. Welding Procedure Specifications (WPSs) are readily available, signed and approved by the applicable authority, and reference the applicable procedure qualification records (PQRs).

b. The WPS is written in accordance with the applicable edition of Section IX or the applicable AWS code and all essential and nonessential variables are addressed by a range or specific value.

c. The WPS is qualified in accordance with the applicable codes by PQRs which document the specific values for all essential variables and required testing. For AWS welding, prequalified procedures meet the code requirements for prequalified procedures.

d. The WPSs and supporting PQRs address all additional requirements, such as supplemental essential variables (applicable when impacts tests are required by the Construction Code, e.g. ASME Code Section III) for the welding processes authorized by the WPS, and any other additional requirements from the Final Safety Analysis Report or design specifications.

Guidance. WPSs are written based upon the weld process, base materials to be welded, thickness of material to be joined, type of joint, type of weld, size of weld, and position of welding. The WPS specifies the welding materials to be used (electrode, filler metal, flux, shielding gas), electrode diameter, voltage, current (amperage) or wire feed speed, travel speed, shielding gas flow rate, minimum (and sometimes maximum) preheat, maximum interpass temperatures, location, number of layers, and other pertinent information specific to the weld to be made. All WPSs, whether pre-qualified or qualified by test, must be in writing.

Both the ASME and AWS Codes require the use of WPSs. The inspector should review the WPS for conformity to the welding code and applicability to the joint to be welded. The inspector should be familiar with the Code qualification requirements and should know which welding attributes, or variables, may be changed in the WPS without requiring re-qualification of the procedure. The WPS also provides other attributes that should be subject to inspection. For structural steel welding, when the WPS does not meet the prequalification requirements of the AWS Code, the WPS must be qualified by testing. Documentation of the WPS used and corresponding test results must be documented in the form of a PQR. Qualified WPSs must reference the applicable PQRs, which must be in writing and available for inspection.

02.03 Welder Qualification. Verify the following:

a. Welding personnel have demonstrated their skill by performing specific performance qualification tests prescribed by the applicable Code.

b. Performance qualification tests are fully documented. The welder qualification procedures include adequate provisions to verify the identity of the welder who is undergoing the performance qualification test.

c. Verify that the welder has used the welding process within the last six months to maintain their qualification. Performance qualification expires 6 months following testing unless the welder has used the process during that time period.

d. Welders who are qualified for a given procedure are required to re-qualify if an essential variable for the procedure is changed beyond the limits specified in the applicable Code.

e. Successful qualification by welder performance qualification testing demonstrates the capability of a welder to apply the welding procedure with success under the specified test conditions. When a specific production weld is to be performed as a first-time application or under difficult conditions including limited access, consideration should be made to provide the welder with sufficient useful weld mockups and practice opportunities to eventually provide an acceptable production weld.

Guidance. The type and number of qualification tests for welders as well as the acceptance criteria are given in the appropriate Code, either ASME Section IX, AWS D1.1, D1.6 or AWS B2.1. The inspector should become familiar with these requirements prior to verifying welder qualifications. Welders are qualified by process, position, materials, weld metal deposit thickness, pipe diameter, and type of weld (either groove or fillet). Welding personnel qualified for groove welding in a given position and process are also qualified for fillet welding in the same position and process, but not vice-versa. Additional position classifications apply for tubular construction. Qualification is also dependent upon thickness of the test section. AWS D1.1 Table 4-8 provides information regarding the cross-over of welding performance qualification tests and the welding products, thicknesses, and positions qualified.

Verify that the licensee and/or contractor is monitoring the performance of each welder. If a welder consistently produces poor quality welds, the program should provide for remediation steps, retesting, and/or revocation of the welder's qualification. If a performance quality issue is identified, the welder's qualification should be revoked until additional testing confirms adequate capability to perform the weld process in question.

Qualification testing can be performed at the same time and as part of the WPS qualification. Reliance upon qualification testing by independent testing laboratories, welding vocational schools, industry associations, and the AWS Certified Welder program are acceptable only if the testing is done and documented in accordance with all the parameters of the WPS to be used during production.

02.04 Welding Observation. Observe welding in process and verify that welding complies with the requirements in the WPS and includes the following controls:

a. Work is conducted in accordance with a "traveler," weld data record or similar document which coordinates and sequences all operations, references procedures, drawings, and instructions, establishes hold points, and provides for production welding and inspection signoffs.

Guidance. This document, along with detailed drawings and welding procedures, should be required to be available at the work location. Welding technique and sequence requirements should be specified for multiple pass welds.

b. The weld joint is sufficiently protected from inclement conditions. Welding is not performed when the ambient temperature in the vicinity of the weld is below the WPS limit without preheat or when surfaces are wet or exposed to rain, snow, dust, or high wind.

Guidance. The welding environment (temperature, wind, rain and snow) should be specified in a procedure. See AWS D1.1, Section 5.12 for typical acceptance criteria. Gas-shielded welding processes should not be performed in winds (including fans) exceeding 5 miles per hour (mph) because wind blows away the necessary shielding gas and contributes to poor weld quality and poor mechanical properties. For self-shielded welding processes, the maximum wind speed is not typically specified, however welding should be discontinued if wind is in excess of 20 mph. Wind breaks may be used to allow welding but care should be taken to ensure their effectiveness.

Care should be taken to ensure that moisture has not been trapped between members that are to be welded and that moisture has not been introduced into previously fit-up joints prior to final welding.

c. Surfaces to be welded must be smooth, uniform, and free from significant surface discontinuities such as cracks or seams, and free from paint, oil, rust, scale, slag, grease, moisture or other harmful foreign materials that are detrimental to welding for usually at least ½ to 2 inches from the weld joint. Any solvents used for cleaning weld surfaces must be approved for use. These requirements are described in ANSI Z49.1, "Safety in Welding, Cutting and Allied Processes" and "Material Safety Data Sheets."

Guidance. Welding procedures should address interpass cleaning, grinding of starts and stops, and peening (if applicable). In addition, cleaning of oxides, or slags shall be performed on the welding surface after each pass or when welding is stopped. Each of these processes should only be performed in accordance with approved welding or site procedures.

d. Weld joint geometry, including root opening and fit-up tolerances, are as specified.

Guidance. Alignment of sections at edges to be butt welded should have a maximum offset not greater than allowed by the applicable Code. Parts to be joined with a fillet weld should be as close as practicable. If the gap is greater than $^{1}/_{16}$ inch, the leg of the fillet weld should be increased by the amount of separation, but in no case should the maximum gap exceed $^{3}/_{16}$ inch. For socket welds, the pipes should be withdrawn a distance of approximately $^{1}/_{16}$ inch away from contact between the end of the pipe and the face of the shoulder of the socket. The depth of insertion of pipe within the socket should not be less than $^{1}/_{4}$ inch. Back gouging, if applicable, should only be performed in accordance with the WPS. Peening should not be allowed except when approved on the root and surface layer of a weld nor on the base metal at the edges of the weld. This operation could mask defects. Peening is allowed on weld surfaces in contact with reactor coolant when applied to impart compressive stresses to reduce the susceptibility of a weld to stress corrosion cracking.

e. Tack welds are made by qualified welders in accordance with an approved WPS. Temporary attachments such as bridging bars or fit-up clips have been attached by qualified welders in accordance with a qualified WPS and using approved materials.

Guidance. Temporary or tack welds need to be subject to the same welding procedure requirements as the final weld. Acceptable tack welds may be incorporated into the final weld.

Temporary attachments, arc strikes and weld splatter should be removed and inspected in accordance with approved procedures.

f. Shielding gas flow and composition should be as specified in the WPS.

Guidance. Shielding gas should conform to the latest edition of the applicable ANSI standard. Flow meters should indicate the gas type for which they are applicable and should have appropriate conversion factors if a different gas or gas mixture is used. For argon, the inlet should be at the bottom and the outlet vent at the top. When purge gas is required, it should be maintained for a minimum of $^{3}/_{16}$ inch or three layers of weld. Purge gas should be used in accordance with the applicable procedure and protection should be provided to shield the welding operation from adverse environmental conditions.

g. The temperature of the base material at the joint prior to welding meets the preheat requirements of the WPS.

Guidance. When the base material temperature is below the minimum preheat temperature specified in the WPS, the material must be heated so that the surfaces to be welded are at or above the minimum preheat temperature prior to welding. The minimum preheat temperature should be maintained for a distance of at least 3 inches on each side of the weld joint and in advance of the welding. Preheat temperatures should be checked using a surface pyrometer, non-mercury type surface thermometer, close-range focused infrared device, temperature indicating crayons, or other approved device. Temperature indicating crayons should not be used directly in the weld zone. Procedures should specify acceptable preheating methods and provide requirements for monitoring and recording temperature before, during and, if specified, after welding.

h. The welding consumables utilized are in compliance with the WPS, manufacturer's recommendations, and the applicable Code specification.

Guidance. If low-hydrogen electrodes are used, verify that their distribution, handling, and storage are in accordance with the applicable WPS. Electrodes should be stored in their original manufacturer-sealed containers until ready for placement in storage ovens or use. Exposure of electrodes to the environment must meet time limitations. Electrodes should only be used in the qualified positions and within the welding parameters specified by the WPS.

i. The interpass temperatures are checked to ensure that they do not exceed the maximum value specified in the WPS.

Guidance. The interpass temperature for welding austenitic stainless steels and high nickel alloys should not exceed 350° F unless otherwise specified on the WPS for ASME welding. For AWS D1.1, interpass temperature should be taken 3 inches from the weld joint, provided the thickest material joined is 3 inches or less in thickness. If the temperature of the weld reaches the maximum interpass temperature, the weld should be allowed to cool down but not below the minimum preheat temperature prior to the resumption of welding.

j. Welding variables specified in the WPS are routinely verified.

Guidance. Voltage and amperage range gauges located on the welding power supply are typically for reference only. Checks for documentation purposes should be performed using

calibrated voltage and amp meters or approved welding parameter equipment. Because of welding lead losses, measurement should be as near the arc as practical. When applicable, measurement of heat input should be periodically taken by QC. This will include measuring the volts, amperes, and travel speed or volume of weld metal.

k. If required, PWHT is performed in accordance with approved procedures using calibrated equipment.

Guidance. PWHT must meet the heating and cooling rates, metal temperature, temperature uniformity, and control limits specified in the applicable Code. Temperature and hold times are specified in the Codes based on material type and thickness (See NX-4600 for ASME welding and Section 4 for AWS welding). Components must be adequately instrumented to provide time-temperature recordings for duration of the entire heat treatment cycle. Sufficient thermocouples should be used to measure the hottest and coldest temperatures of the weld during holding at temperature. Temperature variation measurements must also be adequate to ensure that minimum and maximum PWHT temperatures are followed. Measures must be taken to avoid sensitization of austenitic stainless steel and high-nickel steel alloys during stress relief treatments. This generally involves provisions which preclude furnace stress-relieving of austenitic stainless steel components or parts and limits their exposure to the sensitization temperature range of 800 °F to 1500 °F.

l. Each weld must be traceable to the welder.

Guidance. The performance of each welder should be assessed as production continues. Controls should be in place to require retraining and/or re-qualification of welders not meeting quality standards. Traceability should be maintained through the use of low stress stamps or permanent documentation such as a weld traveler.

m. Weld repairs are fully documented as to apparent cause and extent. Welding repair procedures have limits on number of cycles of repair allowed. For welds that require PWHT, the total number of allowed repair cycles is limited by the accumulated PWHT time at temperature. The PQR tested weld must include at least 80 percent of the aggregate times at temperature of the production weld.

Guidance. Welding repair procedures should include requirements for defect removal, cavity preparation for welding, and number of repair cycles allowed prior to requirement for an engineering evaluation. Residual stresses from welding can be the highest stresses introduced into a weld joint. This is particularly true in a highly restrained weld such as a localized repair area. Residual stresses on surfaces in contact with aggressive environments (i.e., reactor coolant) should be addressed in the repair procedure.

02.05 QC Inspection. Verify the following attributes for weld acceptance and QA:

a. Inspectors performing visual weld inspection are qualified.

Guidance. Visual welding inspection personnel for AWS welds should be qualified under AWS D1.1. Acceptable qualification bases under AWS D1.1 include: current or previous certification as an AWS Certified Welding Inspector (CWI) or an engineer or technician who, by training or experience, or both, is competent to perform inspection work. For the latter case, programmatic requirements should be established for minimum levels of training, experience, and testing by written examinations and performance demonstrations.

b. Inspections include both in-process and completed weld inspections and contain appropriate inspection hold points.

Guidance. Inspections should verify that welding materials are clearly identified and controlled throughout the entire welding process from storage until the material is consumed in the welding process.

Inspections should verify that welding equipment, including power cables and gas lines, are in good condition. Inspectors should verify that ammeters and voltmeters have been calibrated in accordance with applicable procedural requirements.

c. Verify that visual weld IPs ensure that the size, length, and location of welds conform to design requirements.

d. Verify that acceptance criteria for completed welds are in accordance with the applicable Code. Visual inspection criteria prohibit cracks and lack of fusion, and permit only limited amounts of undercut, porosity, reinforcement, and length and amount of undersized fillet weld.

e. Weld edges, fit-up, and profile tolerances are specified and are measured with suitable gauges. Weld defect removal and weld repairs are subject to a process control system that utilizes approved procedures.

Guidance. Root openings that are too narrow must be increased in width to the WPS required root opening. Narrow root openings contribute to trapped slag, poor penetration and lack of fusion near the root. Root openings that are too wide increase the weld volume, increasing heat input and distortion, the potential for drop through and unfavorable root geometry, and increase the risk for lamellar tearing in T-joints. A root pass placed across a wide root opening may develop shrinkage cracks in the heat-affected zone or in the throat of the weld.

For welds with unacceptable convexity, excessive reinforcement, or overlap, the weld should have the excess weld metal removed by grinding. Grinding on the inside diameter of stainless and dissimilar metal piping has been shown to increase the potential for cracking.

For undersized welds, including craters, the weld should be filled to the required size. For excessive undercut, the undercut portion should be filled using an approved repair procedure. For cracks, lack of fusion, and excessive porosity, the unacceptable portion must be completely removed and replaced using approved repair procedures. Additional controls must be in place when repairing cracks. The end of the crack should be located using PT or MT, and then crack removal should begin approximately 2 inches from the end of the crack and then work toward the center of the crack. Starting within the crack may cause the crack to grow during removal.

For ASME welding, repairs to the base metal must be properly documented in a special report as required by Section III of the ASME Code (NB 4132). Repairs or modifications to ASME Code-stamped components are properly documented in a special report as required by ASME Sections III and XI.

f. Parts or weld joints that have been inspected and accepted are identified with a distinguishing mark or other recording method that identifies the inspector.

02.06 NDE Procedures. Verify the following:

a. NDE procedures are fully documented, controlled, and signed by the authorizing official.

b. NDE procedures implement all the requirements from the applicable article of Section V or AWS Code.

c. For ASME welds, the procedures have been demonstrated to the satisfaction of the ANI in a documented demonstration (i.e. qualification) record which details the performance of the exam.

d. NDE procedures also comply with any additional requirements imposed by the construction code.

e. The NDE procedures either contain or reference the appropriate acceptance criteria.

Guidance. Later editions of the ASME Section V give essential variables that work like welding procedure variables and require requalification if changed from those demonstrated. Because of the possibility of delayed hydrogen cracking, NDE of higher strength steels should include a 24 to 48 hour interval from welding completion before final acceptance testing. Final NDE should always be performed after PWHT.

02.07 NDE Inspector Qualifications. Verify the following:

a. NDE personnel have had documented experience and training in the NDE methods they are certified in which meets or exceeds the requirements of their organization's written practice for their level.

b. NDE personnel have passed the required practical, general, and specific exams as required by their organization's written practice.

c. NDE personnel have passed an eye exam in the last 6 months to verify visual acuity and color vision.

02.08 NDE Direct Observation. Observe NDE in process and verify the following (this step not applicable to radiography):

a. All steps and requirements in the procedure are followed.

b. The NDE examiner is using corrective lenses if they were used in his eye exam.

c. The examiner is only using colors that his eye exam found he could differentiate.

d. All materials used are the same type and brand as called for in the procedure and have not expired.

e. All measuring and testing equipment used has been calibrated.

f. The results of the exam are reported accurately, and all indications are reported on the report.

02.09 Record Review. Select one or several completed welds and verify the following:

a. Records are stored and maintained in accordance with Section 17 of the Quality Assurance Program and are readily available and legible. They are also reviewed and approved by the proper authority.

b. Records should provide complete traceability to all aspects of the welding and NDE process

Guidance. Record traceability is usually found in travelers and data sheets which should associate the weld number with the welders, filler metal and base metal heat numbers, NDE inspectors and inspection report numbers, welding and NDE procedures used, and nonconformances or repairs that were identified.

c. Records demonstrate compliance with codes and other requirements

Guidance. The inspector should review the records to verify they demonstrate compliance with requirements and stand as objective evidence of quality. Review the welder qualifications in accordance with (IAW) Section 02.03 of this procedure, welding procedures IAW section 02.02, and NDE procedures IAW ~~s~~Section 02.05. Certified Material Test Reports for the heat numbers of materials used should be available and show that the material was procured to Appendix B and Part 21 and tested and found to meet the requirements of ASME Section II or applicable AWS or American Society for Testing and Materials specifications. NDE reports should be completed and signed. They should contain all the data required by AWS or ASME Section V. Identified defects should be either repaired or dispositioned in accordance with the applicable requirements. Radiography reports should be traceable to the film or digital images which should show the permanent ID number in the film, have a density that meets code requirements, the proper IQIs are visible, and any indications should be listed and evaluated on the report.

d. Accepted, rejected, and repaired items are documented in written reports.

Guidance. Records of receipt inspections, including nonconforming material should be maintained. These records should confirm satisfaction of technical specification requirements.

65001.B-03 RESOURCE ESTIMATE

Inspection resources necessary to complete this IP are estimated to be 240 hours of direct inspection effort over the course of plant construction.

65001.B-04 REFERENCES

AWS Standard D1.1, “Structural Welding Code - Steel,” American Welding Society.

AWS Standard D1.3, “Structural Welding Code - Sheet Steel,” American Welding Society.

AWS Standard B2.1, “Specification for Welding Procedure and Performance Qualification,” American Welding Society.

ASME Code Section III, Division 1, “Rules for Construction of Nuclear Facility Components,” American Society of Mechanical Engineers.

ASME Code Section VIII, “Rules for Construction of Pressure Vessels,” American Society of Mechanical Engineers.

ASME Code Section IX, “Welding and Brazing Qualifications,” American Society of Mechanical Engineers.

ASME Standard B31.1, “Power Piping,” American Society of Mechanical Engineers.

ASME Standard B31.3, “Process Piping,” American Society of Mechanical Engineers.

ANS/AISC Standard N690-94, “Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities,” American National Standard/American Institute for Steel Construction.

ANSI/ASNT CP-189 and ASNT Recommended Practice No. SNT-TC-1A, “Personnel Qualification and Certification in Nondestructive Testing.”

ANSI Z49.1 “Safety in Welding.”

ACI 349, “Code Requirements for Nuclear Safety-Related Concrete Structures,” American Concrete Institute.

ASNT Recommended Practice No. SNT-TC-1A, “Personnel Qualification and Certification in Nondestructive Testing,” American Society for Nondestructive Testing.

Regulatory Guide 1.31, “Control of Ferrite Content in Stainless Steel Weld Metal.”

Regulatory Guide 1.34, “Control of Electroslag Weld Properties.”

Regulatory Guide 1.43, “Control of Stainless Steel Weld Cladding of Low-Alloy Steel Components.”

Regulatory Guide 1.44, “Control of the Use of Sensitized Stainless Steel.”

Regulatory Guide 1.50, “Control of Preheat Temperature for Welding of Low-Alloy Steel.”

Regulatory Guide 1.71, “Welder Qualification for Areas of Limited Accessibility.”

Regulatory Guide 1.84, “Design, Fabrication and Materials Code Case Acceptability, ASME Section III.”

Regulatory Guide 1.193, “ASME Code Cases Not Approved for Use.”

“Welding Activities Guidance” located on the NRC ISI Best Practice Website

*(Code editions shall be the latest in effect or as otherwise specified by the applicable licensing documents)

END

Attachment 1 – Revision History for IP 65001.B

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Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
N/A	8/19/2008 CN 08-024	Initial issuance to support ITAAC Inspection under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52. Researched commitments for 4 years and found none.	N/A	N/A
N/A	ML13225A409 9/25/2013 CN 13-023	Researched commitments for 4 years and found none. Periodic update.	N/A	ML13225A410
N/A	ML19296E738 11/04/19 CN 19-034	Periodic update to address a large number of needed clarifications, reorganizations, and refinements identified from experience and lessons learned in the field. Additionally, expanded to cover Non-destructive Examination more thoroughly.	N/A	ML19296E926