INSPECTION PROCEDURE 73753

INSERVICE INSPECTION

PROGRAM APPLICABILITY: 2515

SALP FUNCTIONAL AREA: MAINTENANCE (MAINT)

73753-01 INSPECTION OBJECTIVE

To determine whether the inservice inspection (ISI), repair, and replacement of Class 1, 2, and 3 pressure retaining components are performed in accordance with Technical Specifications (TS), the applicable ASME Code, correspondence between NRR and the licensee concerning relief requests, and requirements imposed by NRC/industry initiatives, including the augmented licensee inspection requirements identified in Generic Letter 88-01.

73753-02 INSPECTION REQUIREMENTS

02.01 Review the licensee's ISI plans and schedules for the current inspection period of the inspection interval. Determine if changes to the inspection plan concerning component selection, etc. have been properly documented and approved.

02.02 Review the qualifications and certifications of the inspection personnel (Levels I and II) observed during observation of work identified in section 02.03, below. Review the qualifications and certifications of all licensee and contractor Level III examiners involved with the ISI. Ascertain whether the qualification and certification records properly reflect the following:

a. Employer's name.

b. Person certified.

c. Activity qualified to perform.

d. Level of certification.

e. Effective period of certification.

f. Signature of individual certifying title and level.

g. Basis used for certification, such as the required number of training hours, etc. for the examination method specified.

h. Annual visual acuity, color vision examination, and periodic recertification.

02.03 Observe or perform three methods of examination of components such as the following:

a. Volumetric examination of welds using manual (A-scan) ultrasonic technique.

b. Volumetric examination of welds using automatic or programmable ultrasonic technique.

c. Volumetric examination of nozzle-to-vessel radius section using ultrasonic technique.

d. Volumetric examination of welds using radiographic technique.

e. Volumetric examination of components (control rod drive housings, bolts, studs, bolt hole ligaments, integrally welded supports).

f. Volumetric examination of steam generator tubes using eddy current technique.

g. Surface examination of welds, bolts, nuts, or studs using liquid penetrant (PT) or magnetic particle (MT) technique.

h. Visual examination of core support structures.

I. Visual examination of support components (mechanical or hydraulic), or other components listed in ASME Code Section XI.

j. Visual examination during system leakage or hydrostatic test.

02.04 For each selected method of examination from paragraph 02.03, above, verify that the following requirements are met:

a. Approved procedures are available, are being followed, and specified nondestructive examination (NDE) equipment is being used.

b. Examination personnel are knowledgeable of examination method and operation of test equipment.

c. Examination personnel with proper level of qualification and certification are performing the various examination activities, including designation of examination method/technique to be used, equipment calibration, examination, and interpretation/evaluation/acceptance of test results.

d. Examination results, evaluation of results, and any corrective actions/repairs/replacements are being recorded as specified in the ISI program and NDE procedures. If applicable, review the comparison of inservice findings (adverse) with previous examination findings to determine any change in flaw size.

02.05 Observe two Code repairs and two Code replacement activities and verify that:

a. An approved procedure for each activity is in use.
b. Personnel responsible for the performance of each activity are knowledgeable of procedural requirements.

c. The ANI or ANII is involved to the extent required by the licensee's ISI plan.

02.06 Effectiveness of Licensee Controls

a. Evaluate the effectiveness of the licensee's controls in identifying, resolving, and preventing problems by reviewing such areas as corrective action systems, root cause analysis, safety committees, and self assessment in the area of inservice inspections.

b. Determine whether there are strengths or weaknesses in the licensee's controls for the identification and resolution of the reviewed issues that could enhance or degrade plant operations or safety.

c. Evaluate the effectiveness of the licensee's controls over ISI contractors. Determine to what extent licensee personnel are involved in ensuring the quality of the examination and evaluation of work done by contractors.

02.07 Inspection Flexibility

The items listed in this inspection procedure are only guidelines for the inspector to follow. It is not expected, and not possible, for the inspector to complete all areas of this procedure. In some instances, an in-depth review of one NDE procedure may provide more insight into licensee activity than reviewing three examinations in less detail in the same amount of time. While the inspection areas covered in this procedure form a base for inspection, it is recognized that emergent issues unable to be foreseen at this time, e.g, new material degradation mechanisms, may demand the attention of the inspector. In this instance, the requirements of the core procedure would be satisfied by management directed inspection of the emergent, safety-significant NDE issues.

02.08 Use of risk insights

Consider risk significance as one input in the selection of a sample of inspection items.

73753-03 INSPECTION GUIDANCE

General Guidance

Other than for the Preservice Inspection (PSI), it is intended that this inspection procedure be accomplished during a refueling outage. In general, most inservice inspections are performed during refueling outages with a few inspections being performed during

plant operation and during plant shutdowns for maintenance or forced outages. If completion of this procedure during a refueling outage is not possible, such as when there are no outages in a SALP cycle, more significant safety issues exist at other plants during a refueling outage, or limited inspection resources exist, this procedure may be performed during normal operations to the extent practical.

The inservice inspections of interest in this procedure are those nondestructive examinations of Class 1, 2, and 3 components and system leakage and hydrostatic tests performed to meet the requirements of the TS and the ISI program accepted by the NRC. Inservice testing of pumps and valves as described in subsections IWP and IWV of Section XI is not included within the scope of this procedure. Refer to inspection procedure 73756, "Inservice Testing of Pumps and Valves," for inservice testing of pumps and valves.

Perform this inspection during peak periods of inservice inspection activity at the licensee's facility if possible. Under the requirements of Section XI, the licensee files plans and schedules for inservice inspection with the NRC; therefore, obtain a copy of these plans and schedules in order to accomplish and schedule this inspection.
Personnel performing this inspection need to be thoroughly familiar with NDE methods and techniques, their applications, limitations, and the recording and analysis of examination results. Evaluate findings or indications and determine if these are acceptable within code limits. Should the inspector find that justification for an approved examination, exception, or exemption is not valid, document this finding in the inspection report and immediately bring it to the attention of regional management for resolution.

Personnel performing this inspection should also be observant about the general condition of the plant. While traveling to and from the ISI examination sites the inspector should be looking for evidence of boric acid leakage, rust and water stains, and other indicators of deterioration of fluid boundaries. All indications should be noted and explored by questioning the licensee about evaluation and corrective actions for items noted.

Specific Guidance

03.01 Inspection Requirement 02.01. Pursuant to 10 CFR 50.55a(g) the licensee periodically submits an updated ISI program to the NRC for review and approval. Requirements delineated in this program are regulatory requirements, as are the TS. In the event of conflict between the TS and 10 CFR 50.55a(g), the regulatory position is that of the more stringent requirement. Under the provisions of Section XI, the licensee establishes an inservice inspection program for each inspection interval (generally ten years). This interval is usually divided into three inspection periods for accomplishing specified percentages of those component examinations and tests which are to be performed during the inspection interval. In some instances, inspection requirements in addition to those of Section XI are imposed by the NRC for the licensee to comply with 10 CFR 50.55a(g), and these should be

documented in the TS and/or the licensee's ISI program. As the licensee gains experience, or corrective actions are taken, the augmented ISI may change. The licensee must document any changes made.

03.02 Inspection Requirement 02.02. Personnel involved in the performance, evaluation, or supervision of nondestructive examination of safety-related items are expected to meet the qualification and certification requirements in the applicable supplement of SNT-TC-1A and ASME Section XI. Qualification certificates, the last annual visual acuity examination, and color vision test results are a part of the NDE records. For augmented ISI's required by GL 88-01, special qualifications are required.

NDE activities will be performed according to these levels. No one shall perform NDE activities at a level higher than that for which he is qualified (examination evaluation, etc.). The three levels of examiners are:

Level I - Authorized to perform specific set-ups, calibrations, and tests under the guidance of a Level II or III individual.

Level II - Authorized to set-up, calibrate, examine and record data, evaluate and report examination results.

Level III - Authorized to develop and approve inspection and examination procedures, as well as administer training, examinations, and certifications, if specified.

03.03 Inspection Requirement 02.03. The inspector is provided sufficient flexibility to ascertain whether the examinations are being conducted properly. It is expected that when different methods of examinations are in progress simultaneously, the inspector will select methods of examination of higher regulatory interest; i.e., volumetric examination of reactor pressure vessel pressure retaining welds or nozzle radius sections, volumetric examination of Class 1 component pressure retaining welds inside containment, volumetric examination of steam generator tubes. Additionally, a history of problems with a particular technique also should form a basis for the selection of a given technique to inspect.

In view of radiation exposure limitations, and in the interest of efficient use of resources, it is not required for the inspector to observe the complete examination of a component or weld. Rather, observe a method of examination until a determination can be made that the certification of examiners, compliance with NDE procedure requirements during examination, and the evaluation and recording of examination results are satisfactorily performed. For example, when observing volumetric examination of welds using the manual (A-scan) ultrasonic technique, it is expected that the inspector can obtain valid findings by observing the equipment calibration and complete examination of one weld using a straight or one angle beam scan in one direction; i.e., it is not necessary to observe all

straight and angle beam examinations in the several directions in the testing of the weld.

At times the inspector may want additional assurance that the ISI examinations are being conducted properly. Options that are available include the following:

1. Requesting that the licensee repeat certain examinations using different examiners.

2. Having regional NDE specialists repeat certain examinations.

3. Having NRC contractors review ISI data (for automatic UT or eddy current examinations).

The following guidance will help determine the acceptability of the activity being observed and is expected to be consistent with the approved procedure, Section XI, and Section V, where applicable:

1. ISI Program. Use IP 73051, "Inservice Inspection - Review of Program."

2. ISI Procedures. Use IP 73052, "Inservice Inspection - Review of Procedures."

3. ISI Data Review and Evaluation. Use IP 73755, "Inservice Inspection - Data Review and Evaluation."

4. Volumetric Examination Using Ultrasonic Technique. Use work observation requirements from IP 57080 as a checklist for this review, supplemented by any special requirements imposed by NRC or industry initiatives (i.e., Regulatory Guide (RG) 1.150).

5. Volumetric Examination Using Radiographic Technique. Use work procedure requirements from IP 57090 as a checklist for this review.

6. Volumetric Examination Using Eddy Current Technique. Verify by work observation that the licensee follows the approved procedures. Refer to IP XXXXX, "* * * [THIS ITEM UNDER DEVELOPMENT] * * *" for steam generator eddy current inspection information.

7. Surface Examination Using Liquid Penetrant Technique. Use work observation requirements from IP 57060 as a checklist for this review.

8. Surface Examination Using Magnetic Particle Technique. Use work observation requirements from IP 57070 as a checklist for this review.

9. Visual Examination. Use work observation requirements from IP 57050 as a checklist for this review.

10. System Pressure Tests.

(a) Test conditions of pressure and temperature are as specified.

(b) Test condition holding time is as specified.

(c) Rate of temperature and pressure increase is recorded and is as specified.

(d) Pressure and/or temperature measuring instrumentation is calibrated and has a range as specified by procedure.

(e) Sources of detected leakage are located, evaluated, and corrective measures are taken.

(f) Gauges are calibrated prior to test.

11. Pipe Support and Restraint Systems. Use work observation requirements from IP 50090.

12. Steam Generator Plugs and Sleeves. Use work observation requirements from Part 9900: Technical Guidance SGTUBE, "Mechanical - Steam Generator Plugs and Sleeving Repairs."

Because the specific NDE technical requirements vary among Code editions and addenda ensure that when using the 57050 series IPs as technical requirements checklists, the requirements reflect those specified in the Code of record committed to by the licensee being inspected.

03.04 Inspection Requirement 02.04

a. No specific inspection guidance provided.

b. If some or all of these individuals are contractor personnel, interview several individuals to verify that:

1. They are familiar with the scope of work and division of responsibilities between the contractor and the licensee.

2. They are knowledgeable of the requirements of the approved, licensee procedures which they are using, as well as the licensee's overall ISI or repair/replacement program.

c-d No specific inspection guidance provided.

03.05 Inspection Requirement 02.05

a. No specific inspection guidance provided.

b. If some or all of these individuals are contractor personnel, interview several individuals to verify that:

1. They are familiar with the scope of work and division of responsibilities between the contractor and the licensee.

2. They are knowledgeable of the requirements of the approved, licensee procedures which they are using, as well as the licensee's overall ISI or repair/replacement program.

c. No specific inspection guidance provided.

03.06 Effectiveness of Licensee Controls 02.06

a. When safety issues, events, or problems are reviewed, the adequacy of the results of licensee controls may be assessed by determining how effective the licensee was in performing the following:

1. Initial identification of the problem.

2. Elevation of problems to the proper level of management for resolution (internal communications and procedures).

3. Root cause analysis.

4. Disposition of any operability issues.

5. Implementation of corrective actions.

6. Expansion of the scope of corrective actions to include applicable related systems, equipment, procedures, and personnel actions.

b. The determination of whether there are strengths or weaknesses in the licensee's controls will be limited to those issues, events, or problems reviewed in detail. The evaluation will not draw sweeping conclusions about the licensee's overall control programs but will be very specific in identifying any licensee strengths or weaknesses encountered with the individual items reviewed.

Note: For additional inspection guidance on licensee controls, please refer to IP 40500, "Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems".

03.07 Inspection Flexibility 02.07. No inspection guidance provided.

03.08 Use of risk insights 02.08

Consider risk significance as one input in the selection of a sample of inspection items by gaining an understanding of:

a. The impact on plant safety functions resulting from piping failures related to:

1. Initiating events such as LOCA, steam line break (SLB), inadequate heat removal capability of safety systems (e.g. service water piping failure), and flooding as

identified in the core damage accident sequences of the licensee's Probabilistic Risk Assessment (PRA), or

2. Failures which could prevent safety related systems or components from fulfilling their safety function, cause a reactor trip/scram, or actuate a safety-related system.

b. The assumptions regarding plant and operator responses associated with the PRA core damage sequences.

Obtain these insights through discussion with the regional Senior Reactor Analyst, resident inspector staff, licensee PRA group, or by review of PRA documentation (if available in usable form). Compare these insights to your own knowledge of plant design and operation in order to ensure that they are reasonable. Determine if the licensee's LOCA frequency estimates and risk analysis have considered known plant-specific piping degradation mechanisms such as IGSCC, PWSCC, microbiologically induced corrosion (MIC), erosion-corrosion, mechanical fatigue, thermal fatigue, or water hammer potential (see Welding Research Council Bulletin 382, June 1993).

Include in a sample of inspection items piping or components having a combination of:

1. High estimated break frequency (relative to the specific plant being inspected),

2. High relative contribution to core damage frequency, and

3. Risk factors contributing to degradation (e.g. applied stress, piping configuration, material composition, chemistry, operating parameters such as pressure, temperature, flowrate, etc.) which are present but not considered in the risk analysis.

Include the rationale for risk significance of any adverse findings in the inspection report as appropriate. Refer to IMC 2515 Appendix C for further guidance.

73753-04 INSPECTION RESOURCES

Completion of this inspection procedure is expected to take, on the average, 32 hours of direct inspection effort at a site.

73753-05 REFERENCE

Generic Letter 88-01, "NRC Position on IGSCC in BWR Austenitic Steel Piping." (microfiche 69196/290).

NUREG/CR-5985, "Evaluation of Computer-Based Ultrasonic Inservice Inspection Systems."

END