INSPECTION PROCEDURE 49063

PIPING - WORK OBSERVATION

PROGRAM APPLICABILITY: 2512

49063-01 INSPECTION OBJECTIVES

01.01 By direct observation, and independent evaluation of work performance, work in progress and completed work, determine whether activities relative to safety-related piping (except welding and nondestructive examination (NDE)) outside the reactor pressure coolant boundary are being accomplished in accordance with NRC requirements, SAR commitments, and licensee procedures.

01.02 To determine whether inadequacies in completed work, partially completed work, or work activities in progress may indicate management control problems or generic weaknesses.

Inspection Schedule

May Be Started	Must Be Started	Must Be Completed
After work is 20% complete	After work is 40% complete	Before work is 80% complete

49063-02 INSPECTION REQUIREMENTS

02.01 In four different piping systems, listed in Section 03, below, observe five piping activities relative to safety-related piping, such as handling; cleanliness control; installation of pipe spools, fittings, and bellows; cutting; grinding; bending; supporting; cleaning and flushing; hydrostatic testing; and quality-related inspections.

02.02 For those five activities selected for observation (in 02.01, above) determine whether the following requirements, as applicable, are met:

a. conformance with construction/installation specifications

b. personnel are adequately qualified by certification, experience or training

c. conformance with inspection (QC) and work performance procedures

d. conformance with record-keeping requirements

e. identification and control of material

f. control of nonconforming items

02.03 For one location (or run) in each of two piping systems outside the reactor coolant pressure boundary, determine whether piping runs are (or are being) installed as required by applicable specifications, field drawings, and procedures.

02.04 For one piping system (outside the reactor coolant pressure boundary) determine whether there have been significant design changes subsequent to the issuance of approved installation drawings. Review the implementation of the licensee's/contractor's design control measures, including the necessity for a revised stress analysis, as appropriate.

02.05 Additional inspections, as determined by regional management, may be conducted in the areas covered above when the licensee's performance is classified as Category 3 by the SALP program, or if regional management concludes that recent findings will likely result in a SALP Category 3 rating. In these cases, particular consideration should be given to an expanded sample of items to be inspected under Sections 02.01, 02.02, 02.03, and 02.04.

49063-03 INSPECTION GUIDANCE

General Guidance

a. Pertinent portions of the SAR should be reviewed to determine applicable specifications, Codes and standards, as well as other construction and inspection requirements, before observing activities in this area at the site.

b. The inspection requirements in Section 02 of this procedure are, in general, of an auditing nature. However, detailed observations are required to determine whether adequate conformance to applicable requirements is being accomplished.

c. This procedure pertains to safety-related piping activities and NDE (excluding reactor coolant pressure boundary piping) at the site, except welding, i.e., receipt, receipt inspection, identification, storage, handling, protection, installation, inspection, and documentation. (The piping systems and related components are in Quality Groups B and C, as defined in RG 1.26.)

d. The selection of activities to be observed should provide for diversification of piping systems and pipe fabricators. The selection should not establish a pattern so that the licensee/contractor can expect only certain activities or components to be inspected. About three-fourths of the selected activities should be from Quality Group B (RG 1.26).

e. Findings from this inspection activity should address each element as being satisfactory, being unresolved and requiring resolution, or being in violation and requiring correction. When significant inadequacies are identified in licensee/contractor activities, the inspector should inform cognizant Regional supervision. The issue should be addressed at the appropriate level of licensee management.

03.01 Specific Guidance

a. Inspection Requirement 02.01. In general, the intent is to determine whether piping is installed and inspected in accordance with applicable specifications,

drawings and procedures. This should include verification that pipe-to-pipe and interdisciplinary clearance requirements are met.

b. Inspection Requirement 02.02b. The qualifications of those engaged in quality sensitive or special processes related to pipe installation, inspection and testing work should be sampled for an assessment of compliance with licensee commitments. Also, depending on the type and extent of design engineering work being performed at the site, it may be appropriate to review the qualifications of certain key individuals assigned to this design area.

c. Inspection Requirement 02.03. A piping run, for purposes of this procedure, is meant to be a particular section of piping, for example: relief valve discharge piping, emergency diesel fuel system piping from fuel oil storage tank to diesel, steam piping from steam generator to second isolation valve (PWR).

d. Inspection Requirement 02.04. The intent is to determine whether piping is being installed according to properly approved drawings--either the original design drawings or properly approved revisions; and, if revisions are in process, that these changes are properly handled in accordance with established procedures.

Appropriate standards can be used as a guide in this area. For example, ANSI N45.2.11 requires that where changes to previously verified designs have been made, design verification shall be required for the changes, including effects of those changes on the overall design. Also, changes made to safety-related piping during construction which may result in significant deviations from the (SAR) design should also be subject to a design verification. Such changes could result in an accumulation of design change documents and/or marked-up drawings. These documents reflect as-built conditions and should be adequately controlled so they will be readily available for future use especially during future evaluations of other design changes. Additionally, the as-built process should result in proper and timely updating of the original/master drawings and specifications to incorporate such changes.

03.02 Prevalent Errors and Concerns. This section, included to provide background on past piping problems of a generic nature that have been identified at various nuclear facilities, may serve to alert NRC inspector of potential problem areas.

a. Stability of work force or QA/QC personnel and the attitudes in work crews and relations between construction personnel and QA/QC personnel.

b. Power grinders used for weld preparation of pipe (socket welds) that result in violation of minimum wall thickness.

c. Piping runs containing mud, sand, and other foreign material.

d. Incorrect size orifices installed in pump recirculation lines.

e. Surfaces for welding not properly free of paint, oil, rust, or other material that is detrimental to welding.

f. Drawings or other records fail to show evidence of actual piping components installed in pipeline or are not a current revision.

g. Piping changes without proper design change authorization.

h. Repairs of linear indications on pipe spool pieces not properly performed as to testing for wall thickness and blending uniformly into the surrounding surfaces.

i. Controls over the installation/removal of cleaning and flushing devices are inadequate.

j. Refer to IE Bulletin 79-14 for additional concerns relating to as-builts.

03.03 Safety-related systems from which piping selections can be made include the following:

a. Boiling Water Reactors

Core Spray System - complete system beyond outermost isolation valves

Control Rod Drive System - insert and withdrawal lines, and scram discharge volume lines

Main Steam System - downstream of the second main steam isolation valve to the turbine stop/control valve, including connecting piping 2-1/2 inches or larger up to first valve capable of remote closure

Standby Liquid Control System - from the second isolation valve to the standby liquid control tank

Reactor Water Cleanup System - second isolation valve to the second valve on the pump discharge and from the regenerative heat exchanger to the second isolation valve

Safety and Relief Valve System - relief valve discharge piping; complete system beyond outermost isolation valves

Residual Heat Removal System - include reactor head cooling, containment cooling, shutdown cooling and low pressure coolant injection system

Reactor Core Isolation Cooling System - complete system beyond outermost isolation valves, except return test line to condensate storage tank beyond second isolation valve

High Pressure Coolant Injection System - complete system beyond outermost isolation valves, except return test line to condensate storage tank beyond second isolation valve

Fuel Pool Cooling and Cleanup System - complete system

RHR Service Water System - complete system

Reactor Building Closed Cooling Water System - piping forming part of primary containment boundary

Instrument and Service Air Systems - piping forming part of primary containment boundary and piping between accumulators and safety-related system being supported

Diesel Generator System - piping in fuel oil system and cooling system

Hydrogen Control Systems - drywell purge, drywell mixing and atmospheric monitoring systems

Standby Gas Treatment System - piping forming part of primary containment boundary

b. Pressurized Water Reactors

Main Steam System - from the steam generator to the second isolation valve, including piping to the following:

safety valves
relief valves
atmosphere dump valve
main steam trip and non return valves
auxiliary feedpump inlet
residual heat release valve

Condensate and Feedwater System - all of the feedwater piping and all auxiliary feedwater piping

Chemical and Volume Control System - complete system from second isolation valve

Residual Heat Removal System - includes reactor head cooling, containment cooling, shutdown cooling, and low pressure coolant injection systems; complete system beginning with the second isolation valve from loop outlet to loop inlet

Emergency Core Cooling System - complete system from second isolation valve
Containment Depressurization System - all piping from the refueling water storage tank to the spray headers

Boron Recovery System - complete system

Component Cooling System - complete system

Fuel Pool Cooling and Purification System - complete system

Post DBA Hydrogen Control System - complete system

Emergency Diesel Generator System - all fuel oil system except fill lines for underground fuel oil storage tanks

Gaseous Waste Disposal System - complete system

49063-04 REFERENCES

SAR Chapters 1, 3, 5, 7, and 17, including pertinent Codes and Standards referenced in these chapters

Regulatory Guide 1.28, "Quality Assurance Program Requirements (Design and Construction)"

Regulatory Guide 1.37, "Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants"

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 1.64, "Quality Assurance Requirements for the Design of Nuclear Power Plants"

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