INSPECTION PROCEDURE 50053

REACTOR VESSEL AND INTERNALS WORK OBSERVATION

PROGRAM APPLICABILITY: 2512

50053-01 INSPECTION OBJECTIVES

01.01 By direct observation and independent evaluation of work performance, work in progress and completed work, determine whether activities relative to the reactor vessels and internals are being accomplished in accordance with NRC requirements and SAR commitments.

01.02 To determine whether inadequacies in work or work activities associated with the reactor vessel and internals could be symptomatic of a management control problem or other generic weaknesses.

Inspection Schedule

Inspection	May Be Started	Must Be Started	Must Be Completed
A-Reactor Vessel	--------	Before installation complete	--------
B-Internals	--------	During installation	Installation plus one month
C-Storage Inspection	--------	Quarterly	--------

50053-02 INSPECTION REQUIREMENTS

02.01 Observe reactor vessel storage, preservation, protection, handling and installation activities and/or conditions and determine whether requirements on applicable specifications, work procedures and inspection (QC) procedures are being met in the following areas:

a. Stored Vessel Protection

1. Ascertain whether the reactor vessel is being stored in accordance with approved procedures.
2. Observe seals and devices to identify vessel internal atmospheric conditions and verify maintenance of requirements.

3. Observe condition of protective coating and/or protective covering and verify conformance with requirements.

4. Observe dunnage or support structures and determine whether protection from entry of dirt, water, flooding (height of structure) and strength of support (shifting or collapse of structure) is adequate and consistent with storage specifications.

b. Installation Techniques

1. Ascertain whether lifting and handling activities are consistent with established specifications and procedures, including special requirements and precautions.

2. Ascertain whether lifting equipment is as specified, and the required lift tests and/or nondestructive examination (NDE) of equipment have been satisfactorily accomplished.

3. Observe whether placement is being, or has been, accomplished as specified in the areas of

   (a) lifting and accessory equipment,

   (b) route used, and

   (c) rate of vessel travel during placement.

4. Observe the installed reactor vessel and, based on a review of the installation specifications, drawings, and work procedures, identify a number of requirements (at least five, but not more than ten) such as vessel support structures, vessel-to-support-structures fittings, number and location of support structures and mounting pads, hold down devices, shimming devices, and alignment requirement, and determine whether

   (a) work procedures have been or are being followed,

   (b) installation is in accordance with specifications and procedures, and

   (c) inspection (QC) procedures are being followed.

c. Installed Vessel Protection

1. Ascertain whether procedures for protection of the installed reactor vessel are being (or were) followed.

2. Ascertain whether protective devices are installed around top of open vessel to prevent entry of foreign objects and debris.

3. Observe whether vessel side openings are blanked off to prevent entry of foreign objects and nozzle ends are protected from construction damage.

4. Observe whether work platforms and scaffolding inside vessel are nonflammable or treated to prevent spread of accidental fires.

5. Determine whether access control activities meet requirements, i.e., entry of authorized tools, equipment and personnel only.

02.02 Observe reactor vessel internals storage, protection, preservation, handling, installation, and inspection activities and/or conditions, and ascertain whether requirements of applicable specifications, work, and inspection (QC) procedures are being met in the following areas:

a. Protection of Stored Vessel Internals

1. Internals storage

2. Protection/protective coverings

3. Storage supports

b. Installation Techniques

1. Lifting and handling are consistent with established requirements and precautions.

2. Lifting equipment is as specified and required testing has been completed prior to lifting.

3. Placement is being (or has been) accomplished in conformance with requirements.

4. Installation is being (or has been) accomplished in conformance with requirements, including special requirements and precautions. Select five internals components (such as internals support structure, holddown nuts, and mounting pads) and ascertain whether

(a) work procedures have been followed,

(b) installation is in accordance with specifications, and

(c) inspection (QC) activities are in accordance with established procedures.

02.03 Observe reactor vessels and internals when in storage and after installation to determine that requirements of applicable specification, work procedures and inspection (QC) procedures are being met in following areas:

a. Stored Vessel Protection. Quarterly, while the reactor vessel is in storage,

1. determine whether the reactor vessel is being stored in accordance with approved procedures.
2. observe seals and devices to identify vessel internal atmospheric conditions and verify maintenance or requirements;

3. observe condition of protective coating and/or protective covering and verify conformance with requirements, and

4. observe dunnage or support structures and determine whether protection from entry of dirt, water, flooding (height of structure) and strength of support (shifting or collapse of structure) is adequate and consistent with storage specifications.

b. Installed Vessel Protection. Quarterly, after vessel placement,

1. verify that procedures for protection of the installed reactor vessel are adequate and are being followed;

2. verify that protective devices are installed around top of open vessel to prevent entry of foreign objects and debris;

3. observe whether vessel side openings are blanked off to prevent entry of foreign objects and nozzle ends are protected from construction damage;

4. observe whether work platforms and scaffolding inside vessel are nonflammable or treated to prevent spread of accidental fires;

5. determine whether access control activities meet requirements (i.e., entry of authorized tools, equipment and personnel only):

   (a) work procedures have been followed;

   (b) installation is in accordance with specifications; and

   (c) inspection (QC) activities are in accordance with established procedures.

c. Protection of Stored Vessel Internals. Quarterly, while the reactor vessel internals are in storage, determine whether

   1. internals storage requirements are being adhered to;

   2. protection/protective coverings are as specified;

   3. storage supports are adequate; and

   4. inspection procedures are being followed.

d. Installed Vessel Internals Protection. Quarterly, after "final" installation of vessel internal,

   1. determine whether procedures for protection of the installed vessel internals are being followed;

   2. observe whether protective devices are installed around top of open vessel to prevent entry of foreign objects and debris into the vessel internals;

   3. observe whether vessel side openings are blanked off to prevent entry of foreign objects;

   4. determine whether access control is provided to assure only authorized entry of tools, equipment, and personnel; and

   5. determine whether cleanliness requirements are being met.

50053-03 INSPECTION GUIDANCE

03.01 Applicable portions of the SAR should be reviewed to determine licensee commitments relative to storage, handling, installation, and post-installation protection of the reactor vessel and internals before observing work activities in this area. The inspector should make this determination during inspection preparation.

03.02 If possible, arrange the inspection schedule to coincide with vessel placement activities. In this case, among other observations, determine whether handling and placement procedures are at the work location and are being used.

03.03 The inspector should observe load and operational testing of the lifting crane and associated equipment.

03.04 The inspector should observe critical installation operations such as sizing of shim plates, prussian blue of feeler gage checks of support-to-vessel contact area and final elevation, levelness, and orientation checks.

03.05 The inspector should observe the assembly work associated with internals installation. That welding activities are in accordance with NSSS specifications and that the fit up of the reactor internals is satisfactorily accomplished and meets NSSS installation criteria.

03.06 Prevalent Errors and Concerns:

a. Reactor vessel and internals installation procedures provide for mandatory inspection hold points that are witnessed by the responsible engineer and QA representative.

b. Proper testing of lift equipment prior to movement and positioning of reactor vessel.

c. Reactor vessel placed in position within dimensional tolerances, proper axis orientation and levelness.

d. Forcing assembly of reactor vessel internals to the extent of bending alignment pins.

e. Misalignment between core plate holes and CRD stub tube center lines.

f. Improper storage of reactor vessel and internals.

g. Control of personnel entry and material into reactor vessel area.

h. Housekeeping in area of reactor pressure vessel.

i. Washing reactor vessel with water not meeting purity specifications.

50053-04 REFERENCES

SAR, Chapter 1, 3, 4, 5 and 17, including pertinent codes and standards referenced in these 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 1.39, "Housekeeping Requirements for Water-Cooled Nuclear Power Plants"

Regulatory Guide 1.65, "Materials and Inspections for Reactor Vessel Closure Studs"

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