PART 52, IDENTIFICATION AND RESOLUTION OF CONSTRUCTION PROBLEMS

PROGRAM APPLICABILITY: 2504

40504-01 INSPECTION OBJECTIVES

01.01 To determine whether NRC requirements regarding the problem identification and resolution (PI&R) processes are being appropriately implemented for the facility construction phase.

01.02 To determine whether PI&R processes have been adequately described for the facility construction phase.

01.03 To provide insights whether safety culture considerations have been adequately considered for the facility construction phase.

01.04 To evaluate additional objectives as the Construction Inspection Program (CIP) enforcement/assessment process is developed.

40504-02 INSPECTION REQUIREMENTS AND GUIDANCE

02.01 Programmatic Review of Construction Phase PI&R Processes. Reviews under this inspection procedure (IP) will apply to both the licensee and its contractors that implement their own QA programs. Where the term “Licensee” is used, it may be read as the “Licensee or the Licensee’s contractor.”

NRO originally developed the concept of having two sister IPs to review the programmatic aspects and the implementation of a given licensee’s PI&R processes. This IP is a thorough review of the programmatic aspects of a licensee’s PI&R processes. IP 40500.52B, currently under development, will review the implementation of a licensee’s PI&R processes.

During the reviews of the licensee’s Quality Assurance (QA) manual and procedures associated with the PI&R, the inspector should coordinate with the Office of New Reactors (NRO) staff performing IP35101, "QA Program Implementation Inspection for Operational Programs." IP35101 will also cover some of the aspects identified below.

a. Review the QA manual and procedures pertaining to the PI&R processes for the licensee involved with the construction, fabrication, or testing of structures, systems, and components, (SSCs) to ensure regulatory requirements are met.

Guidance: See 10 CFR 50, Appendix B, Criterion XVI; 10CFR 50.55; 10 CFR Part 21;

and the Design Control Document (DCD)/Final Safety Analysis Report (FSAR) Chapter 17.5 which describe the licensee's QA program for procurement, installation, construction, and testing.

Inspection Manual Chapter (IMC) 2504, Section 04 contains the definition of construction activities that can occur at the construction site or at a remote location. This IP should be implemented for contractors participating in the construction phase regardless of geographic location.

b. Review applicable plans, manuals, procedures, and instructions for the licensee to determine whether PI&R processes have been adequately described.

Guidance: The licensee may use multiple processes to accomplish PI&R, or they may employ a single process. The processes should ensure that all deficiencies are promptly identified, fully evaluated, tracked, trended, and corrected in a timely manner commensurate with their safety significance and complexity. If multiple QA programs exist, ensure that interfaces are defined so that the potential impact of identified problems are appropriately evaluated across organizational boundaries.

Problems should be evaluated such that the resolutions address causes and extent of conditions, as necessary. This includes properly classifying, prioritizing, and evaluating for reportability the conditions adverse to quality. For significant problems, effectiveness reviews of corrective actions should be conducted to ensure that the problems are resolved, to review the causes and the documentation, and to ensure they are reported to the appropriate levels of management.

Procedures should be established to identify and to correct significant conditions adverse to quality (SCAQ) and to preclude their recurrence. Provisions should be established for escalating to higher management those corrective actions that are not adequate or not timely. Controls should be established for the overview of trends in conditions adverse to quality. The licensee should periodically trend and assess information from PI&R processes in the aggregate to identify programmatic and common cause problems and then communicate the results of the trending to the applicable personnel. Controls should also be established for the imposition of corrective measures on contractors and the documentation of corrective actions.

PI&R, as related to design, includes identifying and correcting deficiencies (errors). For significant deficiencies, it includes determining the cause and instituting fixes to the design process and QA program to prevent recurrence of similar deficiencies. Sufficient guidance should be provided on the methodology for evaluating causes of problems including root cause evaluation of significant problems. Measures should also be established for the identification and correction of: procurement document errors; deviations from procurement document requirements; defective materials and components; poor workmanship; incorrect vendor instructions; significant recurring deficiencies at both vendor shops and onsite; and generic procurement related deficiencies.

c. Verify that an appropriate threshold has been defined to enter construction problems into PI&R processes.

Guidance: Corrective action programs should have a low threshold for identifying issues. Issues should be identified completely, accurately, and in a timely manner commensurate with their safety significance. Problems such as: design errors, personnel errors, procedure deficiencies, noncompliances with regulatory requirements, inadequate procurement requirements, equipment deficiencies, inadequate implementation of work controls, QA record deficiencies, inadequate training, inadequate storage conditions, equipment functional and pre-operational testing problems, problems meeting Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC), and NRC identified issues should all be considered. Detection of design errors can be from: 1) design verification measures, 2) audits, 3) use of design documents, 4) testing results, and 5) equipment failures. Construction quality inspections may result in the rejection and repair of problems within that process being inspected rather than being separately entered into the PI&R process. These items should however be documented and considered for trending.

d. Review the licensee's means for utilizing site-specific risk information in conjunction with other factors to determine the safety significance of identified problems.

Guidance: SSCs shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. The QA program, including PI&R processes, shall be established and implemented in order to ensure that SSCs will satisfactorily perform their safety functions. Appropriate corrective actions should be taken to address safety issues and adverse trends in a timely manner, commensurate with their safety significance and complexity.

Site specific risk analysis (Core Damage Frequency (CDF), Large Early Release Frequency (LERF), and Offsite Dose) developed in support of the DCD, Chapter 19 should be considered by the licensee when determining the safety significance of a problem.

Some additional factors that should be considered when assigning graded levels of treatment within PI&R processes include: 1) consequence of malfunction or failure of the item, 2) design and fabrication complexity or uniqueness of the item, 3) the need for special controls and surveillance over processes and equipment, 4) the degree to which functional compliance can be demonstrated by inspection or test, 5) the quality history and degree of standardization of the item, and 6) the difficulty of repair or replacement.

e. Review the licensee's provisions for conducting self-assessments of PI&R processes.

Guidance: Review the licensee's plans for performing surveillances and audits of the effectiveness of the contractors' PI&R processes. Coordinate with IP 35020, "Inspection of COL Applicant/Holder's Surveillance of Contractor Quality Assurance (QA) Activities." Review plans for licensee management and safety committee (as appropriate) involvement in oversight of PI&R processes.

Self- and independent assessments of PI&R processes should be conducted of activities

and practices, as appropriate, to assess performance and identify areas for improvement. Specifically (as applicable), self-assessments should be conducted at an appropriate frequency, at sufficient depth, and in a comprehensive, objective, and self-critical manner. Periodic assessments should be made of the effectiveness of oversight groups. Review the licensee's plans for conducting self-assessments of site safety culture. Results from assessments should be communicated to affected personnel, and corrective actions should be taken to address issues commensurate with their significance.

f. Evaluate the adequacy of the licensee's provisions for implementing corrective actions for issues identified external to the site.

Guidance: Externally identified problems include but are not limited to: 10 CFR 21 notifications; NRC generic communications; reports issued by the Nuclear Steam Supply System (NSSS) vendor (and the applicant for applicable design certification), other facilities under licensee's control, similarly designed facilities, the Architect/Engineer corporate office, major contractor corporate offices, and equipment suppliers and manufacturers; information from the Electric Power Research Institute; Licensee Event Reports; and general operating experience.

A process should be in place to ensure operating experience (OE) information, including vendor recommendations and internally generated lessons learned, will be used to support plant safety. Specifically (as applicable) relevant internal and external OE will be systematically collected, evaluated, and communicated to affected internal stakeholders. The licensee should implement and institutionalize OE through changes to plant design, processes, and equipment.

g. Ensure that the licensee's have extended the QA program coverage as described in the DCD, Chapter 17.

Guidance: Examine the site specific DCD provisions, e.g., the AP 1000 QA program scope includes non-safety related SSCs, such as, Seismic II and Regulatory Treatment of Non-Safety Systems (RTNSS) that perform safety significant functions.

h. If an alternative process (i.e., a process for raising concerns that is an alternate to the PI&R processes or line management) for raising safety concerns exists, then it should have controls to ensure appropriate and timely resolutions of identified problems and provisions for feedback to the concerned individual.

02.02 Programmatic Review of Other Construction Phase Safety Culture Components and Safety Conscious Work Environment Aspects. The safety culture components related to PI&R processes are covered in section 02.01. The remaining safety culture components are covered in this section. Note that potential inspection findings resulting from this assessment should be discussed with regional management to validate the appropriateness of any proposed regulatory action (some issues resulting from this part of the inspection may not have a regulatory basis). The purpose of performing this inspection is to assess the licensee's infrastructure that has been put in place to promote a sound safety culture.

a. Assess the licensee's policies, programs, and procedures with regards to whether relevant safety culture components have been considered and suitably described.

Guidance: The components of safety culture are described in this section. Provisions related to these safety culture components should be considered by the licensee for incorporation in their policies, programs, and procedures as appropriate. The term nuclear safety in the following sections relates to ensuring that equipment within the scope of the QA program is capable of performing its intended safety function.

1. Decision-Making - Decisions should be made on the basis that nuclear safety is an overriding priority. A systematic process should be in place to make safety-significant decisions. This should include formally defining the authority and roles for decisions affecting nuclear safety, communicating these roles to applicable personnel, and obtaining inter-disciplinary input and reviews on safety-significant decisions. A process should be in place to conduct effectiveness reviews of safety-significant decisions to determine how to improve future decisions.

2. Resources - Processes should be in place to ensure that personnel, equipment, procedures, and other resources are available and adequate to assure nuclear safety. This includes those necessary for: maintaining design margins and complete, accurate and up-to-date design documentation, procedures, and work packages.

3. Work Control - Processes should be in place to plan and coordinate work activities, consistent with nuclear safety. Specifically (as applicable) work activities will be appropriately coordinated by incorporating actions to address the impact of the work on different job activities, and the need for work groups to communicate, coordinate, and cooperate with each other during activities in which interorganizational coordination is necessary.

4. Work Practices - Processes should be in place to ensure personnel work practices support human performance. Specifically (as applicable) human error prevention techniques will be communicated, such as, holding pre-job briefings, self and peer checking, and proper documentation of activities. These techniques will be used commensurate with the safety significance of the assigned task, such that, work activities will be performed safely. Personnel should be fit for duty.

   In addition, personnel should not proceed in the face of uncertainty or unexpected circumstances. Expectations regarding procedural compliance and for personnel to follow procedures are defined. Supervisory and management oversight of work activities, including contractors, will be ensured so that nuclear safety is supported.

5. Environment For Raising Concerns - A process exists for employees to raise concerns both to their management and/or the NRC without fear of retaliation, and employees are encouraged to raise such concerns.

Specifically (as applicable) alternative processes (i.e., processes for raising concerns or resolving differing professional opinions that are alternates to the licensee's PI&R processes or line management) for raising safety concerns or resolving differing professional opinions may exist. If so, they should be publicized and accessible, used to preserve the confidence of those raising the concerns as necessary, and independent from management who would in the normal course of activities be responsible for addressing the issue.

6. Preventing, Detecting, and Mitigating Perceptions of Retaliation - A policy for prohibiting harassment and retaliation for raising nuclear safety concerns exists in that all personnel should be trained that harassment and retaliation for raising safety concerns is a violation of law and policy and should not be tolerated. Claims of discrimination should be investigated consistent with the content of the regulations regarding employee protection, and any necessary corrective actions should be taken in a timely manner, including actions to mitigate any potential chilling effect on others due to the personnel action under investigation.

   The potential chilling effects of disciplinary actions and other potentially adverse personnel actions (e.g., reductions, outsourcing, and reorganizations) should be considered and compensatory actions should be taken when appropriate. Assess the licensee's provisions for providing mechanisms for workers to report conditions that may be adverse to quality. The provisions can take many different forms. They should include avenues for workers to report problems on a real-time basis. They should also include exit interviews/surveys to provide opportunities to identify adverse conditions when workers leave the site.

7. Accountability - Management has defined the line of authority and responsibility for nuclear safety. Specifically (as applicable) accountability should be maintained for important safety decisions in that the system of rewards and sanctions is aligned with nuclear safety policies and reinforces behaviors and outcomes which reflect safety as an overriding priority. Management should reinforce safety standards that reflect safety as an overriding priority.

8. Continuous Learning Environment - A process exists to ensure that a learning environment should be in place. Specifically (as applicable) training and knowledge transfer should be provided to onsite personnel to ensure technical competency. Information should be communicated that is learned from internal and external sources about industry and plant issues.

9. Safety Policies - Safety policies and related training should be established that nuclear safety is an overriding priority in that these policies require and reinforce that individuals have the right and responsibility to raise nuclear safety issues through available means, including avenues outside their organizational chain of command and to external agencies, and to participate in the resolution of such issues. Personnel should be effectively trained on

these policies.

Production, cost, and schedule goals should be developed, communicated, and implemented in a manner that reinforces the importance of nuclear safety.

Senior managers and corporate personnel should periodically communicate and reinforce nuclear safety, such that, personnel understand that safety is of the highest priority.

40504-03 RESOURCE ESTIMATE

This IP supports the programmatic review of the processes of a licensee's QA program for identifying and resolving construction problems and for addressing safety culture. The IP is intended to be implemented one time, unless there are substantive changes in any of these licensee processes. The resource estimate for this IP is approximately 80 hours of direct inspection effort (DIE).

40504-04 REFERENCES

Design Certification Document (DCD) Chapter 17

SRP 17.5, Quality Assurance Program Description - Design Certification, Early Site Permit and New License Applicants

40504-05 PROCEDURE COMPLETION

This procedure will be completed when the plant transitions to inspection under the ROP.

END

Attachment:
1. Revision History for IP 40504

ATTACHMENT 1

Revision History For IP40504

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	10/03/07 CN 07-030	1. Completed 4 year search of historical CNs. No commitments found. 2. Initial issue to support inspections of licensee's QA program regarding PI&R and safety conscious work environment.	None	N/A	ML063530020