POLICY ISSUE
(Information)

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FOR: The Commissioners

FROM: Luis A. Reyes
Executive Director for Operations /RA/

SUBJECT: DESCRIPTION OF THE CONSTRUCTION INSPECTION PROGRAM FOR PLANTS LICENSED UNDER 10 CFR PART 52

PURPOSE:

The purpose of this paper is to describe the individual components and overall structure of the construction inspection program (CIP). The descriptions contained in this paper focus on the CIP provisions for inspecting combined license (COL) inspections, tests, analyses and acceptance criteria (ITAAC) and ITAAC-related activities; how inspection results will support the staff's determination on whether the licensee has successfully met the acceptance criteria of each ITAAC; and how the CIP will collect and report on the readiness of the licensee to carry out the initial fuel load and to conduct startup testing (operational readiness).

SUMMARY:

A new construction inspection program (CIP) is being developed for plants licensed in accordance with the requirements of 10 CFR Part 52. The introduction of "inspections, tests, analyses, and acceptance criteria" (ITAAC) into the Part 52 licensing process creates a design specific pre-approved set of performance standards that the licensee must meet and that the Commission must find have been met, before the licensee can load fuel and operate the plant.

CONTACT: Mary Ann Ashley, NRR/DIRS
301-415-1073

As a result, a major focus of the CIP is on the licensee work being performed to support the completion of the ITAAC. However, additional inspections of quality assurance verification activities and operational programs will also be needed to provide assurance that these activities and programs are in compliance with applicable Nuclear Regulatory Commission (NRC) requirements. The CIP is being developed to address the specific needs associated with verifying the successful completion of the ITAAC as well as to incorporate lessons learned from previous NRC construction inspections. This paper does not address any resource implications.

BACKGROUND:

In 1991, the NRC began work to revise the CIP to address programmatic weaknesses that had been identified during the inspection and licensing of plants in the 1980s. The revision work was suspended in late 1994 because of the lack of nuclear power plant construction activities. Before that project was suspended, work had been done to document the lessons learned from previous NRC construction inspections and from reviews of inspection practices overseas and modular construction techniques used in the U.S. shipbuilding industry. Enclosure 1 lists the lessons learned that were documented and the inspection program issues remaining unresolved when the work was stopped and the effort documented. Enclosure 2 describes how the lessons learned and inspection program issues were integrated into the development of the CIP.

The work to revise the CIP was renewed in 2001 when the Construction Inspection Team, composed of representatives from each region, new reactor licensing, and inspection program management, was formed and tasked with updating the inspection program for use in inspecting reactors to be licensed and constructed under 10 CFR Part 52. The current effort to develop the CIP has focused on ensuring that the inspection program collects information to support the Commission in making the finding, required by 10 CFR 52.103(g), on whether the acceptance criteria in the combined license are met, and on addressing the various lessons learned from the NRC's previous construction inspection experience.

The CIP that has been developed has four parts. The first part supports a licensing decision for an early site permit (ESP), the second part supports a licensing decision on the combined license (COL) application, and the third and fourth parts support a determination on whether construction activities supporting ITAAC have been successfully completed and preparations for plant operation have been successful. Each of the inspection manual chapters described in this paper is contained in the NRC's Inspection Manual and can be found on the NRC website. The implementation of the various manual chapters will overlap, however, separating the various areas of emphasis into a distinct inspection manual chapter afforded the opportunity to focus the inspection program on the unique aspects of each area. An overview of an anticipated nuclear power plant construction schedule and the corresponding implementation of the CIP manual chapters is shown in Enclosure 3.

Inspection Manual Chapter-2501 (IMC-2501), "Early Site Permit," was issued in October 2002. Inspections in support of an ESP begin when the NRC is formally notified that an applicant is preparing an application for an ESP. The five inspection procedures implementing the requirements of the IMC verify that an adequate quality assurance framework governs the data and analyses supporting an ESP application. Because data collection and service procurement activities may take place before the staff receives an ESP application, the staff may begin

inspection activities as soon as it receives notification of the intent to submit, but prior to the receipt of an application. The inspection work related to IMC-2501 is complete if and when the ESP is issued. If an applicant for a COL does not reference an ESP, then the inspections in IMC-2501 are completed during the COL application review and would be conducted concurrent with those in IMC-2502.

IMC-2502, "Pre-Combined License (Pre-COL) Phase," was issued in June 2005. The major areas for inspections during the application phase are quality assurance, engineering, and environmental protection. Inspections in support of a COL can begin when NRC is notified of the intent to apply for a COL and when sufficient work has been done on the application to justify an inspection. Inspection will continue through the receipt of a COL application and will end when the Commission decides whether or not to issue a license. The nine inspection procedures associated with this IMC focus on quality assurance in the preparation of the application, the control of contractors, and any site work permitted by a limited work authorization. A significant portion of the activity associated with IMC-2502 is the inspection of first-of-a-kind design engineering work – the completion of the detailed engineering work for an already certified design that was not required as part of the design certification process. The scope of first-of-a-kind engineering inspections will also include the site-specific aspects of a plant being built to a certified design. The engineering inspections of a custom plant design (an uncertified design) submitted with a COL application would also be completed under IMC-2502. The inspection effort associated with this manual chapter will be complete when the final determination is made on the COL. Any followup to issues raised by inspections under IMC-2502 will be completed under IMC-2504.

IMC-2503, "Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)," was issued in April 2006, and describes the program for inspecting construction activities supporting completion of the ITAAC. Inspections of ITAAC will begin when ITAAC-related work begins. NRC inspection results, together with the information submitted by the licensee, will be the foundation of the staff's recommendation to the Commission in support of its finding on whether the acceptance criteria in the combined license have been met. Inspections related to IMC-2503 will end when the Commission has made its finding. Some ITAAC-related work may occur before the COL is issued. As a result, IMC-2503 may be conducted in parallel with IMC-2502.

IMC-2504, "Non-ITAAC Inspections," was issued in April 2006, and describes the program for inspecting programmatic areas. IMC-2504 covers a time period extending from application receipt, through construction and testing, and is completed when the transition to IMC-2515, "Light-Water Reactor Inspection Program - Operations Phase," and the reactor oversight process (ROP) is complete. Activities related to this IMC include inspections of licensee construction programs, the engineering design change process, operational programs, pre-operational and startup testing, and overall operational readiness. IMC-2503 and IMC-2504 will be conducted in parallel. Some aspects of IMC-2504 may also occur during the COL review and will be conducted in parallel with IMC-2502.

In addition to the four inspection manual chapters governing inspection, the CIP will also include IMC-2505, "Periodic Assessment of Construction Inspection Program Results." Periodic assessments of licensee performance will begin once construction inspections have started and will continue throughout the construction period. The periodic assessments will continue until the construction activities are complete and the plant is being monitored under the ROP.

DISCUSSION:

The actual inspections for new plants licensed under 10 CFR Part 52 will not be significantly different from those performed during the construction of the existing plants licensed in accordance with 10 CFR Part 50. The similarity between 10 CFR Parts 50 and 52 inspections is based on the fact that construction processes remain basically the same, even with the new designs and new construction techniques, such as the use of modular construction. For both 10 CFR Parts 50 and 52, the result of construction is an as-built plant that is composed of structures, systems, and components (SSC) that are required to perform as designed. These structures, systems, and components are the product of construction processes that must be adequately controlled to ensure that the SSCs meet all design and performance criteria.

In addition to inspecting the construction processes and their resulting SSCs, NRC inspection activities for plants licensed under both 10 CFR Part 50 and 52 also involve inspection of the programs used by the licensee and their contractors to control the processes and to confirm an adequate level of quality in the products. IMC-2504 is focused on ensuring that the programs are functioning. In the first years of a project, the licensee's construction programs, which are separate from operational programs, will be inspected. Construction programs involve quality assurance (QA) and other activities including procurement, transport, and storage controls; contractor reviews and audits; testing and calibration activities; and design verification and design change controls that support the installation of SSCs. As the construction project progresses and different programs are needed, the staff will review their development and implementation using IMC-2504.

The CIP is designed to develop a level of confidence in the licensee's programmatic controls. The staff's confidence in the licensee's control of the overall construction program is directly related to NRC use of sampling during inspections and is the foundation of the assumption that the specific construction activities inspected by NRC are representative of similar activities that did not receive direct NRC inspection.

The NRC inspection program will involve a combination of differently directed inspections, all of which are aimed at validating the acceptability of the construction programs, processes, and products. Although this concept is valid for plants licensed and constructed under both 10 CFR Parts 50 and 52, the NRC inspection program for Part 52 licensees will target the ITAAC. Although the ITAAC will be the focus when selecting which activities to inspect, the NRC staff will inspect more than just the ITAAC. In addition to inspecting the licensee's construction programs, the NRC will inspect the development and implementation of the testing programs and the development and implementation of the operational programs. The scope and content of the operational programs will have been reviewed by the technical staff during the COL application review process and approved when the COL was issued. The staff intends to inform the Commission of the status of those program before the anticipated date for loading fuel.

Thus, the NRC inspection program will be directed at two fundamental questions: (1) Have the required inspections, tests and analyses contained in the license been completed successfully and the acceptance criteria met? and (2) Is the plant and its staff ready for operation? The results of NRC inspections will be documented in accordance with IMC-0613, "Construction Inspection Reports," which will provide guidance on how to disposition inspection outcomes, including how to handle any related enforcement issues. The staff is currently working with the Office of Enforcement to develop an enforcement policy for construction under 10 CFR Part 52.

In order for NRC inspections to assess the programs, the processes, and the products while focusing on the ITAAC, the staff formulated an integrated inspection strategy. Part of the CIP strategy was the development of an inspection planning tool that organizes and groups the ITAAC for each reactor design based on common characteristics. The grouping of ITAAC into an "ITAAC Matrix" supports the identification and use of consistent inspection guidance for similar ITAAC within a single design. The ITAAC Matrix also provides a consistent approach across other reactor designs by imposing the same framework on the existing certified designs and future designs.

Recognizing that the CIP does not inspect all licensee activities, but rather uses a sampling process, the staff has also developed an ITAAC sample selection process, which prioritizes the ITAAC within each matrix group based on the value of inspecting that ITAAC, rather than the ITAAC itself. The prioritization process uses a structured decision making process to rate each ITAAC using four attributes. Those attributes are: error propensity; opportunity to confirm by means other than direct observation of the ITAAC; construction and testing experience; and safety significance. When used together, the ITAAC matrix and the sample selection process provide a basis for guiding NRC inspection sampling and the targeting of inspection resources. The functions and use of the ITAAC matrix and the ITAAC sample selection process are described in detail in Appendices B and C of IMC-2503. An overview of how the ITAAC Matrix and ITAAC prioritization process work together in inspection planning is shown in Enclosure 4. Also included in the construction inspection strategy is the concept of periodic assessment of inspection results. Within the CIP assessment process, NRC managers will periodically review inspection results that have been collected and reported in NRC inspection reports. These reviews will result in an overall assessment of activities as the plant is being constructed and will be a means for assessing the success of the licensee's programmatic controls. This assessment will also monitor NRC's progress in completing the CIP.

The assessment process will examine inspection observations and findings to determine if the licensee has demonstrated that its control and oversight of construction programs and processes has resulted in quality products. The assessment will also consider how well the licensee is managing the identification and resolution of problems. Under a "sign-as-you-go" (SAYGO) approach the NRC can "sign-off" on one area of inspection (a matrix group) once the minimum sample has been completed and a conclusion can be made that the licensee is consistently achieving satisfactory results. Under the assessment process, a "sign-off" within an ITAAC matrix family will allow NRC to reduce, but not stop, the inspections of a particular area. Conversely, inspections may be increased in areas where licensee performance warrants additional review.

10 CFR 52.99 requires that "at appropriate intervals during construction, NRC staff shall publish in the *Federal Register* notices of successful completion of inspections, tests, and analyses." These notices will inform the public not only that the licensee has completed the inspections,

tests, and analyses of one or more ITAAC, but also that the staff has completed its review of the involved ITAAC and agrees that the licensee was successful. Closeout of an ITAAC will be a process that is initiated by the licensee and involves the NRC's construction inspection organization and new reactor licensing organization. The overall approach to this process was described in SECY-00-0092, "Combined License Review Process." In the ITAAC closeout process, the licensee will inform NRC when its work related to an ITAAC is complete and the acceptance criteria have been met. The licensing staff will ensure that NRC inspection of that ITAAC is complete, including ensuring that any open items related to the acceptance criteria of the ITAAC in question have been closed. The staff will use the inspection history, together with the documentation referenced by the licensee, to perform an independent ITAAC determination. If the NRC review confirms that the ITAAC can be closed, the public will be informed of the completed status of the ITAAC through a *Federal Register* notice (FRN). The introduction of Department of Energy (DOE) regulations on standby support for certain nuclear plant delays will place an additional emphasis on timely completion of inspections and ITAAC closeout activities.

Completion of ITAAC will be accomplished by the licensee over a prolonged period, in some cases beginning prior to the issuance of the COL. For some ITAAC, this will mean significant time will elapse between the initial determination that an individual ITAAC is closed and the Commission finding, in accordance with 10 CFR 52.103(g), on whether all of the acceptance criteria are met. The staff recognizes that in such cases, normal maintenance will be needed on SSCs with associated ITAAC, and such SSCs may also need repairs. The inspection program will confirm, on a sampling basis, that the surveillance and post-maintenance testing performed in this interim period are focused not only on technical specification operability and similar operational concerns, but also on maintaining the validity of ITAAC determinations. The staff will ensure that the testing during this period confirms that the acceptance criteria continue to be met after the maintenance or repair is complete.

The CIP has been developed in a way that links the ITAAC Matrix, the selection of ITAAC for direct inspection, and periodic NRC assessment activities. Their use, along with the inspection activities discussed in IMC-2504, will look at the construction of a new nuclear power plant in a way that efficiently uses the available inspection resources to ensure that the ITAAC are complete, that the construction of the overall facility is complete, and that the plant and its staff are ready for operation. The information collected through the CIP will allow the NRC to determine, with reasonable assurance, that the plant has been built properly in accordance with its design, and that the acceptance criteria in the ITAAC have been met.

COMMITMENTS:

Listed below are the actions or activities committed to by the staff in this paper:

1. The staff will inform the Commission on the details of the ITAAC closeout process in approximately 12 months when discussions with stakeholders are expected to be complete.

2. Inspection procedures covering the inspection of construction activities will be issued over the next 12 months.

CONCLUSIONS:

The staff has described the inspections to be performed during construction of plants licensed under 10 CFR Part 52. The inspection program guidance for construction-related activities occurring during the review of an early site permit and a COL application is complete and has been issued as IMC-2501 and IMC-2502. The inspection requirements and inspection guidance for each has been issued in the supporting inspection procedures. Inspection guidance for early site permit reviews has been used to support the review of ESP applications for the North Anna, Clinton, and Grand Gulf sites. Inspection guidance needed by the staff to conduct inspections in support of a COL application review is ready for use.

The program guidance for ITAAC and non-ITAAC inspections during construction was issued as IMC-2503 and IMC-2504, respectively. The inspection requirements and inspection guidance are being developed and are scheduled to be issued as inspection procedures over the next 12 months. The CIP will be fully functional by the time the first COL application is expected to be submitted.

COORDINATION:

The Office of the General Counsel reviewed this package and has no legal objection.

/RA/

Luis A. Reyes
Executive Director
for Operations

Enclosures:
1. Construction Inspection Lessons Learned
2. Integration of Lessons Learned
3. Construction and CIP Schedules
4. ITAAC Sample Selection Process

Construction Inspection Program
Lessons Learned

INTRODUCTION:

In 1991, NRC began work to revise the CIP to address programmatic weaknesses that had been identified during the inspection and licensing of several plants in the 1980s. The revision work was suspended in late 1994 because of lack of nuclear power plant construction. When the process to revise the CIP was suspended in 1994, work had been done to document the lessons learned from previous NRC construction inspections and from reviews of inspection practices overseas and modular construction techniques used in the U.S. shipbuilding industry.

The effort was renewed in 2001 when the Construction Inspection Team, composed of representatives from each region, from the new reactor licensing organization and from inspection program management in the Office of Nuclear Reactor Regulation, was formed and tasked with fully revising the program to be used for inspecting reactors to be licensed and constructed under 10 CFR Part 52. The current effort to develop the CIP has focused on addressing the various lessons learned listed below from previous NRC construction inspection experience.

Enclosure 2 discusses how the lessons learned were addressed and how the various inspection policy issues were resolved in the development of the new CIP.

LESSONS LEARNED

The 1991 effort identified the areas listed below to be addressed by a revised construction inspection program.

The location within the new construction inspection program where each issue is being addressed is indicated by the manual chapter(s) or CIP project identified in parentheses after each entry.

1. Inspection Program Management

    a. Ensure that the objectives of the inspection program support the licensing decision on whether all of the inspections, tests, and analyses are performed and that the prescribed acceptance criteria have been met by supporting the Commission finding in accordance with 10 CFR 52.103(g). (IMC-2503)

    b. Coordinate all aspects of the construction inspection program, including planning, scheduling and implementation, to ensure that all aspects of construction are properly inspected. (IMC-2503 and IMC-2504)

    c. Ensure operational readiness of the licensee to load fuel. (IMC-2504)

    d. Plan for the transition from the construction to the operating phase. (IMC-2504)

2. Inspection Program Structure and Implementation

   a. Begin onsite inspection whenever site preparation work begins, perhaps even before the combined license (COL) is issued. (IMC-2502)

   b. Establish inspection requirements for systems, structures and components as well as plant programs. (IMC-2503 and IMC-2504)

   c. Closely coordinate planning and scheduling of inspection activities with plant construction plans. (Primavera scheduling)

   d. Begin design engineering inspections in conjunction with the application review (first-of-a-kind engineering inspections). (IMC-2502)

3. Inspection Documentation

   a. Provide simple and coherent methods for inspectors to use to record the results of inspections. (IMC-0613 and CIPIMS)

   b. Ensure that inspection reports fully document all areas that have been evaluated during construction. (IMC-0613 and CIPIMS)

   c. Ensure balanced inspection reporting by documenting both satisfactory and unsatisfactory findings. (IMC-0613 and CIPIMS)

4. Quality Processes

   a. Verify the effectiveness of the licensee's quality processes. (IMC-2501, 2502, 2503, 2504)

   b. Ensure that the licensee can accurately translate high level design information into detailed engineering and fabrication drawings (engineering design verification). (IMC-2502 and 2504)

   c. Ensure the effectiveness of licensee oversight of the construction activities (problem identification and resolution). (IMC-2504 and IMC-2505)

UNRESOLVED INSPECTION PROGRAM ISSUES

While the work in the 1990s established a basic framework to guide the revision of the construction inspection program, specific details had not been established when the work was suspended. As a result, the unresolved inspection program issues listed below were also identified:

The location within the new construction inspection program where each issue is being addressed is indicated by the manual chapter(s) or CIP project identified in parentheses after each entry.

5. Determine the best method of publicizing significant findings, including whether to publish them in the Federal Register. (IMC-0613)

6. Determine if significant findings should be issued by routine or special inspection reports. (IMC-0613)

7. Refine the guidance on how the different types of inspection findings should be made and who should make them. (IMC-0613)

8. Clarify the organizational structure and responsibilities for developing and implementing the CIP, including the roles of regional offices. (SECY-06-0041, “Proposed Strategy to Support Implementation of the New-Reactor Construction Inspection Program”)

9. Define the extent of design engineering evaluations to be done as part of license application review, and the extent to which design engineering will be inspected under the CIP. It will be necessary to validate "first-of-a-kind” engineering, and the design engineering and design change processes, to ensure fidelity of construction drawings to approved design. (IMC-2502 and IMC-2504)

10. Define the protocol of licensee notification to NRC of ITAAC completions, NRC staff verification of the same, and the subsequent publication of Federal Register notices. (Future staff Commission paper and future NRR Office Instruction)

11. Review and revise inspection procedure 94300, "Status of Plant Readiness for an Operating License," to be consistent with 10 CFR Part 52 and CIP requirements. (IMC-2504)

12. Develop a policy to implement a Sign-As-You-Go (SAYGO) process for future nuclear power plant construction projects. (IMC-2503 and IMC-2505)

13. Establish policy for publicizing/docketing construction inspection reports (including the particulars of inspection report formats, and the format that should be used to make reports available electronically to the public). (IMC-0613)

14. Establish the significance of NRC management's certification that a construction inspection procedure has been satisfactorily completed, particularly with respect to ITAAC verifications, significant findings, and SAYGO points. (IMC-0613)

15. Develop policies for inspection sampling. (IMC-2503 and IMC-2504)

Integration of Construction Inspection Lessons Learned into the 10 CFR Part 52 CIP

Inspection Program Management[1]

Lessons learned from previous construction activities in the area of inspection program management resulted in using four inspection manual chapters (IMC) to describe distinct aspects of the CIP rather than a single all-encompassing document. The inspection manual chapters compartmentalize the inspection activities to reflect the anticipated use of the 10 CFR Part 52 licensing process. Although the nature of the work may result in the IMCs overlapping in their implementation, each is directed at a specific aspect of 10 CFR Part 52, and the IMCs are designed to be completed independent of each other. (LL1b)

For example, IMC-2501 describes the inspections performed to support the issuance of an early site permit (ESP). Those inspection activities must be completed before an ESP is issued. However, if an applicant for a combined license (COL) under 10 CFR Part 52 proposes a site not previously approved, the inspection program contained in IMC-2501 will be conducted in parallel with the inspections contained in IMC-2502, which supports the review of the COL application.

IMC-2503, "ITAAC Inspections," and IMC-2504, "Non-ITAAC Inspections," will be implemented as soon as they are needed to monitor construction activities. If long lead-time components are ordered early, these inspections may occur even before the COL application is submitted. Because of the importance of ITAAC in the licensing process and the need to support the Commission's finding under 10 CFR 52.103(g) on whether the acceptance criteria have been met, the staff issued a manual chapter specifically addressing the inspection of ITAAC. This approach allowed the staff to write inspection procedures and devise sample selection criteria that focus on ITAAC and ITAAC-related activities. Focusing on the ITAAC will assure sufficient inspection information to support close out of each ITAAC and the subsequent Commission finding. (LL1a, 2a)

IMC-2504 contains a wide range of inspection activities. The inspection of the licensee's construction program will focus on its programmatic elements. These include but are not limited to construction QA; the program for reporting defects under 10 CFR 50.55e; problem identification and resolution for construction activities (including those related to allegations); training and qualification of construction workers; oversight and control of all contractors; planning of significant work activities including adequacy of construction procedures; and the process used to submit an ITAAC determination to NRC for verification of its successful completion. (LL 2b)

A significant portion of the inspections in IMC-2504 are directed at ensuring that the plant staff and the programs they will use to operate the plant are ready for fuel load, startup testing, and power operations. The operational readiness of the plant will depend, at least in part, on the

[1] Within the paragraphs of this enclosure, the specific lesson learned or inspection program issue from the list contained in Enclosure 1 is denoted by LL## and IPI##, respectively.

status of the implementation of the operational programs. The staff will focus its inspections on assuring that the operational programs are being developed and implemented consistent with the description and schedule described by the licensee in the application and approved by the Commission in the COL. (LL 1c)

The transfer of the plant from the construction inspection organization to the regional operating reactor organization will take place gradually as construction and initial testing activities are completed. As in the restart of Browns Ferry Unit 1, the staff will begin using the reactor oversight program (ROP) inspection procedures as the plant activities allow. Completion of IMC-2404 will occur when construction activities are complete; any remaining construction open items have been appropriately captured in the licensee's corrective action program; and the ROP tools can be used and will provide sufficient information for determining licensee performance in each cornerstone of safety. At that time, the inspection of a new plant will be in accordance with the ROP as defined in IMC-2515, "Light-Water Reactor Inspection Program - Operations Phase." (LL 1d)

The staff has identified the need to evaluate the characteristics of the new reactor designs against the ROP bases and the ROP tools, such as the Significance Determination Process (SDP) and the Performance Indicators (PI). Initial reviews suggest that because the risk profiles of the new reactor designs are different from those of the existing plants under the ROP, some revisions may be needed, but the overall ROP approach can be successfully used on plants licensed under 10 CFR Part 52.

Inspection Program Implementation

Successful implementation of the CIP is closely tied to the qualification of NRC inspectors. A new inspector technical proficiency training and qualification journal is being developed to ensure that the construction inspectors have acquired the knowledge and developed the skills necessary to implement the CIP and evaluate licensee performance during construction. Appendix C-9 will be added to IMC-1245, "Qualification Program for the Office of Nuclear Reactor Regulation Programs," and will be used to develop the technical proficiency of construction inspectors. Although Appendix C-9 is not scheduled to be issued until later in 2006, incoming construction inspection staff can begin the inspector qualification process immediately by completing the basic inspector qualification requirements in Appendices A and B of IMC-1245.

The anticipated rapid pace of construction will require that NRC have a means for monitoring the licensee's construction schedule in order to remain aware of when the key construction activities selected by NRC for inspection will occur. The staff and the industry have held on-going discussions on how to share electronic construction schedules. These discussions have identified that the reactor vendors have used the Primavera scheduling tool. NRC has since purchased the Primavera software and several members of the construction inspection team have completed training on Primavera. This will allow the staff to understand how the vendors are using the tool and how NRC may use the program to schedule its inspections. The construction inspection team will be using a vendor schedule to complete a test program aimed at understanding how to work with the different versions of Primavera that might be used by the vendors or the licensees, and how to update NRC's schedule, in real time with revised licensee information, without losing data. The staff recognizes that once a reactor has been purchased and scheduling has been turned over to the licensee, the licensee and its designated agents

(e.g., contractors) may then alter the basis, coding, and activities of those Primavera files to make them plant-specific. However, the staff is working to ensure that construction schedules are thoroughly considered so that inspection planning will reflect our understanding to the fullest extent possible. (LL 2c)

One key issue related to sharing construction schedules, i.e., that reactor vendors consider such schedules proprietary, was resolved in June 2004. The NRR staff worked with the Office of the General Counsel (OGC) to explore how best to allow NRC to obtain frequent updates to a construction schedule without the need for the licensee to make repeated requests for withholding of proprietary information in accordance with 10 CFR 2.390. NRR and OGC staff determined that, in accordance with 10 CFR 2.390, the licensee would initially submit the schedule with a request to withhold it from public disclosure and would be responsible for demonstrating that the information submitted to NRC is properly designated as proprietary and can be withheld. The staff then will review the submittal in detail to ensure that there is a legitimate basis for withholding the information as proprietary. Because the nature of the information would not change from initial submittal to update, no additional proprietary determinations would be needed and routine schedule updates from the licensee would be considered proprietary and would be withheld from the public without further evaluation. This approach would allow for a single proprietary determination, limited to the schedule and its updates, that would apply to an entire construction project.

During the construction of plants licensed under 10 CFR Part 50, engineering inspections were conducted while work authorized under a construction permit was being completed. The staff then considered the information gained through the engineering inspections when making its recommendation on whether or not the NRC should issue an operating license. However, the future use of certified designs and a combined construction permit and operating license when licensing plants under 10 CFR Part 52 precludes such a process, and the inspection program addresses how the staff will complete design engineering inspections. The staff will inspect and review the adequacy of licensee design engineering early in a construction project, possibly beginning soon after receipt of a licensing application, to assess the licensee's programs and processes for translating design information into construction documents and to assess the success of those programs based on the quality of the products they generate. Site-specific engineering, as well as first-of-a-kind engineering for the lead plant of each certified design, will be assessed during these inspections. IMC-2502 provides for inspections of first-of-a-kind (FOAK) engineering. These inspections will cover the engineering for the reactor design that was not covered as part of the design certification process. FOAK engineering inspections will be used to ensure that the design process is effectively implemented as the engineering is completed for the first plant built of a certified design or for an application that includes a custom design. The site-specific portions of subsequent applications referencing each of the certified designs will also be inspected using the FOAK inspection guidance. Through IMC-2504, NRC will assess the effectiveness of the licensee's design change process in maintaining the fidelity of high-level certified design information as changes to the engineering design are made. (LL 2d)

Under IMC-2503, the scope of ITAAC inspections will be guided through the use of the ITAAC matrix and the results of the sample selection process. Grouping of ITAAC using common characteristics was critical in establishing uniform groups upon which sampling rules could be applied. Expert panels, consisting of inspectors from each region as well as staff from new reactor licensing at headquarters, have completed a design-specific ITAAC matrix for both the

ABWR and the AP1000. The results confirmed that the matrix rules could be applied successfully to different reactor designs. As future reactor designs are certified, an ITAAC matrix will be populated with design-specific ITAAC and the information used for all plants built using that design. Each row and column of the ITAAC matrix has an associated inspection procedure that will be used when inspecting field work related to the ITAAC in that row or column. Approved procedures for inspection of ITAAC are scheduled to be issued over the next 12 months. (LL2.b)

The sample selection process considers four attributes to rate the 'value' that can be gained through direct inspection of construction activities related to an ITAAC. The sample selection process for the AP1000 was completed using a series of expert panels. The panels, which consisted of inspectors from each region as well as staff from new reactor licensing, risk assessment, and component performance and testing at headquarters, rated each ITAAC for each of the attributes. The results confirmed the functionality of the decision making process and produced a list of ITAAC for the AP1000, sorted by matrix group, and presented based on the inspection value. The ITAAC sample selection process will be completed for future designs after design certification or when the COL is issued for a plant using a custom design. From this information, the staff will define the minimum sample set for each group to establish the criteria for completion of the various inspection procedures and for use in establishing the rules that will govern the assessment process. The basis for the sample selection process is detailed in a report from Information Systems Laboratories dated September 30, 2005, titled "Technical Report on the Prioritization of Inspection Resources for Inspections, Tests, Analyses and Acceptance Criteria (ITAAC)." (ADAMS Accession Number ML060740006)

Inspection Documentation

The staff has explored methods for collecting inspection information in a way that would make it easily available and in a form that would support the staff in making its recommendation to the Commission on the completion of the ITAAC. To ensure that the bases for the staff's recommendation on whether or not the acceptance criteria have been met are complete and well balanced, inspection results will not be limited to documentation of only problem areas. Inspection observations will also document instances where inspectors found work being performed successfully. This approach will allow the staff to make a recommendation to the Commission based not only on the lack of problems but also on a record of successes. (LL 3b, 3c)

In the past, information about a construction project was often available in the various NRC inspection reports, however, there was no means for efficiently locating and compiling the information. The construction inspection team has been working with the Information Management Branch within NRR to add a database module under the umbrella of the Reactor Program System (RPS). The database is called the Construction Inspection Program Information Management System (CIPIMS) and will be used to characterize and record individual construction inspection observations, including any findings or open items that may result from an observation. The characterization of each inspection observation will establish the links to the various inspection manual chapters, to inspection procedures, to individual ITAAC and to an ITAAC matrix group. Since CIPIMS will be linked to the other parts of RPS, the staff will use those existing functions to assign report numbers, to select docket numbers, and to monitor inspection program completion status. CIPIMS will allow NRC inspectors to record observations and inspection team leaders to review and approve individual inspection

observations electronically. The staff will use CIPIMS to compile and generate draft inspection reports comprised of the various approved observations. The staff then will format the document, obtain final management approval, declare the report an official agency record, and issue the final approved inspection report in the same way it is done today. (LL 3a)

The primary benefit from using CIPIMS is that it will allow the staff to sort inspection report information using the characteristics of the various ITAAC. Identifying the characteristics of the ITAAC associated with an inspection observation as each observation is generated will allow NRC to compile a complete and accurate record of the areas inspected and evaluated throughout the course of construction. As a result, the staff will also use CIPIMS when periodically assessing inspection results and monitoring NRC's progress in implementing the overall CIP. IMC-2505, "Periodic Assessment of Construction Inspection Program Results," is under development and is scheduled to be issued in 2007.

CIPIMS will also be used as an ITAAC is being closed. When the licensee informs NRC that an ITAAC has been completed and the acceptance criteria have been met, the staff will use CIPIMS to review the complete NRC inspection history for that ITAAC to ensure that all of the planned NRC inspections related to that ITAAC have been completed and that there are no open items that would prevent NRC from concluding that the licensee has successfully met the acceptance criteria. Information about the completion of an ITAAC will be included in CIPIMS. This will allow the staff to monitor the licensee's progress toward completion of all of the ITAAC.

Guidance for the inspection staff on how to characterize and document construction inspection observations will be contained in IMC-0613, "Documenting Construction Inspections." IMC-0613 will provide the criteria for identifying findings and describe appropriate followup to close any resulting open items. The format and content of inspection reports and the administrative processes for populating and maintaining CIPIMS will be addressed in IMC-0613. The manual chapter will also describe the types of inspection findings for which enforcement action would be appropriate. An update to the construction supplement of the existing enforcement policy is being considered to describe the enforcement actions appropriate for a plant licensed and being constructed under 10 CFR Part 52. (IPI 6, 7, 13, 14)

Quality Processes

The successful implementation of a comprehensive quality assurance (QA) program by the licensee will be an important indicator of the licensee's ability to manage the various activities associated with a large construction project. Each of the four CIP manual chapters provides for review of different aspects of the licensee's QA program and inspection of program implementation during the performance of construction-related work. For example, IMC-2501 requires reviews of the QA measures exercised in the development of the application for an early site permit. In accordance with IMC-2502, NRC staff will inspect the scope of the licensee's QA manual for construction and confirm that the procedures and instructions to assure quality are being implemented by appropriately trained and qualified staff. As set forth in both IMC-2503 and IMC-2504, each observation of construction activities will monitor the implementation of the QA program by the licensee and its contractors to ensure their ability to find and appropriately characterize and resolve any conditions adverse to quality that may occur. A licensee's ability to provide adequate levels of oversight is a key component in NRC's licensee assessment program. During the periodic assessment reviews by the NRC, the ability

of the licensee to find and successfully resolve problems will be considered when deciding if a SAYGO determination is warranted. The structure of the NRC's construction inspection process, including the rules for making and documenting SAYGO determinations, will be detailed in IMC-2505. (LL 4a, 4b, 4c) (IPI 12)

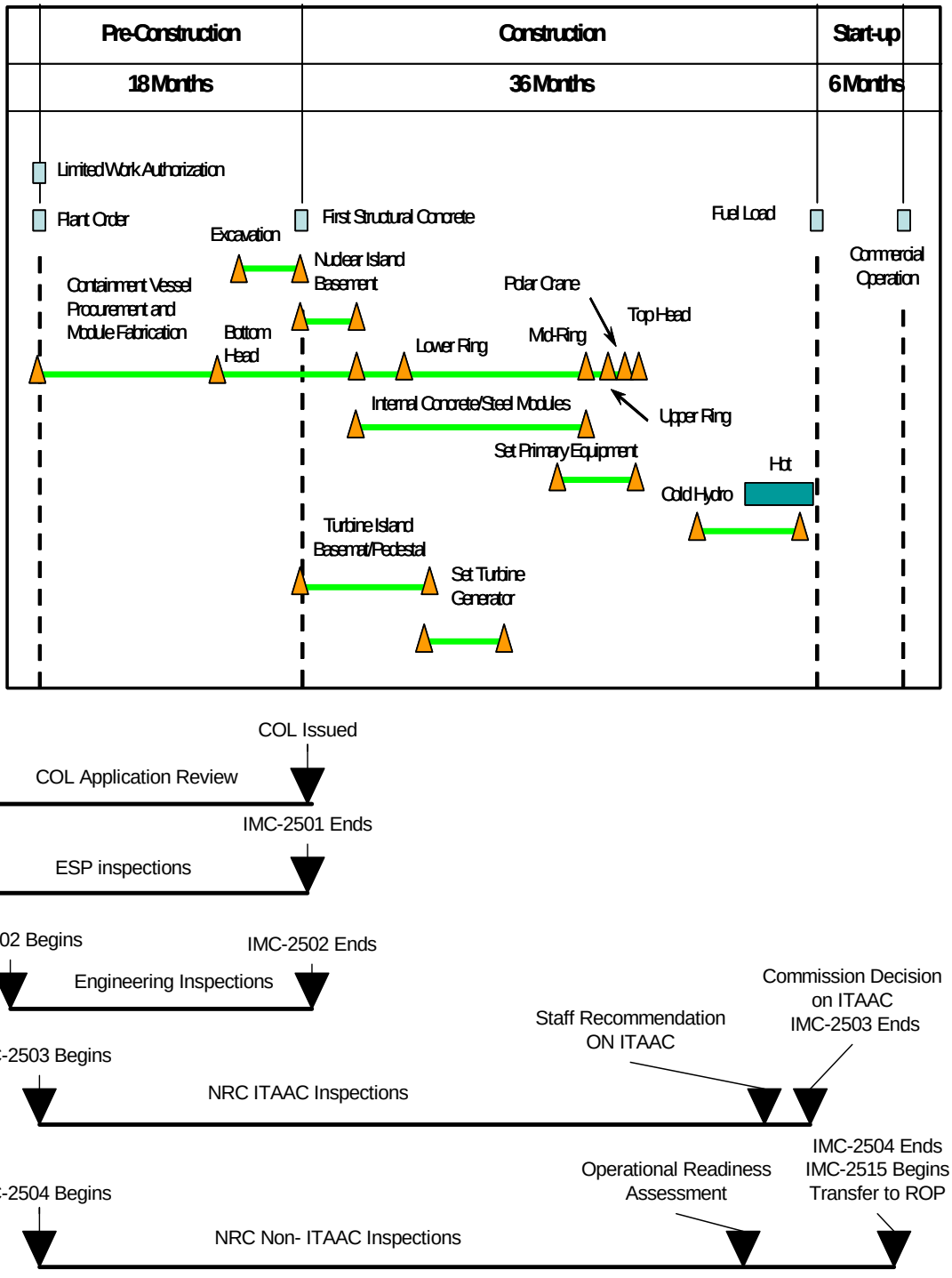
ITAAC Closeout

The process of closing out each individual ITAAC involves action by the licensee and NRC's construction inspection and new reactor licensing organizations. A proposed program for NRC verification and closeout of a licensee's completion of ITAAC was described in SECY-00-0092. Elements of this proposed program included certification by the licensee to the NRC that an ITAAC had been successfully performed and that the acceptance criteria had been met. The industry and NRC staff currently are discussing the specific form and content for such a letter. The staff will continue to engage the industry to reach a common understanding on what information is necessary to document the successful completion of a specific ITAAC. The staff plans on using an approach for engaging stakeholders similar to that used for operational programs. The results of those interactions and a full description of the ITAAC determination process will be presented in a future Commission paper. Successful resolution of all issues associated with NRC review of ITAAC documentation is critical because of the significant number of licensee ITAAC closeout letters the staff expects to receive during the later stages of construction. And because current projections indicate that construction will be occurring on multiple plants at the same time, the staff expects to have to verify a significant number of ITAAC closeouts simultaneously. In addition, the introduction of DOE standby support for certain nuclear plant delays emphasizes the importance of ensuring the timely completion of inspections and ITAAC closeout activities.

Upon receipt of an ITAAC letter, the staff will perform an acceptance review to ensure that the information submitted is appropriate and complete for each specific ITAAC. The licensing staff will then consult with the construction inspection staff to confirm that planned inspections have been completed for that ITAAC and that there are no open items or findings related to that ITAAC that would prevent it from being closed. NRC licensing staff will perform an independent ITAAC verification and closeout that will be informed by a review of the inspection history contained in CIPIMS and a review of the information submitted or referenced by the licensees in its ITAAC letter. In this way, every ITAAC will receive a final review by the staff.

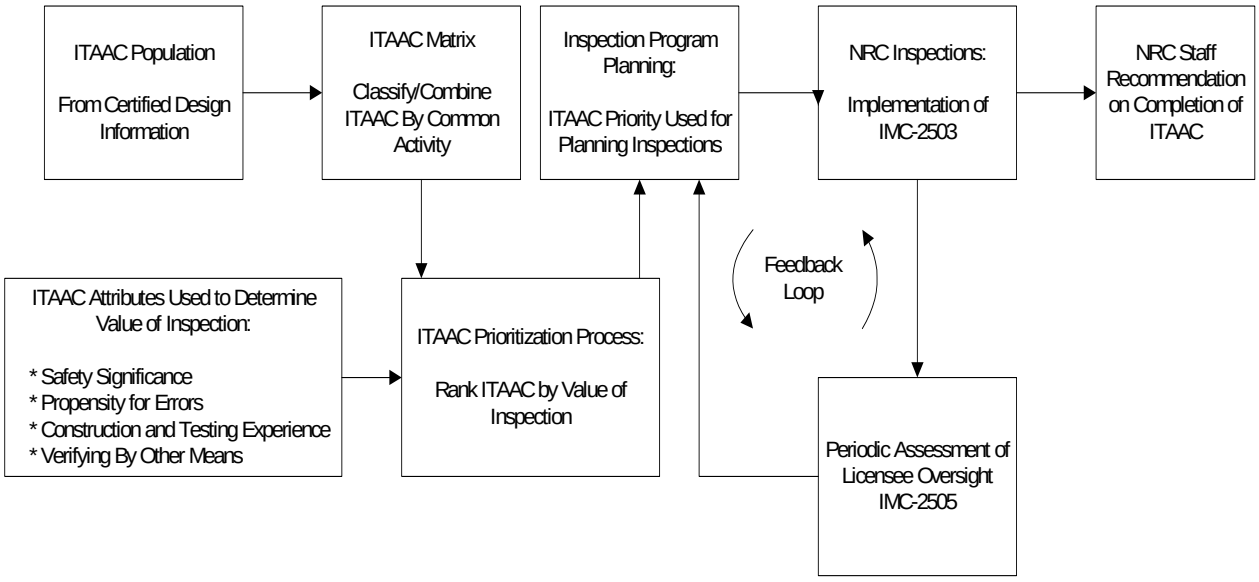
In accordance with 10 CFR 52.99, the staff is required, at appropriate intervals during construction, to publish *Federal Register* notices of the successful completion of inspections, tests, and analyses. The periodic notices will not only inform the public that the licensee has completed the inspections, tests, and analyses in one or more ITAAC, but also that the staff has completed its review of the involved ITAAC and has found that the licensee successfully completed the ITAAC. The notices will list the licensee documents reviewed, identify the ITAAC inspections performed and their results, summarize the pertinent information from the licensees ITAAC determination bases documents relied on by the staff when reaching its conclusion related to each ITAAC, and notify the public of the staff's conclusions. The specific content and frequency of issuing the notices of successful ITAAC completion are still being considered but will be fully described in a future paper to the Commission. (IPI 5 and 10)

Anticipated Nuclear Power Plant Construction Schedule and Construction Inspection Program Implementation



Enclosure 3

ITAAC Sample Selection Process



- Objective of ITAAC Sample Selection: Provide reasonable assurance that a significant construction flaw by the licensee does not go undetected (i.e., all ITAAC have been satisfied).
- A prioritization methodology is used, as opposed to statistical sampling, to provide an educated and dynamic inspection program.
- The methodology prioritizes the value of inspecting each ITAAC, rather than the ITAAC itself.
- The methodology uses expert panels and a structured decision-making process to evaluate ITAAC based on certain attributes.
- A coverage review ensures that a diverse set of ITAAC are inspected.