POLICY ISSUE
NOTATION VOTE

February 22, 2006 SECY-06-0041

FOR: The Commissioners

FROM: Luis A. Reyes
Executive Director for Operations

SUBJECT: PROPOSED STRATEGY TO SUPPORT IMPLEMENTATION OF THE NEW-REACTOR CONSTRUCTION INSPECTION PROGRAM

PURPOSE:

This Commission paper requests approval of a strategy for implementation of the construction inspection program (CIP) for new reactors. The staff will incorporate the Commission's direction into development of the FY 2008 budget, including updating the FY 2007 budget.

BACKGROUND:

As discussed in SECY-06-0019, "Semiannual Update of the Status of New Reactor Licensing Activities and Future Planning for New Reactors," which updated the Commission on the status of new-reactor licensing activities, the industry has expressed increased interest in licensing and constructing new reactors. The industry has indicated that the first combined license (COL) applications will be submitted in late FY 2007, with fabrication of large components beginning about 18 months after a COL application is submitted. Although detailed industry schedules for new construction activities are not currently available to the staff, the above general schedule requires the staff to budget resources for the associated inspection activities as part of the FY2007-2008 budget cycle, in order to be prepared to begin construction related inspection activities as early as FY 2009. Additionally, depending on the staffing strategy selected, the staff may need to begin efforts soon to obtain office space to support the increase in staff.

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To prepare for the construction of new reactors licensed in accordance with 10 CFR Part 52, a new construction inspection program (CIP) is being developed. The new CIP builds on the lessons learned from the construction of the existing fleet of operating reactors. The CIP comprises four different parts, and is described in Inspection Manual Chapter (IMC) 2501, "Early Site Permit Inspections"; IMC 2502, "Pre-Combined License (Pre-COL) Inspections"; IMC 2503, "ITAAC Inspections"; and IMC 2504, "Non-ITAAC Inspections." These Inspection Manual Chapters will cover all aspects of the inspection program from early site preparation work, through construction, to the transition to inspections under the Reactor Oversight Process for operating reactors. IMCs 2501 and 2502, and the associated inspection procedures, are in place. IMCs 2503 and 2504, and their inspection procedures, are under development, and are scheduled to be in place well before the start of on-site construction activities.

The results of inspections conducted under IMC 2503, "ITAAC Inspections," will support the Commission in determining whether the acceptance criteria in the combined license are met, as required by 10 CFR Part 52.103(g).

DISCUSSION:

Successful implementation of the CIP, as described in IMCs 2501 through 2504, will require four main functions: 1) day-to-day inspections at the construction site, 2) on-site inspections by specialist inspectors, 3) off-site inspections (e.g., vendor inspections), and 4) documentation and public notification of the successful completion of the inspections, tests, analyses and acceptance criteria (ITAAC). ITAAC are part of the combined license and define specific requirements to be met during construction. A functional statement for each of the above four areas is enclosed (Enclosure 1). Options for implementation of the vendor function within the CIP are still being developed.

The staff considered various options for allocating the work necessary to support the implementation of the CIP in the other functional areas. The staff first concluded that:

- There should be an onsite construction inspection staff at each construction site.

- In accordance with 10 CFR 52.99, the Nuclear Regulatory Commission (NRC) will issue a notice in the *Federal Register* informing the public of the successful completion of an ITAAC. The Office of Nuclear Reactor Regulation (NRR) will issue the notices based on licensee documentation and the NRC's inspection history related to an ITAAC.

- Contractors to support the regional implementation of the CIP will be managed in NRR. Contractors may be needed if the number of units to be constructed increases faster than the agency can recruit and train inspectors; if the agency has trouble recruiting staff, in part because of competition from the industry for the same individuals; or if unique technical expertise is required. NRR has broad experience with contract administration and is co-located with the other agency offices that participate in establishing and administering contracts.

These conclusions are consistent with past staff practices. The primary issues remaining are: (1) where to locate the specialist inspection resources and (2) how to assign those resources to conduct construction inspections.

In considering these two issues, the staff concluded that the following benefits apply equally to Option 1, 2 and 3.

- Greater ease of recruiting in the regions due to the lower costs of living in the regions, in contrast to the Washington, D.C., area.

- The proximity of a major airport to each of the regional offices.

- The ability of the regions to leverage existing inspection staff to initially staff the construction program with experienced inspectors.

The staff considered the following four options in detail. A list of the benefits and challenges of the options discussed below is enclosed (Enclosure 2). With respect to the cost of each option, the staff believes that the total cost for Option 1, Option 3, or Option 4 will be greater than the total cost for Option 2.

Option 1: Locate all specialized inspection resources in a single region which would schedule all specialist inspectors nationwide.

In general, locating all specialist inspectors in a single region offers the benefit of efficient staff utilization and improved communication among inspectors.

This option has significant challenges including human capital and infrastructure issues arising from a large staff increase in a single region. The construction inspection program may have a negative impact on the operating reactor focus in the region where the specialist inspectors are assigned. Option 1 also complicates scheduling of specialist inspections because three of the regions would need to coordinate with the one region with the resources in order to obtain staff to complete some inspections. This option also largely removes a significant aspect of construction inspection from the other three regional offices, although each region will ultimately have responsibility for assuring the adequacy of construction for sites within its geographic area. The regional administrator of the selected region will be faced with managing both an operating inspection organization and a construction inspection organization.

Option 2: Locate specialist inspectors in all of the regions proportional to the number of plants planned for construction in each region. Each region would control its own resources.

In general, locating specialist inspectors in each region offers a greater opportunity for each regional administrator to directly control the construction inspection program for his or her region. In addition, accountability for inspection program completion is clear. Staffing on-site inspections by specialist inspectors would require less coordination with other regions and, when assistance from other regions was needed, would be accomplished consistent with the present staffing approach for operating reactors. This option also offers the benefit of facilitating communication with external stakeholders by allowing the region to build on existing outreach efforts.

Under Option 2, regions where the number of construction projects is low would face the challenge of minimizing construction inspection staff underutilization.

Option 3: Locate a majority of the specialist inspectors within a single region which would be designated a “center of construction inspection expertise.” The remaining inspectors would be divided among the other three regions. Under this option, the center of expertise would manage the specialist inspection function and would supplement the specialist inspectors in the other regions as circumstances dictated.

In general, establishing a center of construction expertise in a single region and assigning each region some specialist inspectors would allow each region to expand its knowledge base in the construction area and would promote greater consistency in implementation of the construction inspection program. This option is arguably more flexible and would be better able to respond to uncertainties in the number of plants to be built.

A significant challenge with Option 3 is that responsibility for completion of the inspection program would be distributed. In addition, like Option 1, this option would significantly increase the size of the staff in the region selected as the center of construction expertise, not only because a majority of the inspectors would be assigned to one region, but also because of the addition of onsite inspection staff for each construction site within that region. This option would also complicate the scheduling of resources.

Option 4: Form a separate and independent Construction Inspection Office at a new location either away from or near an existing regional office. Responsibility for the construction inspection program at all sites would rest totally with this office. The existing four regional offices would assume responsibility for sites of new reactors at some point during the transition from construction to operation. Under Option 4, an operations resident would be assigned to the site as construction neared conclusion and would report directly to the Regional administrator for the geographic area in which the site is located. All other construction inspection staff would report to the Director of the Construction Inspection Office. This new office would report to the Deputy Executive Director for Reactor and Preparedness Programs.

In general, establishing a Construction Inspection Office would improve the consistency of the implementation of the construction inspection program nationwide. This option provides clear accountability for completion of the inspection program and eliminates the potential for diverting attention from operating reactors. Human capital benefits include more focused recruiting.

A significant challenge associated with Option 4 is that the regional staff will be disconnected from the plant as it is being constructed. Other challenges include high potential impact if experienced inspectors are transferred to initially staff the organization. If experienced inspectors are not used, there will be significant training needed to adequately prepare new inspectors. Option 4 also has the potential to cost more than the other options. The costs would be associated with establishing a new organization at a new location.

COMMITMENTS:

This paper contains no new commitments. The staff will implement the construction inspection program consistent with the Commission’s direction.

RECOMMENDATION:

The staff recommends that the Commission approve Option 2. Under Option 2 each regional administrator will be provided the resources needed to accomplish the construction program for each new reactor unit in his or her region, thereby largely eliminating the coordination challenges created by the other options. As noted above, Option 2 is consistent with past staff practices. Because so much time has passed since the staff has had significant experience with "ground up" construction, the staff concludes that the best approach to staffing is the traditional approach. The staff anticipates that some use of contractor resources will likely be required and this will be coordinated by NRR.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection to its content.

The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections.

/RA/

Luis A. Reyes
Executive Director
for Operations

Enclosures:
1. Functional Statements
2. Comparison of Options

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Enclosures:
1. Comparison of Options
2. Functional Statements

ADAMS Accession No.: ML060250030 *via email

OFFICE	DIRS/IRIB	TECH ED	DIRS/DD	PMAS	DNRL/DD
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OFFICE	OCFO*	OGC	NRR/OD	OEDO
NAME	LBarnett (AAzeem for)	RWeisman	JDyer (BBoger for)	LReyes
DATE	2/8/2006	2/17/2006	2/8/2006	

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Functional Statements
for Implementation of the Construction Inspection Program

Onsite Construction Inspection

Assesses onsite reactor construction activities through day-to-day inspection. Primary interface with the licensee for scheduling and planning inspections of ITAAC and ITAAC-related activities and for assessing operational readiness.

Construction Inspection Support

Provides specialized inspection support to the onsite inspection organization for ITAAC and ITAAC-related activities and processes in the areas of engineering (including first-of-a-kind engineering) and technical specialties. Also supports inspection of operational programs and operational readiness assessments.

Vendor Inspections

Provides expertise for inspections related to procurement and fabrication processes and vendor quality assurance programs (10 CFR Part 50, Appendix B). Supports inspections of commercial grade dedication activities and processes for reporting defects of new reactor services or components. Provides inspection support at remote fabrication facilities to ensure compliance with QA commitments in the application and license related to vendors.

Licensing

Coordinates the review of licensee ITAAC closeout documentation when the region has completed its inspection of an ITAAC. Documents the NRC's basis for accepting the licensee's ITAAC closeout, and drafts and issues *Federal Register* notices announcing the licensee's successful completion of an ITAAC, as required by 10 CFR 52.99. Performs licensing project management, as appropriate.

Comparison of Options for Specialty Inspection Support

The level of staffing needed to implement the construction inspection program is still under discussion pending completion of all of the construction inspection procedures. The organization would include inspectors who would conduct structural, mechanical, and electrical and instrumentation inspections.

The following benefits apply equally to Options 1, 2, and 3. These benefits may, or may not, apply to Option 4, as discussed further below.

1. Greater ease of recruiting due to the lower costs of living in the regions than the Washington, D.C., area.
2. Proximity of a major airport to each of the regional offices.
3. Ability to leverage existing inspection staff to initially staff the construction program with experienced inspectors.

Option 1: Locate all specialized inspection resources within a single region which would schedule all specialist inspectors nationwide.

Benefits:

- Staff utilization will be improved as a result of centralizing resources. The off-site organization will probably not need to grow incrementally to support multiple projects. Specific needs will depend on the timing of the applications and construction activities. This option minimizes the impact of uncertainty in the number and location of plants to be built.

- Resources may be saved due to the economies of scale in establishing the necessary infrastructure in a single location.

- Inspectors in the single region responsible for construction would develop an extensive expertise in construction programs and processes by being focused only on those activities.

- Implementation of the construction inspection program will be more consistent nationwide. By having all off-site inspectors located in a single location, there would be more consistent training provided to the inspectors, and there would be only a single set of management expectations regarding program implementation for off-site inspectors.

- The generic nature of issues can be identified more rapidly. When technical or programmatic issues are identified at a construction site, this option will allow easier assessment of the applicability of the issue at other construction sites.

- If multiple licensees choose to implement modular construction techniques at a remote location (for example, several licensees using a common shipyard to fabricate modules for AP 1000 plants being built in different areas of the country), Option 1 would be more efficient in providing inspection oversight and would reduce coordination between regions.

- Centralization of construction inspection resources at the early stages of new

construction will be more efficient, but still allows for the potential to transition the program to a more traditional distribution of resources if the number of construction sites and the locations warrant.

Challenges:

- Scheduling inspections in all regions will require greater coordination. This occurs because the onsite inspection staff report to the region in which the construction site is located, and the off-site staff may report to a different regional office. Scheduling can also be affected by competing priorities from each region. In addition, distances to plants in other regions will increase travel times and costs.

- The regional staff, who will ultimately have responsibility for a plant, will be disconnected from the plant as it is being constructed. The region responsible for specialty construction inspections could be different than the region that will ultimately be responsible for inspecting the plant when it is in operation. Under this option the geographic separation of the inspectors reduces the opportunity for routine interaction of regional inspectors with operational plant staff, and, as a result, complicates the transition of the plant from construction to operations.

- This option could result in one region being much larger than the other three regions, potentially distracting the region assigned the off-site inspections from operating plant safety focus. This challenge becomes greater as the number of construction projects increases and is made more complex if a large number of the plants being constructed are also within that region. Past experience has demonstrated that construction activities can require a significant amount of senior management focus.

- The knowledge base of only one region is enhanced. Inspectors in the single region responsible for specialty construction inspections would develop extensive expertise in construction programs and processes. However, historically, inspections of construction also served as an opportunity for inspectors to develop an understanding of plant systems, which is important for understanding plant performance during testing and later during operations. This option minimizes the opportunity for inspectors from the 'home' regions to develop a detailed understanding of the plant as it is being constructed from the ground up. This option does not foster an efficient and effective knowledge transfer about the plant.

- Existing regional offices may not have sufficient space to accommodate a centralized construction inspection organization. This option will likely result in additional costs associated with obtaining sufficient office space for an entire organization, particularly if the anticipated number of applications materialize in a short period.

- This approach will be the first time the NRC has centralized such a large inspection function. There is likely to be communications and logistical issues associated with establishing the interfaces among the regions, headquarters licensing, and the construction inspection organization.

- Licensees and other external stakeholders may have to interact with two separate regions - one region for the on-site inspection staff and a second region for the off-site specialty inspectors. The region in which the site is located would be challenged

to remain abreast of issues residing with the off-site inspection staff.

- Assigning responsibility for allegations followup and technical issue resolution could be more complex. For some issues, it may not be readily clear which organization (on-site inspection or off-site inspection) would have the lead. With these functions located in different regions, resolution of these issues would be more challenging. A process to address such issues would need to be developed and implemented.

- Tracking completion of the inspection program could be more complex with inspections being conducted out of two locations.

Option 2: Locate specialist inspectors across all regions proportional to the number of plants planned for that region, with each region managing the full construction inspection function within its geographic area. This is the historical approach with which the NRC has programmatic experience.

Benefits:

- Using a single region provides clear accountability for completion of the CIP at each site. A single regional administrator will have responsibility for the plant during construction, as the plant transitions into the ROP, and as the plant operates.

- The coordination challenges of the other options are largely eliminated by having a single regional office responsible for the full process.

- Using a single region is the approach used by the NRC for construction inspection in past. The NRC is aware of the benefits and challenges of this approach. The current situation presents several major challenges including a large influx of new NRC inspectors, the use of a new licensing approach, and the implementation of a new construction inspection program. In addition, there are varying levels of uncertainty associated with the number and location of the potential construction projects. Option 2 presents an approach with which the staff is familiar and has some confidence and will provide some degree of stability at a time of uncertainty.

- If the number of projected construction projects fail to materialize, Option 2 provides a greater ability to readily absorb construction inspection resources into the regional operating reactor program. In contrast, if the construction resources are largely centralized, then if construction projects fail to materialize, reassigning the resources may require relocating to another region, with the associated relocation costs.

- Easier accessibility to sites will mean that travel times to sites will generally be shorter if traveling from the region in which the site is located. Travel costs are thereby reduced, and inspection time is maximized. Longer travel times under Options 1, 3, and 4 may result in an increased number of trips or more overtime for inspectors, or both.

- This option allows the inspectors in the region that will have responsibility for the operating plant to expand the overall regional inspection knowledge base and to develop a detailed understanding of the plant as it is being constructed from the ground up.

- Communication with external stakeholders will be easier by having all communication about the plant from a single point of contact who is both familiar with the inspection results and the stakeholders. New plant construction will be of interest to those in the local community as well as to state and local officials. Under Option 2, the communication would be more efficient and direct since the regional administrator would have full knowledge of the inspection program activities. In addition, because many of the proposed new plants are at the sites of existing reactors, the regions will have a better opportunity to build on already established channels of communications with the state and local officials and with the local community.

- Option 2 is adaptable. Current estimates for the number of plants to be built and their location indicate that three of the four regions may need to prepare for construction inspection work. The current schedules indicate that Region II will likely be the first region to actively form a construction inspection organization. Lessons learned from that experience together with more definitive plans for additional construction can be used to determine if there is a need to adopt a different staffing approach over time. The total number and location of the new construction projects affect the benefits of the various options. Adopting Option 2 allows for flexibility over time to allow for more definitive information to become available.

- The existing regional infrastructure can be used best under Option 2. Over time, the inspection resources will likely spread over all four regions, thereby minimizing the impact on any single region.

Challenges:

- Implementing the construction inspection program through four regions has a greater potential for inconsistencies in inspections among the regions. When considering the set of design-specific plus site-specific inspections, test, analyses and acceptance criteria (ITAAC) to be inspected, each project will have some unique inspection needs which each region may approach differently. Experience with the implementation of the ROP has provided some insights on how to minimize diverging approaches.

- This option does not take advantage of the economies of scale that occur with the centralization of resources and will likely require some redundant staffing among the regions.

- Option 2 cannot adapt as well to unforseen increases in the number of plants being built within a single region and as a result will have a high potential impact from applications not currently anticipated.

- Assessing the impact of potentially generic construction issues is more difficult.

- Providing uniform training to inspectors is more difficult.

Option 3: Locate a majority of the specialist inspectors within a single region which would be designated a “center of construction inspection expertise.” The remaining inspectors would be divided among the other three regions. Under this option, the center of expertise would manage the function and would supplement the technical inspectors in the other regions as circumstances dictated.

Benefits:

- Option 3 is a hybrid of Options 1 and 2, and thereby contains some of the benefits and challenges of both options.

- Communications among specialist inspectors located at the center is improved. However, this benefit is limited when considering communication with inspectors located in other regions.

- A center of expertise approach could promote more balanced staffing among the regions but is dependent on the distribution of resources. Minimal construction staffing in regions other than that selected as the center would reduce this benefit significantly.

- Consistency in inspection results among regions would be improved. A single point of contact for the decisions and results of the off-site inspections is the most significant benefit of this option.

- The impact of multiple construction projects is spread among multiple regions. The actual distribution of resources among the region selected as the center and the other regions would have a significant impact on this benefit. If only minimal staffing is assigned to the regions, then the impact of multiple projects is focused on the center and then becomes a challenge. If the staffing is more evenly spread among the regions, the outcome is no longer a center of expertise, but rather is a variation of Option 2.

Challenges:

- Most of the challenges of Option 1 apply to this option also, however, some to a lesser degree.

- Scheduling and coordinating inspections become more challenging using staff located in other regions. This is particularly true if the staff is not dedicated to work on construction, which is likely to be true in the early years when fewer projects are underway.

- The addition of a large number of staff to a single region could impact that region’s focus on operating reactors. Maintaining a focus on operating reactors will be a challenge regardless of the option selected. However, the responsibilities of a center of expertise would require the Regional administrator to deal not only with the expected challenges which come with construction, but also with the challenges of ensuring that construction nationwide is being adequately monitored.

- Increased travel times to locations outside of the region would result in inefficiencies and has a potential to increase overtime.

- Human capital impacts associated with a large staffing increase in a region if the majority of the specialist inspectors are located in a region which also has a significant number of plants being constructed. This increase will be twofold: one increase will be in the area of resident staff and the other will be in the increase in the number of off-site support staff.

Option 4: Form a separate and independent Construction Inspection Office at a new location either away from or near an existing regional office. Responsibility for the construction inspection program at all sites would rest totally with this office. The existing four regional offices would assume responsibility for sites of new reactors at some point during the transition from construction to operation. Under Option 4, an operations resident would be assigned to the site as construction neared conclusion and would report directly to the Regional administrator for the geographic area in which the site is located. All other construction inspection staff would report to the Director of the Construction Inspection Office. This new office would report to the Deputy Executive Director for Reactor and Preparedness Programs.

Benefits

- Centralizing resources improves staff utilization. The off-site organization will probably not need to grow incrementally to support multiple projects. Specific needs will depend on the timing of the applications and construction activities. This option minimizes the impact of uncertainty in the number and location of plants to be built.

- Having all construction inspectors reporting to the same office results in the most consistent results from the construction inspection program on a national basis.

- The organization will be fully focused on construction inspections. There would be little potential under this option for the construction staff to be diverted to operating reactor inspections.

- Economies of scale are realized in establishing the necessary infrastructure.

- Clear accountability exists for completion of the CIP at each site. The option will result in the most consistent implementation of the construction inspection program.

- Past experience has demonstrated that construction activities can require a significant amount of senior management focus. New reactor construction would have little or no impact on the safety focus of the regions regarding plants already in operation. This option eliminates any additional burden being placed on the regions until a new reactor starts the transition to operation.

- Licensees and other public stakeholders would have a single agency point of contact for all construction inspection issues.

- Having a single point of contact for construction would increase the effectiveness of communications between licensing of new reactors and construction inspection of new reactors.

- Eliminates the challenge of developing additional office space in the regional offices.

- Allows for focused recruiting of staff for construction inspections.

- Allows for greater flexibility because inspection resources can be used for any site under construction.

Challenges

- The regional staff, who will ultimately have responsibility for a plant, will be disconnected from the plant as it is being constructed. The region in which a new reactor is located would not be involved with construction activities until the site started to make the transition to the operations phase. This option eliminates the opportunity for inspectors from the 'home' region to develop a detailed understanding of the plant as it is being constructed from the ground up. In addition, the transition from a construction project to an operational status occurs gradually as systems are turned over to the operating staff. The opportunity for routine interaction of regional inspectors with operational plant staff is more limited, and, as a result, complicates the transition of the plant from construction to operations and transfer of the plant to the ROP.

- Establishing an organization at an alternate location has the greatest cost. Each of the options adds staff and creates a need for additional office space. Under the other options, the additional staff would be located at the regional office and would be supported by expanding the existing infrastructure. However, Option 4 would require not only obtaining the additional office space, but also creating an entirely new infrastructure.

- It could be more difficult under this option to draw on existing inspection experience to staff the new office because inspectors would be required to relocate. If the new office under this option were to be located in the same general area as one of the region offices, then that one regional office would likely be heavily impacted by the reassignment of inspectors to the new office.

- This approach will be the first time the NRC has centralized such a large inspection function. There are likely to be logistical issues associated with establishing the interfaces among the regions, headquarters licensing, and the construction inspection organization.

- If the anticipated number of new reactors does not materialize, this option will be the least efficient. In the worst case, the office infrastructure would serve only a few construction sites. If new construction does not continue for a long period of time, the agency will be faced with disestablishment of this office.

- This option could result in a large number of inspectors who have only construction skills, making integration of these inspectors into the operating reactor program difficult.

- Average travel costs would be higher and average travel times longer due to the centralized location.