

APPENDIX F

Reactor Construction Activities Near Operating Unit(s)

A. OBJECTIVES

After a 30-year lapse, new reactor construction activities have begun in the United States. As currently envisioned, the majority of new reactor construction will be in the vicinity of preexisting operating unit(s), resident inspectors (RIs) assigned to operating unit(s) should be aware of construction activities which may affect the operating unit(s)' safety systems. This appendix provides guidance to operating unit(s) RIs on construction activities that they should be aware of when they conduct their plant status activities. The appendix focuses on the aspects of reactor construction activities regulated under Title 10 of the Code of Federal Regulations (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," and the supplemental guidance in Appendix D, "Plant Status," to Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program—Operations Phase."

The impact of construction activities on operating units will depend on multiple factors such as; distance from the operating unit(s) to the construction site; and the number of shared structures, systems, and components (SSCs) between operating unit(s) and units under construction. The guidance in this appendix is intended to be generic in nature and aid the RIs during their plant tours and control room walkdowns as required by Appendix D of IMC 2515.

B. EVALUATION OF CONSTRUCTION IMPACT ON OPERATING UNITS AND PLANT TOURS

1. Construction activities for a nuclear power plant may not commence without a construction permit, limited work authorization, or combined license. Activities that are construction are defined by 10 CFR 50.10(a). Activities include:
 - a. driving of piles and subsurface preparation
 - b. placement of backfill
 - c. concrete or permanent retaining walls within an excavation
 - d. installation of foundations or certain testing
2. An applicant may undertake a range of pre-construction activities without a construction permit, limited work authorization, or combined license. Pre-construction activities are defined in 10 CFR 50.10(a)(2). Pre-construction activities include:

- a. site exploration, including necessary borings to determine foundation conditions
- b. preparation of a site for construction of a facility, including clearing of the site, grading, installation of drainage, erosion and other environmental mitigation measures
- c. construction of temporary roads and borrow areas
- d. erection of fences and other access control measures
- e. excavation and erection of support buildings

Region II Center of Construction Inspection (CCI) on-site inspection activities will generally commence once construction is authorized by a construction permit, limited work authorization, or combined license. The operating licensee will continue to have the responsibility for ensuring that any site activities, including construction and pre-construction activities, do not impact risk significant systems to the operating unit(s) or Independent Spent Fuel Storage Installation (ISFSI). The operating licenses are required to consider the impacts of construction on various aspects of operations, such as emergency planning, radiological protection, security, and demolition of existing facilities and structures. These areas are not within the scope of CCI's construction oversight role and the applicants are not required to inform CCI when these activities occur. RIs should be aware of pre-construction activities, such as, inadvertent moving of security barriers, potential excavation damage to buried piping or cable vaults, and work near the switch yard that could adversely impact the operating unit(s) risk significant systems, emergency planning, security, and radiological protection. It is anticipated that most applicants are discussing related activities in the vicinity of the operating unit(s) during the Plan of the Day meetings and are provided in a construction schedule. RIs should contact their regional management regarding any questionable pre-construction activities to ensure unauthorized construction activities are not occurring and do not have a impact on risk significant systems.

Resident Inspectors at operating unit(s) should be alert to situations with potential adverse impact (e.g., unit transients or reactor trips) from planned construction activities, including pre-construction activities. The RIs should be aware of ongoing construction activities and evaluate potentially adverse impacts in a timely manner. The RIs should use available information to accomplish this objective, including discussion of construction activities during the daily meeting at the operating unit(s), published licensee construction schedules, occasional attendance at meetings for the construction site, observations of construction activities as part of other inspection activities, and input from the construction resident inspector (CRI).

3. While the operating unit(s) RIs are responsible to address adverse impacts at the operating unit(s) risk significant systems, the RIs should coordinate with the CRIs to enable them to address potential problems in construction activities.

Examples of potential IPs that could be used to evaluate the adverse impact of construction activities on the operating unit(s) include, but are not limited to, the following:

- a. IP 71111.01 “Adverse Weather Protection”
- b. IP 71111.04 “Equipment Alignment”
- c. IP 71111.12 “Maintenance Effectiveness”
- d. IP 71111.13 “Maintenance Risk Assessment and Emergent Work Control”
- e. IP 71111.15 “Operability Determinations and Functionality Assessments”
- f. IP 71111.17 “Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications”
- g. IP 71111.18 “Plant Modifications”
- h. IP 92709 “Licensee Strike Contingency Plans”

At multi unit sites, the unit under construction is required, in part, to have managerial and administrative controls to provide assurance that the limiting conditions for operation are not exceeded as a result of construction activities (10 CFR 52.79(a)(31)). The RIs should understand how construction issues, that may affect the operating unit, are communicated and dispositioned at the operating unit(s).

4. Understanding potential adverse impacts from the pre-construction and construction activities will allow the inspector to implement the appropriate IP to evaluate the potential risk significant systems. Examples of how construction activities could adversely impact the operating unit(s) include, but are not limited to, the following:
 - a. effects on seismic monitoring from sheet piling installation or explosives used during excavation
 - b. damage to underground piping, electrical cables, fiber-optics, and telecommunications during excavation or movement of heavy loads
 - c. disruptions in the switchyard and electrical transmission and distribution systems during movement of heavy loads and associated crane operations
 - d. emergency preparedness affected by traffic issues from additional personnel for construction or movement of heavy loads

- e. heatsink, coolant reservoir intake and discharge structures or piping for the operating unit(s) affected by construction activities occurring near the structures
 - f. breach of physical protection of the operating unit(s) because of construction activities
 - g. fire protection plan impacted by construction activities preventing operator actions through the unavailability of equipment or limited methods to access equipment locations
 - h. material or debris from the construction site that could impact the operating unit(s) SSCs, switch yard, or offsite power supplies during extreme weather conditions
 - i. wrong unit maintenance or work activity
 - j. ISFSI impacted by construction activities
5. ISFSI are either located within or co-located outside the operating unit(s) protected area (PA). Construction and pre-construction activities could have risk significant impact on ISFSI if conducted in the vicinity. Construction activities, such as movement of heavy loads, potential risk significance on ISFSI are
- a. construction activities that have the potential to affect the integrity, operability, or performance effectiveness of the operating unit's security barriers, illumination capabilities, intrusion detection systems or devices, and access control measures
 - b. construction activities performed in areas adjacent to or in isolation zones of the ISFSI that limit the ability of the operating reactor's security force to detect, assess, and interdict potential threats
 - c. potential damage to ISFSI vaults and dry storage casks

D. MOVEMENT OF HEAVY LOADS

1. Multiple heavy load movement and associated crane operation evolutions are expected to occur during pre-construction and construction activities in and around operating unit(s) which have the potential to affect risk significant SSCs. The potential adverse impact of these evolutions on operating unit(s) depends on the distance from vital SSCs and buried piping, the number access roads supporting pre-construction and construction activities and operating unit(s), and if they occur near transmission lines providing off-site power to operating unit(s) and switch yards. RIs should be aware of licensee's plans for heavy load movements and crane operations. Additionally, concrete booms can extend to heights where impact with offsite power lines maybe a concern.

2. The RIs should bring any concerns they have of potentially negative impact on the operating unit(s) from pre-construction and construction activities heavy load movements and associated crane operations to the attention of the licensee and CRI. The following inspection procedures and guidance are recommended for determining the risk significance to operating unit(s) from heavy load movements and associated crane operations:
 - a. IP 50001, "Steam Generator Replacement Inspection"
 - b. IP 71111.20, "Refueling and Other Outage Activities"
 - c. Operating Experience Smart Sample FY2007-03, Revision 2, "Crane and Heavy Lift Inspection, Supplemental Guidance for IP 71111.20," September 12, 2008.

Additional information on lifting heavy loads appears in NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants: Resolution of Generic Technical Activity A-36," issued July 1980.

E. REACTOR SAFETY AND PLANT SECURITY INTERFACE

1. The RI should be aware of the potential impact to reactor safety and to plant security when reactor pre-construction and construction is occurring in the vicinity of an operating unit(s). Throughout the pre-construction and construction process, licensees are required to ensure that the operating reactor's physical protection program maintains the capabilities to detect, assess, interdict, and neutralize threats up to and including the design-basis threat of radiological sabotage as stated in 10 CFR 73.1, "Purpose and Scope." In observing security activities and the modification or addition of security features, the inspector should consider and, as appropriate, question the licensee about the impact of pre-construction and construction activities on possible safety and security interface issues. During the periodic tours of security-related areas, the inspector should focus on potential degradation of reactor safety and plant security. Inspectors should be sensitive to changes to security measures and systems needed to implement the site's protective strategy that were made to support construction activity. Changes to the operating reactor's security program require that the licensee submit proposed alternative measures for review and approval in accordance with 10 CFR 50.4, "Written Communications," and 10 CFR 50.90, "Application for Amendment of License, Construction Permit, or Early Site Permit." Specifically, such changes would relate to pre-construction and construction activities in areas which intersect a protected area boundary (e.g., cable tunnels, drainage pipes) or areas that house security equipment needed by the licensee to implement its protective strategy. Additional examples include the following:
 - a. pre-construction and construction activities that have the potential to affect the integrity, operability, or performance effectiveness of the operating

unit's security barriers, illumination capabilities, intrusion detection systems or devices, and access control measures

- b. pre-construction and construction activities that are conducted in areas where access control is performed for the operating reactor
 - c. pre-construction and construction activities performed in areas adjacent to or in isolation zones of the operating reactor that limit the ability of the operating reactor's security force to detect, assess, and interdict potential threats
 - d. pre-construction and construction activities that could prevent operator actions through the unavailability of equipment or limited methods to access equipment locations
 - e. temporary conditions warranting compensatory measures from either security or operations because the conditions differ significantly from plant or risk profiles in either the operating or security procedures
 - f. changes in site layouts, ingress or egress routes, or security procedures that affect emergency preparedness in areas such as site assembly, staff augmentation times, or accountability of construction personnel
2. Security issues identified during tours of the licensee facility shall be referred to appropriate regional specialists (e.g., security or emergency preparedness specialists) in the region for followup inspections as needed.

F. REFERENCES

NOTE: Some references contain hyperlinks to the specific document. These hyperlinks should be used with caution (the linked document should be verified to be the current version before use).

[NUREG-0612](#), "Control of Heavy Loads at Nuclear Power Plants: Resolution of Generic Technical Activity A-36," July 1980

[Inspection Manual](#) Chapter 2515, Appendix D, "Plant Status"

[Inspection Procedure](#) 50001, "Steam Generator Replacement Inspection"

[Inspection Procedure](#) 71111.20, "Refueling and Other Outage Activities"

[Operating Experience Smart Sample](#) FY2007-03, Revision 2, "Crane and Heavy Lift Inspection, Supplemental Guidance for IP 71111.20," September 12, 2008.

[Region II Memorandum](#), "New Reactor Pre-Construction Activities," December 17, 2009

END

Attachments:

Revision History for IMC 2515 Appendix F

Attachment 1

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Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	ML103090611 06/02/11 CN 11-009	Reviewed commitments and found none for 4 years. Developed new appendix for IMC 2515 that provides guidance for inspectors for reactor construction activities near operating unit(s).	No	N/A	ML11095A000