

January 14, 2002

MEMORANDUM TO: Christopher I. Grimes, Program Director  
License Renewal and Environmental Impacts Program  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Caudle A. Julian, Inspection Team Leader  
Division of Reactor Safety  
Region II

FROM: Bruce A. Boger, Director  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

Loren R. Plisco, Director  
Division of Reactor Projects  
Region II

SUBJECT: NORTH ANNA AND SURRY LICENSE RENEWAL INSPECTIONS

Attached is the final version of the North Anna and Surry Power Stations License Renewal Inspection Plan. The plan, which was developed jointly by NRR and Region II, is hereby approved. You are directed to use this plan to prepare and conduct the license renewal inspections at North Anna and Surry.

Original signed by  
Bruce A. Boger, Director  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

Date: 01/4/02

Original signed by C I. Grimes for  
Loren R. Plisco, Director  
Division of Reactor Projects  
Region II

Date: 01/14/02

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# **NORTH ANNA AND SURRY POWER STATIONS LICENSE RENEWAL INSPECTION PLAN**

## **I PURPOSE**

This inspection plan specifies methods for implementing Manual Chapter 2516 requirements for activities relating to 10 CFR Part 54 (herein after referred to as “the rule”) and the North Anna and Surry Power Stations (NA&S) license renewal inspection program. This plan defines the scope of the inspections planned to verify that NA&S’s license renewal program is in compliance with the requirements of the rule and is consistent with Virginia Electric and Power Company’s (VEPCO’s) license renewal application (LRA) and the staff’s safety evaluation of VEPCO’s LRA. The plan also provides guidance for inspection scheduling, inspector training, inspection activities, and resource requirements.

VEPCO’s LRA identified the systems and structures that VEPCO determined were within the scope of the rule. Attachment 1 lists the systems and structures selected for this inspection. The inspection team chose the items, after reviewing the scoping results provided in NA&S’s LRA, on the basis of their risk significance, uniqueness to NA&S, and current issues. The scope and depth of inspections of these systems and structures may vary.

## **II OBJECTIVES**

The overall objective of this plan is to provide guidance for inspecting the implementation and effectiveness of the programs and activities associated with VEPCO’s license renewal program. The inspection will verify that there is reasonable assurance that the effects of aging will be adequately managed so that the intended function(s) of structures and components (SCs), for which an aging management review is required, will be maintained consistent with the current licensing basis (CLB) during the period of extended operation. Region II will implement the license renewal inspection plan (LRIP) at NA&S before NRR approves VEPCO’s LRA to verify that VEPCO meets the requirements of the rule and has implemented license renewal programs and activities consistent with the rule, the LRA, and the staff’s safety evaluation report (SER) on the LRA.

## **III INSPECTION ACTIVITIES**

Each inspector will receive basic LRIP training. The inspectors will receive additional training on the NA&S LRA and the staff’s safety evaluation of the LRA. The training will be given before the inspections.

Inspection Procedure (IP) 71002, “License Renewal Inspections,” will be the primary procedure used to inspect VEPCO’s implementation of the requirements of the rule. IP 71002 is included for ready reference as Attachment 2.

1. The systems and structures groups to be inspected are identified in Attachment 1 of this plan. The selection of these systems and structures is based on risk significance and the importance of the safety function performed. The inspection team will verify that VEPCO has implemented the scoping methodology consistent with the rule and VEPCO's methodology, as described in the LRA submitted by letter dated May 29, 2001. The inspection team will also inspect a sample of the systems and structures listed in Attachment 1 (systems and structures that VEPCO concluded were not within the scope of the rule) in order to verify that there is reasonable assurance that all systems and structures within the scope of 10 CFR 54.4 have been identified.
2. The implementation of the screening activities required under 10 CFR 54.21(a)(1) will be inspected by reviewing system boundaries on plant drawings, intended functions, and the active/passive and short-/long-lived characteristics of the structures and components within the scope of VEPCO's aging management review for the systems, structures, and commodity groups listed in Attachment 1.
3. The inspection team will also walk down accessible portions of the systems and structures to identify any observable inconsistencies in the scoping and screening activities and any aging effects on the systems and structures that are not covered in the LRA. Aging effects identified by VEPCO will be reviewed and evaluated during the NRR technical review. The inspection team will perform a sample audit of related maintenance records of the systems and structures listed in Attachment 1 to attempt to identify any previously unrecognized aging.
4. The inspection team will inspect the aging management programs for approximately half of the aging effects in each of the systems and structures listed in Attachment 1. The inspection team will examine records for existing aging management programs to evaluate the programs' effectiveness and will review plans for new aging management programs. The inspection team will then document its findings on the effectiveness of the aging management programs to maintain a system's intended function(s) consistent with the CLB for the period of extended operation.

#### IV INSPECTION SCOPE

The NA&S license renewal inspection activities will be implemented through three site inspections.

1. The first inspection will last one week, or longer if necessary, and focus on the scoping and screening processes to verify that they have been implemented consistent with the rule, VEPCO's methodology, and the staff's safety evaluation of VEPCO's methodology. This inspection should be performed after the staff has completed its safety evaluation of the scoping and screening methodology but before the SER is issued. For efficiency, this inspection will be performed primarily in the corporate offices, with visits to the sites, as necessary to complete inspection tasks. The inspection will verify that there is reasonable assurance that VEPCO's scoping and screening processes have identified all of the systems, structures, and components for which an aging management review is required consistent with the requirements of the rule.

2. In the second inspection the team will spend one week at one site; return to the region for one week to review documents, write the interim report, and adjust the inspection plan; and go back to the other site for one week. The two weeks inspection time will be divided between the sites so the team can examine samples of equipment and components at each site. This inspection will examine aging management reviews and demonstration activities. Because this inspection involves units at two different sites, the team may need more time to complete the second inspection. To support the NRR review process, the second inspection will be performed just before the "SER with open items" (currently scheduled for June 2002) is issued.
3. If the regional administrator decides that the open inspection items from the first two inspections warrant a third inspection, the team will followup on previous inspection activities and also inspect VEPCO actions on any SER open items. This inspection will also focus on any portion of the LRA updated by the applicant as a result of recent plant modifications. The third inspection report will document the need for any future followup inspections.

## V INSPECTION RESOURCES

The inspection will need the following inspection resources:

1. Inspectors
  - One team leader
  - Three inspectors from the region
  - One consultant with site-specific knowledge (preferably the resident inspector)
  - One or more support staff from the program office
2. Skills

The inspection team needs a cross-section of skills, including mechanical, material, civil, and electrical engineering skills.

The scope of the third inspection (and thus the resources) will depend on how many open issues remain from the previous inspection activities. Three to six inspectors with skills suited to the tasks will probably be needed to accomplish the tasks.

- Attachments
1. List of Systems and Structures to be reviewed during the inspections
  2. Inspection Procedure 71002

# NORTH ANNA AND SURRY POWER STATIONS LICENSE RENEWAL INSPECTION PLAN

## Systems LRA Concludes Are Within the Scope of License Renewal

SYSTEM	LRA SECTION REFERENCE
AAC Diesel Cooling Water (BCW)	Section 2.3.3.10, Alternate AC (AAC) Diesel Generator Systems
AAC Diesel Fuel Oil (BFO)	Section 2.3.3.10, Alternate AC (AAC)
AAC Diesel Lube Oil (BLO)	Section 2.3.3.10, Alternate AC (AAC)
AAC Diesel Starting Air (BSA)	Section 2.3.3.10, Alternate AC (AAC)
Alternate AC (AAC)	Section 2.3.3.10, Alternate AC (AAC)
Auxiliary Steam (AS)	Section 2.3.4.1, Auxiliary Steam (AS)
Batteries (125V DC Components)(BY)	See Footnotes No. 1&2.
Blowdown (BD)	Section 2.3.4.2, Blowdown (BD)
Chemical Volume and Control (CH)	Section 2.3.3.1, Chemical and Volume Control (CH)
Chilled Water (CD) See Footnote 3	Section 2.3.3.7, Chilled Water (CD)
Circulating Water (CW)	Section 2.4.6, Intake Structures
Component Cooling (CC)	Section 2.3.3.8, Component Cooling (CC)
Compressed Air (CA) See Footnote 3	Section 2.3.3.13, Compressed Air (CA)
Condensate (CN)	Section 2.3.4.3, Condensate (CN)
Containment Access (CE)	Section 2.4.1, Containment
Containment Vacuum (CV)	Section 2.3.3.17, Containment Vacuum (CV)
Electrical Instrumentation (EI)	See Footnotes No. 1&4.
Electrical Power (EP)	See Footnote No. 1.
Electro-Hydraulic Control (EH)	See Footnote No. 1.
Emergency Diesel Cooling (EC)	Section 2.3.3.11, Emergency Diesel Generator (EDG) Systems See Footnote 3
Emergency Diesel Generator (EG)	Section 2.3.3.11 See Footnote 3
Emergency Diesel Lubrication (EL)	Section 2.3.3.11 See Footnote 3
Emergency Diesel Starting Air (EB)	Section 2.3.3.11 See Footnote 3
Emergency Electrical Power (EE)	See Footnote No. 1
Feedwater (FW)	Section 2.3.4.4, Feedwater (FW)
Fire Protection (FP)	Section 2.3.3.31, Fire Protection (FP)
Fire Protection Monitoring (FPM)	See Footnotes No. 1&3.
Fuel Handling (FH)	Section 2.4.12, Load-handling Cranes and Devices
Fuel Oil (FO)	Section 2.3.3.11, Emergency Diesel Generator (EDG) Systems See Footnote 3.
Fuel Pit Cooling (FC)	Section 2.3.2.2, Fuel Pit Cooling (FC)
Heat Tracing (HT)	See Footnote No. 1.
High-Radiation Sampling System (HRSS)	Section 2.3.3.2, High-Radiation Sampling System (HRSS) See Footnote 3.
Incore Instrumentation (IC)	Section 2.3.3.3, Incore Instrumentation (IC)
Instrument Air (IA)	Section 2.3.3.14, Instrument Air (IA)

Leakage Monitoring (LM)	Section 2.3.3.18, Leakage Monitoring (LM)
Liquid and Solid Waste (LW)	Section 2.3.3.26, Liquid and Solid Waste (LW)
Main Steam (MS)	Section 2.3.4.5, Main Steam (MS)
Neutron Monitoring (NM)	See Footnotes No. 1&5.
Nuclear Instrumentation (NI)	See Footnote No. 1&5.
Penetration-Electrical (PE)	Section 2.4.1, Containment See Footnote 6
Penetrations (PEN)	Section 2.4.1, Containment See Footnote 6
Post-Accident Hydrogen Removal (HC)	Section 2.3.3.28, Post-Accident Hydrogen Removal (HC) See Footnote 3.
Quench Spray (QS)	Section 2.3.2.1, Quench Spray (QS) See Footnote 3
Radwaste (RW)	Section 2.3.3.27, Radwaste (RW)
Reactor Coolant (RC)	Section 2.3.1, Reactor Coolant System
Reactor Protection (RPS)	See Footnote No. 1.
Recirculation Spray (RS)	Section 2.3.2.3, Recirculation Spray (RS)
Residual Heat Removal (RH)	Section 2.3.2.4, Residual Heat Removal (RH)
Rod Control (RCS)	Section 2.3.1.2, Reactor Vessel
Safety Injection (SI)	Section 2.3.2.5, Safety Injection (SI)
Service Air (SA)	Section 2.3.3.16, Service Air (SA)
Service Water (SW)	Section 2.3.3.6, Service Water (SW)
Solid State Protection (SSP)	See Footnote No. 1.
Vacuum Priming (VP)	Section 2.3.3.20, Vacuum Priming (VP)
Valve Monitoring (VMS)	See Footnote No. 1.
Vital Bus (VB)	See Footnotes No. 1&2.

## Systems LRA Concludes Are Not Within the Scope of License Renewal

System	UFSAR Reference
AAC Diesel Service Air (BSR)	System not explicitly described in the UFSAR
Electrical Equipment (4kv & above) (PH)	Section 8.1.2
Gaseous Waste (GW)	Section 11.3
Vacuum Priming Seal Water (VSW)	Section 10.4.2.2 See Footnote 1.

1. This system does not contain any mechanical components that require an AMR. However, this system does contain electrical/I&C and/or structural components, which have been evaluated on a commodity basis.

2. The North Anna batteries (BY) and vital bus (VB) systems are functionally equivalent to the Surry DC Power (EPD) system.

3. North Anna system for which the in-scope portions are functionally equivalent to in-scope portions of a Surry system(s) with a different name.



4. The North Anna electrical instrumentation (EI) and solid state protection (SSP) systems are functionally equivalent to the Surry ATWS mitigation (AMS), consequence limiting safeguards (CLS), process instrumentation (PRO), and recirculation mode transfer (RMT) systems.
5. The North Anna neutron monitoring (NM) and nuclear instrumentation (NI) systems are functionally equivalent to the Surry nuclear instrumentation (NI) system.
6. The North Anna penetration-electrical (PE) and penetrations (PEN) systems are functionally equivalent to the Surry reactor building penetrations (PEN) system.

### **Structures LRA Concludes Are Within the Scope of License Renewal**

<b>Structure</b>	<b>Screening Results Section</b>
Auxiliary Building	Section 2.4.2, Auxiliary Building Structure
Auxiliary Feedwater Pump House	Section 2.4.3, Other Class I Structures
Auxiliary Feedwater Tunnel	Section 2.4.3, Other Class I Structures
Auxiliary Service Water Expansion Joint Enclosure	Section 2.4.7, Yard Structures
Buried Fuel Oil Tank Missile Barrier	Section 2.4.7, Yard Structures
Casing Cooling Pump House	Section 2.4.3, Other Class I Structures
Casing Cooling Tank Foundation	Section 2.4.7, Yard Structures
Chemical Addition Tank Foundation	Section 2.4.7, Yard Structures
Circulating Water Intake Tunnel	Section 2.4.6, Intake Structures
Containment	Section 2.4.1, Containment
Discharge Tunnel & Seal Pit	Section 2.4.6, Intake Structures
Domestic Water Treatment Building	Section 2.4.7, Yard Structures
Duct Banks	Section 2.4.7, Yard Structures
Emergency Condensate Storage Tank Foundation and Missile Barrier	Section 2.4.7, Yard Structures
Flood wall west of the Turbine Building	Section 2.4.8, Earthen Structures
Fuel Building	Section 2.4.4, Fuel Building
Fuel Oil Pump House	Section 2.4.3, Other Class I Structures
Fuel Oil Storage Tank Dike	Section 2.4.7, Yard Structures
Intake Structure	Section 2.4.6, Intake Structures
Main Steam Valve House	Section 2.4.3, Other Class I Structures
Manholes	Section 2.4.7, Yard Structures
Quench Spray Pump House 1	Section 2.4.3, Other Class I Structures
Refueling Water Storage Tank Foundation	Section 2.4.7, Yard Structures
Safeguards Building	Section 2.4.3, Other Class I Structures
SBO Building	Section 2.4.5, Miscellaneous Structures
Security Diesel Building	Section 2.4.5, Miscellaneous Structures
Security lighting poles	Section 2.4.7, Yard Structures
Service Building	Section 2.4.5, Miscellaneous Structures
Service Water Pipe Expansion Joint Enclosure	Section 2.4.3, Other Class I Structures
Service Water Pump House	Section 2.4.3, Other Class I Structures
Service Water Reservoir	Section 2.4.8, Earthen Structures

Service Water Tie-in Vault	Section 2.4.3, Other Class I Structures
Service Water Valve House	Section 2.4.3, Other Class I Structures
Transformer Firewalls/Dikes 2	Section 2.4.7, Yard Structures
Turbine Building	Section 2.4.5, Miscellaneous Structures
Yard Valve Pit	Section 2.4.7, Yard Structures

1. The North Anna Quench Spray Pump House is functionally equivalent to the Surry Containment Spray Pump Building.

2. Applies to main and station service transformers.

### **Structures LRA Concludes Are Not Within the Scope of License Renewal**

<b>Structure</b>	<b>UFSAR Reference</b>
Concrete firewalls/foundations for the reserve station service transformers	UFSAR. Structures are not explicitly described in the
Concrete foundations for the main transformers and station service transformers	UFSAR. Structures are not explicitly described in the
Condensate Storage Tank Foundation	Structure is not explicitly described in the UFSAR.
Independent Spent Fuel Storage Facility (ISFSI)	Structure is not explicitly described in the UFSAR.
RSST exterior bus bar support structure	Structure is not explicitly described in the UFSAR.
Switchyard	Structure is not explicitly described in the UFSAR.
Switchyard Control House and Communications Building	See Footnote 1
Transmission Line Towers	Structure is not explicitly described in the UFSAR.
Vacuum Priming Pump House	Structures are not explicitly described in the UFSAR.
	UFSAR. Structure is not explicitly described in the UFSAR.
	See Footnote 1

1. This North Anna structure is functionally equivalent to a Surry structure with a different name.

# NRC INSPECTION MANUAL

RLSB

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## INSPECTION PROCEDURE 71002

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### LICENSE RENEWAL INSPECTION

PROGRAM APPLICABILITY: IMC 2516

FUNCTIONAL AREA: OTHER

#### 71002-01 INSPECTION OBJECTIVES

01.01 To verify the applicant's license renewal program, including supporting activities are implemented consistent with the requirements of Title 10 of the *Code of Federal Regulation (10 CFR)*, Part 54, "Requirements for the Renewal of Operating Licenses for Nuclear Power Plants", hereinafter referred to as the "rule", the applicant's license renewal application (LRA), and the NRC's safety evaluation report (SER).

01.02 To verify the material condition of the systems, structures and components (SSCs), that require an aging management review, are maintained consistent with the rule, the applicant's license renewal program, and the requirements of 10 CFR, Part 50.

01.03 To verify the information and documentation required by, or necessary to document compliance with the provisions of the rule are retrievable, auditable and consistent with the rule and site-approved programs and procedures.

01.04 To verify the implementation of license renewal plant assessment and aging management programs are consistent with NRC guidance for license renewal including the statements of consideration (SOC) that accompanied the rule (60FR22461, published May 8, 1995); draft Regulatory Guide DG-1047, "Standard Format and Content for the Application to Renew Nuclear Power Plant Operating Licenses," dated August 1996; and the draft license renewal standard review plan (SRP-LR), "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," dated April 21, 2000, and other staff guidance documents.

#### 71002-02 INSPECTION REQUIREMENTS

##### DEFINITIONS

Passive Structures and Components (SCs) Structures and Components which perform an intended function without moving parts or without a change in configuration, change in properties, or change of state. These may include SCs which are classified as inherently reliable under the maintenance rule, or SCs for which aging degradation is not readily monitored.

Long-lived Structure and Components Structures and components which are not subject to replacement based on a qualified life or specified time period.

Applicable Aging Effect An effect, related to an SC because of its design, configuration, material makeup, and environment, that if not prevented or mitigated, will result in degradation that will affect the component's ability to perform its intended function

Plausible Aging Effect An effect, related to an SC, under generally applicable conditions, having the potential for affecting the SC's ability to perform its intended function.

Current Licensing Basis(CLB) As defined in 10CFR54.3, CLB is the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design basis (including all modifications and additions to such commitments over the life of the license) that are docketed and in effect.

## 02.01 General Inspection Requirements

- a. The License Renewal Inspections (LRIs) verify:
  2. The applicant implements the scoping and screening methodology in conformance with descriptions contained in the LRA and SER.
  3. The applicant correctly and completely identifies the SSCs satisfying the conditions of 10 CFR 54.4(a).
  4. The passive, long lived SSCs are subject to an aging management review, and have aging management programs that are in conformance with descriptions contained in the LRA and SER.
  4. The engineering analysis documentation used to support the application exists, is credible and auditable. The inspections will review the documentation associated with the applicant's implementation of the scoping, screening, aging management, and annual update process for the systems, structures, components, and commodity groups within the scope of the LRA to verify that the information and documentation required by, or otherwise necessary to document compliance with, the provisions of the rule are being maintained in an auditable and retrievable form consistent with NRC and staff approved guidance for license renewal, and site-approved programs and procedures.
- b. LRIs are performed prior to the approval of a renewed license. LRIs should be performed by NRC regional offices including visits to the applicants' site. The inspections will cover Scoping and Screening, Aging Management, the annual LRA update process and any open items resulting from inspections or staff review of the LRA.

Prior to performing inspections the Regional Inspection Team Leader should develop the elements of the site specific LRI inspection plan with assistance from License Renewal and Standardization Branch (RLSB) and others if necessary. The inspection

plan should include, as a minimum, the scope of the inspections, the specific inspection activities, the schedule, and the planned resources. Any subsequent substantive change to the inspection plan should be discussed with RLSB prior to implementation.

## 02.02 Specific Inspection Requirements

- b. Scoping and Screening Inspection - This LRI verifies that the SSCs required by the rule have been included in the scope of license renewal. The LRI verifies there is reasonable assurance the applicant identified all the passive and long-lived SSCs requiring an aging management review. The applicant may designate groups of like components with similar designs, materials of construction, operating environments, and aging management practices referred to as commodity groups. The inspection should examine a representative set of SSCs and commodity groups chosen using risk insights, features unique to the plant, and previous plant operating history to verify the selected SSCs were subject to an AMR. Using this sample set the inspection should look for the following:
  - 1. Scoping - Evaluate whether the scoping process was implemented consistent with the rule, the applicant's methodology, the information presented in the applicant's LRA, and the results of the staff's review as documented in the SER. Review the SSC's included by the applicant within the scope of the rule. Using the applicant's methodology determine if the five systems and three structures, not identified in the applicant's LRA, were appropriately excluded from the scope of the rule. Carefully compare the justification used to include or exclude any SSC against the descriptions of the SSC in the Updated Final Safety Analysis (UFSAR), and under the CLB, the relative importance of the SSCs in a design basis event.
  - 2. Screening - Evaluate whether the screening process was implemented consistent with the rule, the applicant's methodology, the information presented in the applicant's LRA, and the results of the staff's review as documented in the SER. The applicant will identify the SCs and commodity groups contained within the evaluation boundaries that are within the scope of the rule. Determine the appropriateness of the evaluation boundaries by examining SCs beyond the limit of the boundaries established by the applicant. Review a sample of SCs for their intended function, their active or passive characteristic, and their long or short-lived characteristics. Assure the justification used to classify a SC is reasonably supported by the description of the component in the UFSAR, including site-specific and industry operating history.
- b. Aging Management Review Inspection - The applicant is required to identify all applicable aging effects for the SCs subject to AMR and within the scope of the rule. For each SC requiring an aging management program, the applicant is required to demonstrate the effects of aging will be adequately managed so there is reasonable assurance the intended function will be maintained consistent with the CLB throughout the period of extended operation. This inspection is intended to assess the AMR portion of the LRA. For selected SCs within the scope of the rule requiring an AMR, the following inspection activities should be undertaken:

1. For the selected SSCs determine from the LRA and SER which aging management programs (AMPs) are credited to prevent applicable aging effects. This will typically be a combination of existing programs and practices, existing programs that need enhancement, and new programs to be created. These AMPs are the focus of this inspection.
  2. Review the available documentation description of these AMPs from the LRA, UFSAR, Plant procedures, and related engineering support documentation. Determine the on-site engineering staff responsible for implementation of these AMPs and interview them to assess their knowledge and involvement in the license renewal effort. Discuss program methods, past results, past weaknesses and corrections, and future plans.
  3. Verify the applicant implemented their methodology for determining plausible and applicable aging effects consistent with the information presented in their LRA and the results of the staff's review as documented in the SER in determining the AMPs.
  4. Verify the applicant evaluated site-specific information such as surveillance test results, preventive maintenance records, corrective maintenance records, equipment history files, inservice test and inspection results in determining aging effects. Verify the applicant evaluated industry operational experience such as generic communications, vendor notifications, INPO notifications, etc. in determining aging effects.
  5. Perform walk-downs of the selected in-scope systems and structures to verify that any observable aging effects were identified in the LRA. If possible, the on-site responsible engineering staff should accompany the inspector during the walk-down to discuss observations at the equipment location. Portions of this inspection should be performed during a unit outage, to allow visual observation of equipment inaccessible during power operation, i.e., inside containment, normal high radiation areas, etc. Observed aging effects not addressed by the LRA and resulting AMPs should be addressed to the applicant and resolved with the support of NRR.
  6. Review the applicant's documentation associated with the demonstration of AMPs. For the selected SSCs, verify the adequacy of the description in the LRA and supporting documentation of AMP activities that are relied upon to demonstrate that the intended SSC functions will be adequately maintained during the period of extended operation. For existing programs, review the results of past tests and inspections. Assure the proposed or existing programs adequately demonstrates ample opportunity to detect, monitor, trend, and correct age related degradations through performance and/or condition monitoring, technical specification surveillances, and other aging management activities.
- c. Annual Update/Open Item Inspection - The applicant may make changes to the plant or the current licensing basis while the NRC performs its review of the LRA. Annually, after the initial application, the applicant is required to submit an amendment to the

original application describing any change that materially affects the contents of the original application. The applicant may also make changes or commitments to satisfy an issue raised during the SER process or raised during a previous LRI.

1. Select a sample of plant modifications and CLB changes the applicant made since the date of the original LRA submittal. Determine that these changes were included in an annual LRA update. For newly installed plant equipment required to be in the scope of license renewal, verify that the equipment is included in appropriate aging management programs.
2. Compile the issues raised by previous LRIs and determine the current status from the applicant. Determine if the issue has been resolved. If the issue has not been resolved determine what the applicant's plans are to resolve the issue and coordinate with NRR to determine the acceptability of those plans.

#### 71002-03 INSPECTION GUIDANCE

03.01 General Inspection Guidance - The LRIP will be implemented, prior to the approval of an application for renewed license, to verify that an applicant, requesting a renewed license under 10 CFR Part 54, meets the requirements of the rule and has implemented license renewal programs and activities consistent with their LRA and the LRA safety evaluation report (SER) developed by the staff.

Inspectors should familiarize themselves with the requirements and guidance relating to license renewal. Inspectors should familiarize themselves specifically with the LRA and associated safety evaluations performed by the staff for the specific plant to be inspected. License renewal requirements and guidance documents that should be reviewed prior to an inspection include:

1. 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants";
2. The statements of consideration (SOC) published with the revision to the rule in the Federal Register, Vol. 60, No. 88, Monday, May 8, 1995, pages 22461 to 22495;
3. Draft Regulatory Guide 1047; "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," August 1996;
4. Nuclear Energy Institute 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," March 1996; and
5. NRC approved positions relating to license renewal.

The overall scope of a license renewal inspection should include approximately 20 percent of the systems (no less than six systems), approximately one-third of the structures (no less than three major structures), and a minimum of three commodity groups. The sample should be selected during the inspection planning process from the list of in-scope SSCs appearing in the LRA. The sample should include a variety of systems, structures, components, and commodity groups that involve mechanical, structural and electrical components with diverse characteristics, environments, and application.

Throughout the license renewal inspection, the inspectors should review the supporting documentation associated with an applicant's license renewal program to verify that documentation required by the rule, or otherwise necessary to verify compliance with the rule, is being maintained in an auditable and retrievable form consistent with the requirements 10 CFR 54.13 and 54.37, the applicant's LRAs, and site approved programs and procedures.

The LRIP includes visual inspection of the structures and components requiring an aging management review, to look for aging effects not identified by an applicant in their LRA or identified by the staff during their safety evaluation of an LRA. Portions of this inspection should be performed during a unit outage, to allow visual observation of equipment inaccessible during power operation, i.e. inside containment, normal high radiation areas, etc. Observed aging effects not addressed by the LRA and resulting AMPs should be addressed to the applicant and resolved with the support of NRR.

All inspection activities relating to a renewed license that are performed after the approval of that license will be performed under the Reactor Inspection Program (IMC 2515), and are outside the scope of this inspection procedure.

### 03.02 Specific Inspection Guidance

- a. Integrated Plant Assessment. 10 CFR 54.21(a) requires that each LRA contain an Integrated Plant Assessment (IPA). 10 CFR 54.3 defines the IPA as a licensee assessment that demonstrates that a nuclear power plant facility's structures and components requiring aging management review in accordance with 54.21(a) for license renewal have been identified and that the effects of aging of such SCs will be managed to assure that the intended function(s) will be maintained in accordance with the CLB during the period of extended operation. The IPA is the integrated engineering analysis that the licensee must perform to support a request for license renewal and the LRA describes that analysis. Typically the IPA process includes the following: (1) scoping to determine which SSCs are included within the scope of license renewal, (2) screening to determine from the in-scope SSCs, which of the structures and components (SCs) require an aging management review, (3) identifying aging effects applicable to those SCs, (4) developing and implementing aging management programs, and (5) demonstrating the effectiveness of each AMP.
  1. Scoping. 10 CFR 54.4(a) provides the criteria for the SSCs required to be included within the scope of license renewal. For the SSCs within the scope of the rule, the applicant will have to identify the system and structural level functions that meet the criteria under 10 CFR 54.4(a). System-level and structural-level functions are the functions that define the plant process, condition, or action that must be accomplished in order to perform or support a safety function, or a specific requirement of one of the five regulated events identified under 54.4(a)(3). The functions the SSCs must fulfill are the functions that are the bases for including them within the scope of license renewal.

The completeness of the applicants scoping process will be evaluated during the LRA technical review performed at NRR. Any potential deficiencies associated with the documentation and implementation of the scoping process, the SSCs determined to be



within the scope of the rule, or the SSCs functions identified during the site inspection should be documented in the inspection report and promptly communicated to NRR.

Licensees sometimes categorize nonsafety-related SSCs as safety related for reasons of convenience. As a result, some SSCs categorized as safety related may not meet the safety-related criteria under 10 CFR 54.4(a)(1). In addition, some safety related systems may meet the safety related criteria under 10 CFR 54.4(a)(1) and may also meet the criteria under 10 CFR 54.4(a)(2) and/or (a)(3). It is important to recognize that certain SSCs may meet more than one scoping criterion and each applicable scoping criterion can add additional system/structural-level functions to some of SSCs included within the scope of the rule. Based on the rule and NRC approved industry guidance, applicants are to assess each SSC against each of the criterion under 10 CFR 54.4(a) for inclusion within the scope of the rule, and to determine the system/structural-level function(s) associated with each applicable criterion.

As required under 10 CFR 54.4(b), 54.21(a)(1)(I), and 54.37(a), the system/structural-level function(s) for each SSC within the scope of the rule, is required to be documented at a sufficient level of detail to provide the bases for including the SSC within the scope of the rule. The system/structural-level functions are expected to be presented in the form of brief descriptions with enough detail to convey the essential parameters. Although the adequacy of an applicant's description of an intended function will be considered during the NRR technical review of the LRA, inspectors should be aware of these requirements when verifying that the intended functions identified by the applicant are consistent with the rule.

Based on staff approved industry guidance in NEI 95-10, applicants have the option to use alternate methods for identifying SSCs within the scope of the rule. For example, if an applicant already has a process in place that meets the scoping and screening requirements under 10 CFR 54.4 and 54.21(a)(1), the applicant can use the results from that previously established process to identify the SSCs within the scope of the rule and their intended functions. If alternate methods are used, they will be reviewed during the inspection in a manner similar to this inspection guidance.

2. Screening - Consistent with 10 CFR 54.21(a) and NRC approved industry guidance, applicants are required to identify and list those SCs requiring an aging management review. The screening of SCs that require an aging management review from the SSCs that meet the criteria under 10 CFR 54.4 typically involves the following activities: (1) identifying evaluation boundaries, (2) excluding the SCs within the evaluation boundaries that are excluded by the rule, NRC approved guidance and documented staff positions, (3) identifying structural/component-level intended functions, (4) determining active/passive and long/short-lived characteristics of the SCs for each intended function, to exclude some SCs and (5) listing those SCs subject to an aging management review.

Consistent with the requirements of the rule and NRC approved industry guidance, an applicant has the option of using a previously selected list of SCs that meet the criteria under 10 CFR 54.4. If an applicant chooses to use a preselected list of SCs to meet the requirements of the rule or parts thereof, the adequacy of the preselection process and

the completeness of the list of SCs requiring an aging management review will be assessed during the NRR technical review of the LRA under the guidance of the SRP-LR. The site inspection team will inspect documentation supporting the process to verify that it was implemented and produced results consistent with the requirements of the rule and the process presented in the LRA.

The site inspection will verify the necessary information and documentation are available to support the screening process. Although the adequacy of the screening process used by the applicant and the list of selected SCs determined to be within the scope of license renewal is reviewed by NRR during their evaluation of the LRA, any potential deficiencies associated with the implementation of the documented process and the resulting list of SCs identified during the site inspection should be promptly communicated to NRR for resolution and included in the inspection report. Inspectors should review the results of the screening process of the SCs for each intended function to verify the proper implementation of the screening process as documented in the LRA and the completeness of the list of SCs requiring an AMR.

Evaluation boundaries are typically documented in the form of marked-up plant drawings that mark the boundaries of the SSCs that contribute to the system/structural-level functions. The evaluation boundaries may be provided in a text format. Text format is typically a list by plant component identification number, of parts of the SSC that are in-scope. The inspection team will have to obtain plant drawings and a sample of the lists to the drawings to conclude if the evaluation boundaries are correct. If a text format is used, it must also bound and identify the SSCs that contribute to the system/structural level function for the system or structure under review. The NRR technical review will assess the applicant's process and the technical correctness of evaluation boundaries selected. The site inspection team will visually inspect the evaluation boundaries of the SSCs included within the scope of the inspection to verify that there is reasonable assurance that the process was implemented as described in the LRA. The inspection team will assess samples of SCs, up to five key components, outside the evaluation boundary and their intended function(s) for potentially belonging within the scope of the rule. If the team identifies any SCs that were incorrectly omitted from scope the issue will be discussed with NRR to obtain their agreement in resolving the issue with the applicant.

Except for those SCs excluded by the rule, staff approved guidance, and documented staff positions, all SCs within the evaluation boundaries are considered within the scope of the rule, and must be evaluated by the applicant to determine if an AMP is required. This evaluation includes identifying the structural/component level intended function(s), the active/passive and/or long/short-lived characteristics, and applicable aging effects for those SCs within the evaluation boundary.

NRC approved guidance for screening allows an applicant to group SCs, with identical characteristics, into "commodity groups." The acronym SC as used in this guidance, should be interpreted to mean structure, components, and commodity groups, whenever commodity groups are used by the applicant. Commodity grouping characteristics for SCs include, but are not limited to, similar designs, materials of construction, aging management practices, and (internal and external) environments. The NRR technical review will assess the process for grouping SCs and the technical correctness of SCs

grouped together. The site inspection team will inspect the implementation of this process to verify that it was implemented and produced results consistent with the requirements of the rule and the program presented in the LRA.

As required under 10 CFR 54.4(b), 54.21(a)(1)(i), and 54.37(a), the structural/component/commodity group-level intended functions for each of the SCs determined to be within the scope of the rule, are required to be identified. These intended functions are required to be documented at a sufficient level of detail such that a reviewer can determine that they are consistent with the system/structural level functions, that they are technically correct and complete for each SC, and that they are consistent with the rule. The structural/component-level intended functions are expected to be presented in a brief descriptive format (may be as brief as a few words), but must satisfy these requirements. The NRR technical review of the LRA will assess the technical correctness and completeness of the intended functions selected as well as the level of detail. Any deficiencies with the correctness and completeness of the documented intended functions determined by the applicant, that are identified during the site inspections, should be promptly brought to the attention of NRR and documented in the inspection report.

As required under 10 CFR 54.21(a)(1)(i), an applicant must identify each SC that performs its intend function without moving parts or change in configuration or properties (passive). For the purpose of license renewal, moving parts refer to a relative difference in movement among the subparts or subcomponents of a structure or component to perform its intended function. For example, the typical function of a motor is to provide a moving force which requires a rotating armature or moving parts. (Note: It isn't the intended function of the motor providing a moving force that makes it active. It is the fact that the motor uses a rotating armature to perform this function.) A change in configuration refers to a change in relative position. The intended function of a ventilation damper is to control the flow of air by changing the relative position of the damper disc and therefore the damper is an active component. The change in properties refers to a change in chemical, certain physical, or other properties similar to the changes in the electrolytic properties of a battery (an active component) needed for that battery to provide an electrical current. Changes in physical characteristics can include a change in physical makeup, or change in gaseous, liquid or solid state, but does not include a change in temperature, or the pressure created by or exerted on a component. Other physical characteristics will have to be considered on case-by-case bases.

In the SOC published with the rule, the Commission also concluded that "a change in configuration or properties should be interpreted to include a change in state." A change in state consists of a change in physical state as discussed above or a change in energized state. For example, the pressure control function of the pressurizer is accomplished by cycling the pressurizer heaters on and off. Although one intended function of a heater is to add heat to a medium, this typically does not require moving parts or change in configuration or property. However, the intended function of maintaining pressurizer pressure by cycling heaters on and off does require a change of state, making the pressurizer heaters active components.

Although the adequacy of this process and the correctness and completeness of the active/passive characteristics determined by the applicant for the SCs within the scope of the rule and their intended functions will be evaluated by NRR during the LRA review, any deficiencies associated with the implementation of the documented process, and the active/passive determination of any structure or component identified during the site inspection should be promptly brought to the attention of NRR and documented in the inspection report.

As required under 10 CFR 54.21(a)(1)(ii), applicants can identify those SCs that are not subject to replacement based on a qualified life or specified time period (long-lived). SCs that have a qualified life of less than 40 years, and that are replaced based on their qualified life (short-lived) do not require an aging management program. Alternatively, SCs that are included in a site approved program that will ensure their periodic replacement at a frequency of less than 40 years (also short-lived) do not require aging management. Although the adequacy of this process and the correctness and completeness of the short/long-lived determination of the SCs within the scope of the rule will be evaluated by NRR during the LRA review, any apparent incorrect determination of short-lived structures or components identified during the site inspection should be promptly brought to the attention of NRR and documented in the inspection report.

Because the SCs within the correct evaluation boundaries should be both passive and long-lived to require an AMR, any structure or component that is correctly determined to be either active or short-lived will not need to be included among those SCs that require an AMR. Therefore, an applicant may choose to eliminate a structure or component from the list of those SCs requiring an AMR based on either the active or short-lived determination, whichever is easier to determine. This is an acceptable approach per the NRC approved guidance, and may result in the absence of the active/passive determination of those SCs that have been correctly determined to be active or short-lived.

The rule, under 10 CFR 54.21(a)(1), requires an applicant to identify and list all SCs requiring an AMR. To meet this requirement, NRC approved guidance states that an applicant needs to provide a list of individual SCs (those SCs not included within commodity groups), a list of commodity groups, and a description of each commodity group that clearly bounds and identifies the SCs included in each commodity group. Although this "condensed" list of structures and components is acceptable for an LRA, the applicant is required to have a complete list of individual SCs on-site in an auditable and retrievable form. By comparing the condensed and complete lists, inspectors can identify SCs screened out and evaluate the correctness of that determination. Although the adequacy of this process and the correctness and completeness of the list of SCs requiring an AMR will be evaluated by NRR during the LRA review, any deficiencies in the list of individual components, commodity groups, and the description of each commodity group identified during the site inspection should be promptly brought to the attention of NRR and documented in the inspection report.

As prescribed under 10 CFR 54.21(a)(2), applicants are also required to describe and justify the methods used to determine those SCs requiring an aging management review

in the LRA. Any concerns with the technical adequacy of the description and justification will be communicated to NRR for resolution.

3. Aging Effects - Each applicant must identify all applicable aging effects for each intended function associated with each SC requiring an aging management review. As per staff approved industry guidance for identifying applicable aging effects, applicants are to perform a technical review of the materials, environments, and stressors associated with each SC, and a review of site-specific and industry operating experience as well as plant maintenance experience to determine any applicable aging effects.

Site inspection teams will assess the applicant's consideration of industry-operating experience, site-operating experience and site-maintenance history. Inspectors will review a sample of the maintenance history of the SCs within the scope of the inspection to verify that the applicant considered site-maintenance history in determining applicable aging effects. Any concerns with an applicant's process used to identify aging effects or with the technical correctness or completeness of the applicable aging effects as documented in the LRA, identified during inspection, will be brought to the attention of NRR and documented in the inspection report.

4. Aging Management Review - As required under 10 CFR 54.21(a)(3), an applicant is required to demonstrate that the aging effects will be adequately managed so the intended function will be maintained consistent with the CLB for the period of extended operation. To fulfill this requirement an applicant must first identify the applicable aging effects, and the aging management program(s) and activities that will manage each aging effect. The technical adequacy and completeness of the aging management programs used to manage aging effects will be assessed by NRR during the LRA review. However, any concerns with the technical correctness and completeness of the AMPs identified by the site inspection team during the inspection of documentation or the inspection of the material condition of a structure, component or commodity group needs to be promptly brought to the attention of NRR and documented in the inspection report.

The rule initially required applicants to identify aging mechanisms. The rule was revised in 1995 and currently requires an applicant to identify aging effects. It may be difficult to manage the effects of aging without understanding the mechanism(s) and specifically addressing the mechanism that causes the aging effect. Therefore, an applicant has the option of identifying aging mechanisms and to develop programs to address these mechanisms. However, if an applicant decides to use aging mechanisms, they must clearly correlate the mechanisms with the aging effects, such that there is no confusion as to which aging mechanism correlates to which aging effect, and which AMP correlates to which aging mechanism and/or aging effect. In general, the applicant should be consistent in their use of aging mechanisms and the level of detail used to describe aging effects/mechanisms and related AMPs.

As part of the inspection process of AMP documentation, the site inspector needs to ensure that the implementation of the program is producing results consistent with the claims made by the applicant as to how the program will manage the aging effect in

question. Each program should clearly state how the aging management program will manage the aging effect/mechanism and the supporting documentation along with the material condition of the SCs must be consistent with these claims.

The assessment of an AMP to meet its objective(s) should not be limited to SCs within the evaluation boundaries. If a program fails to meet its objective in similar applications but outside of the evaluation boundaries, the failures need to be assessed by the applicant, and an adjustment to the program may need to be made to prevent failure within the evaluation boundaries. To this end, the site inspection team can inspect any AMP failure(s), independent of the location of the failure(s) with respect to the evaluation boundaries, to verify that the AMPs are being implemented in a manner that are effectively managing the aging effects.

Individual failure of a program to fulfill its stated aging management objectives does not automatically result in the program being determined as ineffective. For example, a chemistry control program has a stated objective of preventing corrosion from causing the loss of material in carbon steel piping to drop below the design minimum wall thickness throughout the period of extended operation. If a section of carbon steel piping drops below minimum wall thickness prior to the end of the period of extended operation, the applicant needs to assess the particular incident(s) that exceeded the stated objective and determine the cause of that failure(s). If an applicant can determine the reason for not meeting its stated objective, take corrective actions to correct the cause, and demonstrate the effectiveness of the corrective actions; or specifically explain why the failure caused in one location does not have an effect on other locations within evaluation boundaries, the program can still be used to manage the effects in this and similar situations. In addition to assess a particular failure(s) of an AMP, an applicant needs to identify other areas that experience the same stressor(s) that can result in a similar failure(s) and need to implement corrective actions, as appropriate. Repeated failure is considered a good indication of a basic deficiency or the inability of an AMP to manage aging effects.

Some AMPs may have an objective to monitor and trend ongoing degradation, and implement corrective actions prior to anticipated failure of a structure or component to perform its intended function consistent with the applicant's CLB. For these AMPs, the technical review performed by NRR will assess the technical adequacy of the trending process. During the site inspection, any trends identified as being less conservative with respect to the objective(s) of the AMPs in the LRA and/or site-approved procedures needs to be identified to NRR and included in the inspection report.

NRC inspection of the material condition of SCs is an important element of the aging management review process. Although it is recognized that an NRC inspection of each SCs requiring an AMR can not be performed, an inspection of a good cross-section of SCs that are constructed of different materials in a variety of applications, environments, and environmental stressors, and that experience a variety of aging effects should be performed. This cross-section should be skewed toward more adverse environments (e.g., open, salt water environments versus closed, treated water environments, or the upper levels, high radiation areas of containment versus climate controlled, low radiation switchgear rooms), but should not exclude mild, controlled environments. In addition, the material conditions of a good cross-section of the SCs within commodity groups

should also be inspected. Efforts should also be made to inspect during an outage the material condition of SCs with limited access during plant operation to ensure the thorough implementation of AMPs throughout the plant. The material condition of the SCs requiring an AMP should be consistent with the conditions required by the CLB and the objectives of the AMP as stated in the LRA. During the inspection of SCs, inspectors should look for any material condition of a structure or component that is found to be degraded such that it cannot perform its intended function consistent with the applicant's CLB, that is experiencing excess aging inconsistent with the objectives of the AMPs intended to manage the observed aging, that is exceeding its expected trend in degradation, or that is experiencing aging effects of a type not considered in the LRA.

5. Demonstration - As required under 10 CFR 54.21(a)(3), applicants are required to include a demonstration that the effects of aging for each SC requiring an AMP will be adequately managed such that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.

To meet this requirement for an existing program, an applicant may provide a complete and accurate summary of the results from the implementation of each existing AMP discussed in the LRA. This summary should accurately reflect supporting information and objective evidence from the implementation of each program and should serve to demonstrate the adequacy of the AMP. This summary should also include a discussion of the applicable types of age related failures (if any) experienced, the corrective actions taken to prevent future failures, and the results from implementing the corrective actions or a technical justification as to why those failures will not prevent the program from meeting its objective(s) during the period of extended operation as stated in the LRA.

For those newly developed programs without sufficient supporting information or objective evidence to provide an adequate demonstration, consistent with staff approved industry guidance, applicants may provide the following information: (1) a justification as to why the AMP being proposed will provide reasonable assurance that the effects of aging will be managed during the period of extended operation, (2) a schedule for providing supporting information and/or objective evidence that the AMP is adequately managing the aging effects, (3) a description of any applicable criteria, limits, and thresholds, and (4) a description of the planned corrective actions if the AMP does not adequately manage the aging effects.

For the demonstration of new and existing programs, the technical review performed by NRR will assess the adequacy of the demonstrations provided. The site-inspection teams will review any available documentation associated with the demonstration of the AMPs identified in the LRA. During the site inspection process, the site inspection team will inspect the material condition of some of the accessible SCs within the scope of the inspection, that have AMPs in place, in order to verify that the material conditions of the SCs are being maintained adequately. Any discrepancies in documentation or material conditions will be brought to the attention of NRR and documented in the inspection report.

- b. CLB Changes - As required under 10 CFR 54.21(b), each year following the initial submittal of the LRA and at least three months before the scheduled completion of the NRC review, applicants are required to submit an amendment to the renewal application

identifying any changes to the CLB of the facility that materially affects the contents of the LRA, including the FSAR supplement. The site inspection team will review any available information and documentation associated with the changes in the CLB identified by the applicant in the amendment to the renewal application. The team will review the group of plant modifications made since the date of the LRA submittal. The team should select a sample of plant equipment affected by these modifications that are within the scope of license renewal and verify that newly install equipment is being incorporate into the appropriate AMPs.

- c. FSAR Supplement - 10 CFR 54.21(d) requires each applicant to provide an FSAR supplement for the facility that contains a summary description of the programs and activities for managing the aging effects and the evaluation of TLAAs for the period of extended operation. The technical correctness and level of detail of the information provided in the FSAR supplement will be reviewed by NRR. However, the site inspection team will verify that the summary description of the programs in the FSAR supplement is consistent with the program implemented by the applicant. Any concerns with the technical correctness and completeness of the FSAR supplement identified during the inspection will be brought to the attention of NRR and documented in the inspection report.

#### 71002-04 RESOURCE ESTIMATES

It has been estimated that the license renewal inspection activities will require approximately four weeks of inspection time on site involving a team of four inspectors and a team leader. Each week of inspection will require one week of prior preparation and one following week of documentation. In addition, it has been estimated that the team leader will need approximately an additional 10 working days to finalize the inspection report. Based on these estimates, each application will require 1.2 FTE of inspection activities prior to the approval of a renewed license.

#### 71002-05 REFERENCES

1. 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants"
2. U.S. Nuclear Regulatory Commission, Draft Regulatory Guide 1047, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," August 1996
3. Nuclear Energy Institute, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," NEI 95-10, March 1996
4. NUREG 1568, "License Renewal Demonstration Program: NRC Observation and Lessons Learned," December 1996
5. U.S. Nuclear Regulator Commission, "Nuclear Power Plants License Renewal; Revisions," Federal Register, Vol. 60, No. 88, Monday, May 8, 1995, pages 22461 to 22495



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