UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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June 14, 2002

Virginia Electric and Power Company
ATTN: Mr. David A. Christian
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SUBJECT: NORTH ANNA AND SURRY POWER STATIONS - NRC INSPECTION REPORT 50-338/02-09, 50-339/02-09, 50-280/02-09 AND 50-281/02-09

Dear Mr. Christian:

On May 17, 2002, the NRC completed an inspection regarding your application for license renewal for the North Anna and Surry Power Stations. The enclosed inspection report presents the results of that inspection. The results of this inspection were discussed with members of your staff on May 3 and May 17, 2002, in public exit meetings at the North Anna and Surry sites.

The purpose of this inspection was an examination of activities that support your application for a renewed license for the North Anna and Surry facilities. The inspection consisted of a selected examination of procedures and representative records, and interviews with personnel regarding your proposed aging management activities to support license extension. For a sample of plant systems, inspectors performed visual examination of accessible portions of the systems to observe any effects of equipment aging.

The inspection concluded that the existing aging management activities are being conducted as described in your License Renewal Application and your plans for new aging management activities appear acceptable to manage plant aging.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Should you have any questions concerning this report, please contact Caudle Julian at (404) 562-4603.

Sincerely,

\RA

Loren R. Plisco, Director
Division of Reactor Projects

Docket Nos. 50-338, 50-339 and 50-280, 50-281
License Nos. NPF-4, NPF-7 and DPR-32, DPR-37

Enclosure: NRC Inspection Report

cc w/encl: - See page 3

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.	50-338, 50-339 and 50-280, 50-281
License Nos.	NPF-4, NPF-7 and DPR-32, DPR-37
Report No:	50-338/02-09, 50-339/02-09 and 50-280/02-09, 50-281/02-09
Licensee:	Virginia Electric and Power Company (VEPCO)
Facility:	North Anna Power Station, Units 1 & 2 and Surry Power Station, Units 1 & 2
Location:	1022 Haley Drive Mineral, Virginia 23117 5850 Hog Island Road Surry, VA 23883
Dates:	April 29 - May 3 and May 13 - 17, 2002
Inspectors:	B. Crowley, Reactor Inspector M. Scott, Reactor Inspector K. VanDoorn, Reactor Inspector H. Wang, Operations Engineer, NRR
Approved by:	Caudle Julian Team Leader Division of Reactor Safety

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SUMMARY OF FINDINGS

IR 05000338-02-09, IR 05000339-02-09, 05000280-02-09, 05000281-02-09; 03/29-04/03 and 04/13 - 17/2002; Virginia Electric and Power Company North Anna Power Station, Units 1 & 2 and Surry Power Station, Units 1 & 2. License Renewal Inspection Program, Aging Management Activities.

This inspection of License Renewal activities was performed by four regional office engineering inspectors, and one inspector from the office of Nuclear Reactor Regulation. The inspection program followed was NRC Manual Chapter 2516 and NRC Inspection Procedure 71002. This inspection did not identify any "findings" as defined in NRC Manual Chapter 0612.

The inspectors reviewed Aging Management Activities for selected plant systems as described in Attachment 2 of this report to determine if the program requirements were identified correctly and being implemented for the selected systems consistent with the North Anna and Surry License Renewal Application (LRA). Where existing programs are to be expanded or new aging management programs are to be created to support the LRA, the inspectors examined available documentation and discussed future plans with applicant engineers.

This inspection concluded that the existing aging management programs were being implemented as described in the LRA. Discussion with plant staff and review of available documentation for expansion of existing programs and creation of new aging management programs demonstrated that plans were consistent with the LRA.

The inspectors performed numerous visual inspections on portions of plant equipment to attempt to observe aging effects. The overall condition of plant equipment was generally good.

Attachment 1 of this report lists the applicant personnel contacted and the documents reviewed. Attachment 2 of this report lists the Aging Management Activities selected for inspection. A list of acronyms used in this report is provided in Attachment 3.

Report Details

I. Inspection Scope

This inspection was conducted by NRC Region II inspectors and members of the NRR staff to interview applicant personnel and to examine a sample of documentation which supports the license renewal application (LRA). This inspection reviewed the implementation of the applicant's Aging Management Activities. The team reviewed supporting documentation and interviewed applicant personnel to confirm the accuracy of the LRA conclusions.

While the applicant had generally described necessary procedure changes needed for license renewal activities, no procedure changes had yet been developed for review by the inspectors. In addition, the inspectors identified additional procedures which warranted changes to incorporate LR activities. The applicant stated that changes to the upper tier procedures were expected to be completed by late 2002. This issue will be reviewed during a future inspection.

For a sample of plant systems, inspectors performed visual examination of accessible portions of the systems to observe any effects of equipment aging. Attachment 1 of this report lists the applicant personnel contacted and the documents reviewed. The Aging Management Activities selected for inspection are listed in Attachment 2 of this report. A list of acronyms used in this report is provided in Attachment 3.

II. Findings

A. Review of Mechanical Aging Management Activities

1. Inservice Inspection (ISI) Program: Component and Component Support Inspections, Reactor Vessel, and Reactor Vessel Internals (Surry and North Anna)

The ISI Program, an existing program, is credited in the LRA as an aging management program for the pressurizer, reactor coolant (RC) system, reactor vessel (RV), RV internals, chemical volume and control (CH) system, feedwater (FW) system, main steam (MS) system, residual heat removal (RH) system, safety injection (SI) system, sample system, NSSS equipment supports, general structural supports, and steam generators. Both Surry and North Anna are converting to a risk-informed (RI) ISI program in accordance with Westinghouse Topical Report WCAP-14572. The Surry Unit 1 program has been approved by the NRC and is a full-scope RI ISI program covering Classes 1, 2, and 3 and non-class piping. The Surry Unit 2 program has also been approved, but covers Class 1 piping only. The programs for both North Anna Units will only include Class 1 piping.

The ISI program is credited for managing loss of material, cracking, gross loss of pre-load, and gross indication of reduction in fracture toughness for: stainless steel, cast stainless steel, nickel-based alloy, low alloy steel, and carbon steel. The program consists of performing surface and volumetric nondestructive examinations of piping and components at various intervals in accordance with the ASME Boiler and Pressure Vessel Code and other augmented requirements such as NUREGs, Generic Letters, etc. The ISI Program is controlled by:

> North Anna Power Station Unit 1 Inservice Inspection Program Third Inspection Interval May 1, 1999 - April 10, 2009, Revision 2, Change 2

North Anna Power Station Unit 2 Inservice Inspection Program Third Inspection Interval December 14, 2001 - December 13, 2010, Revision 1, Change 1

Surry Power Station Unit 1 Inservice Inspection Plan For Components and Component Supports For the Third Inspection Interval, Revision 11

Surry Power Station Unit 2 Inservice Inspection Plan For Components and Component Supports For the Third Inspection Interval, Revision 11

The program documents are updated each 10-year interval and submitted to the NRC for approval of any relief requests. Inspection schedules and procedures, implement the program.

The inspectors reviewed the applicable Aging Management Activity (AMA) technical reports and selected Aging Management Review (AMR) technical reports as listed in Attachment 1. To verify that the ISI program was in place and was being implemented, the inspectors reviewed the above program documents, discussed various aspects of the program with responsible applicant personnel, and reviewed inspection plans and results as listed in Attachment 1 of this report.

Also, periodic inspections of ISI activities are performed by NRC ISI inspectors during outages. Recent inspections have found activities to be performed in accordance with program and plan requirements.

During the review, the inspectors identified the following discrepancies when comparing the ISI Program with Section B2.2.11 of the Surry LRA and Table 2.1 of Aging Management Activity Technical Report LR-1732/LR2732:

Section B2.2.11of the Surry LRA and Table 2.1 of LR-1732/LR-2732 list ASME Section XI Category B-M-1 (Pressure Retaining Welds in Valve Bodies) as a Component Type and Category included in the ISI program. The Surry ISI program does not include this Component Category. Discussions with applicant personnel revealed that there are no Class 1 Pressure Retaining Welds in Valve Bodies (Category B-M-1) at Surry.

Surry LRA Section B2.2.11 and Table 2.1 of LR-1732/LR-2732 list ASME Section XI Category B-M-2 (Valve Bodies) as a Component Type and Category included in the ISI Program. Category B-M-2 is for inspection of ASME Class 1 valve bodies when valves are opened for maintenance. Section B2.2.11 lists the CH and the FW systems as two systems where credit is taken for the ISI Program. LRA Tables 3.3.1-1 (CH system) and 3.4-4 (FW system) take credit for the ISI Program for aging management of cracking in valve bodies. Since the Surry ISI Program does not contain any Category B-M-2 inspections for the FW and CH systems, the inspectors questioned whether the LRA should take credit for the ISI Program inspections for Valve Bodies for these systems. The applicant stated that the LRA was in error for the FW system since the FW system does not contain any Class 1 components. However, for the CH system the applicant considered that reference to the ISI program was appropriate since ASME Category B-P (Pressure Testing) was also included in the LRA tables and would be an appropriate ISI method for managing cracking in valve bodies.

Page B-76 of the LRA states under “Detection of Aging Effects” that, “Volumetric examinations include a region equivalent to one-half of the material thickness on each

side of welds ....." This is incorrect for pipe welds, as the coverage is only ½" on each side of the weld as required by the ASME Section 11 Boiler and Pressure Vessel Code.

Based on the above discrepancies, the applicant agreed to again review the LRA relative to ISI Program credit for various components and make any necessary changes. This issue will be reviewed during a future inspection.

In addition to the ASME Section XI RV Internals Inspection that is conducted once per 10 years, the applicant identified an Aging Management Activity Followup Item to follow industry events and any new developments regarding RV internals issues and to perform a one-time focused inspection of the RV internals for one Unit at each site between year 30 and the end of the current operating license. Another Aging Management Activity Followup Item was identified to follow industry efforts and consider recommendations for enhanced inspections of RV core support lugs. An additional Aging Management Activity Followup Item was identified to follow industry activities related to failure mechanisms for small-bore piping and evaluate changes to inspection activities based on industry recommendations.

The inspectors concluded that ISI activities are being conducted as described in the ISI Program. With exception of the discrepancies for valve bodies noted above, the program includes the systems and components listed in the LRA, for which the LRA credited the ISI Program for aging management. Adequate guidance had been provided to reasonably ensure that aging effects will be appropriately managed.

2. Inservice Inspection Programs: Augmented Inspection Activities

Augmented inspections are outside the required scope of ASME Section XI. The examination methods and acceptance criteria are generally similar to those for ASME Section XI. The inspections are performed for selected components and supports in accordance with requirements identified in the Technical specifications, UFSAR, license commitments, industry operating experience and Surry and North Anna good practices.

The ISI Augmented Inspection Activities (Program) are credited for managing cracking of stainless steel, low alloy steel, and carbon steel in selected components in the FW, MS and RC systems. In addition, the program is credited with managing loss of material in general structural supports. The program consists of performing surface and volumetric nondestructive examinations of piping and components at various intervals. The inspections are performed as an add-on to the ASME Section XI ISI Program and are controlled by that program and the Dominion Augmented Inspection Manual in accordance with the ASME Boiler and Pressure Vessel Code procedures and other augmented requirements such as NUREGs, Generic Letters, Bulletins, etc. .

The inspectors reviewed the applicable AMA and selected AMR technical reports as listed in Attachment 1. To verify that the ISI Augmented Inspection Program was in place and was being implemented, the inspectors reviewed the above program documents, discussed various aspects of the program with responsible applicant personnel, reviewed inspection plans and results as listed in Attachment 1 of this report, and verified that the components identified in the LRA as taking credit for the ISI Augmented Inspection Program were included in the ISI Augmented Inspection Program and ISI Schedules.

In the review, the inspectors noted that inspection of reactor vessel heads using a modified VT-2 visual inspection technique was included in the Dominion Augmented Inspection Manual

(Attachment 36 for Surry and Attachment 18 North Anna). These inspections are in response to NRC Bulletin 2001-01 relative to cracking and leakage at the reactor vessel head penetrations and NRC Bulletin 2002-01 relative to degradation of the reactor vessel head due to boric acid wastage caused by leaks. In response to Bulletin 2002-01, by Letter Serial 02-168 dated April 1, 2002, the applicant committed to perform a bare-metal inspection of the reactor vessel head during each refueling outage for both Surry and North Anna. The inspectors noted that Attachment 18 (North Anna) of the Dominion Augmented Inspection Manual and the North Anna ISI Plan had been revised to incorporate the bare-metal visual inspection followed by volumetric/surface examinations if leakage is found. However, Attachment 36 for Surry had not yet been revised to incorporate these bare-metal inspections. The applicant stated that revision to Attachment 36 to add the bare-metal head inspection for Surry is planned by June 2002.

The applicant had identified followup actions for the ISI Augmented Inspection Activities relative to: (1) implementation of an augmented inspection of the presssurizer surge line connection to the reactor coolant system hot-leg loop piping, and (2) implementation of an augmented inspection of the core barrel hold-down spring.

The inspectors concluded that the ISI Augmented Inspection Activities are being conducted as described in the Dominion Augmented Inspection Program. The program includes the systems and components listed in the LRA, for which the LRA credited the ISI Augmented Inspection Program for aging management. Adequate guidance had been provided to reasonably ensure that aging effects will be appropriately managed.

3. Secondary Piping and Component Inspection Program

The Secondary Piping and Component Inspection Program is a program to control flow accelerated corrosion (FAC). For this report, the term “FAC Program” will be used interchangeably with Secondary Piping and Component Inspection Program. FAC is an aggressive internal material loss from piping, vessels, and equipment made from carbon steel piping materials that occurs under certain conditions of flow, chemistry, geometry, and material. The FAC Program, an existing program, is credited in the LRA as an aging management program for portions of the auxiliary steam (AS), blowdown (BD), FW, MS, and steam drain systems.

The program is credited for managing the loss of material in carbon steel piping and components, including valve and pump bodies, and consists of monitoring the wall thickness of susceptible materials in various systems, and replacing or repairing affected piping and components prior to failure. In most cases, FAC resistant materials are used for replacements. The program is based on NRC Generic Letter 89-08, Erosion/Corrosion-induced Pipe Wall Thinning, NUREGS-1344, Erosion/Corrosion Induced Pipe Wall Thinning in U.S. Nuclear Power Plants, and PERI NSA-202L, Recommendations for an Effective Flow-Accelerated Corrosion Program. The program computer models susceptible systems and predicts wear rates. The model is supplemented and updated with periodic thickness inspections of selected components each operating cycle. Based on the model and inspection results, decisions are made on future inspections and replacement schedules.

The FAC Program is controlled by the following procedures: (1) Standard S.D.-GN-0033, Secondary Piping and Component Inspection Program, Revision 9 and (2) VPAP-0807, Secondary Piping and Component Inspection Program, Revision 2. The inspectors reviewed the applicable AMA and AMR technical reports as listed in Attachment 1. In addition to review of the above program implementing procedures and discussion of the program with responsible

applicant personnel, the inspectors reviewed the most current Outage Inspection Lists and Outage Inspection Results, as listed in Attachment 1 below, for Surry and North Anna to verify that the FAC Program was in place and being implemented.

The inspectors noted that a planned enhancement to the Work Control Program will also enhance the FAC Program for inspection of internal surfaces of pumps and valves.

The inspectors concluded that the FAC Program was in place, had been implemented, and included the systems and components identified in the LRA and should manage aging effects as defined in the LRA. Adequate guidance had been provided to reasonably ensure that aging effects will be appropriately managed.

4. Reactor Vessel Integrity Management

The RV Integrity Management activities, existing activities, are credited in the LRA as aging management activities for managing RV reduction in fracture toughness. The program encompasses the following sub-programs: (1) Reactor Vessel Irradiation Surveillance, (2) Vessel Fast Neutron Fluence Calculations, (3) Measurements and Calculations of Charpy Upper Shelf Energy, (4) Calculation of Reactor Coolant System (RCP) Pressure/Temperature (P/T) Limit Curves and Low Temperature Overpressure Protection System (LTOPS) Setpoints, and (5) Pressurized Thermal shock (PTS) Screening Calculations.

The Reactor Vessel Integrity Management activities are controlled by applicant procedures and engineering calculations listed in Attachment 1 below to meet the FSARs, Technical Specifications, 10 CFR 50.61, and 10 CFR 50, Appendices G and H.

The inspectors reviewed the applicable AMA and selected AMR technical reports as listed in Attachment 1. To verify that the Reactor Vessel Integrity Management Activities were in place and being implemented, the inspectors reviewed the program, procedures, completed PTs, and engineering calculations listed in Attachment 1 of this report and discussed various aspects of the program with responsible applicant personnel.

During the review, the inspectors noted that, although the various aspects of the Reactor Vessel Integrity Activities were in place and had been implemented, there was no overall procedure to tie the five individual activities together in a single program procedure. The applicant agreed to create an administrative procedure to describe the relationship between the five aspects of the program. Before the end of the inspection, the applicant initiated Level 1 Tracking Item # 1647 to ensure issuance of the procedure.

The inspectors concluded that the Reactor Vessel Integrity Management activities were in place, had been implemented, and were consistent with the description in the LRA. Activities in place should reasonably ensure that aging effects will be appropriately managed.

5. Steam Generator Inspections

The Steam Generator Inspections (Program), existing activities, are credited in the LRA as an aging management program for the aging effects of cracking and loss of material in carbon and low alloy steels, stainless steels, and nickel-based alloy. In addition to inspections required by the ASME Section XI, additional inspections are performed and are based on Electric Power Research Institute (EPRI) Guidelines and Nuclear Energy Institute (NEI) 97-06, Steam Generator Monitoring Guidelines. The program includes: periodic inspection of tubing and

plugs, secondary side integrity inspections, tube integrity assessments, assessment of degradation mechanisms, primary to secondary leakage monitoring, primary and secondary chemistry control, sludge lancing, maintenance and repairs, and foreign material exclusion. The main program controls are the Steam Generator Monitoring and Inspection Program Plans for each site as listed in Attachment 1.

The inspectors reviewed the applicable AMA and AMR reports as listed in Attachment 1. In addition to review of the program implementing procedures and discussion of the program with responsible applicant personnel, the inspectors reviewed the most recent Steam Generator Condition Monitoring Evaluation and Operational Assessment for all four Units and the most recent Westinghouse Steam Generator Field Services Reports (Surry Unit 1 and North Anna Unit 1), as listed in Attachment 1. This review was to verify that the inspection programs were in place and being implemented.

The inspectors concluded that the Steam Generator Inspection Program was in place, had been implemented, and was consistent with the description detailed in the LRA. Activities in place should reasonably ensure that aging effects will be appropriately managed.

6. Chemistry Control Program (Primary, Secondary, and Diesel Fuel Oil)

This is an existing program which is credited for managing the aging effects of loss of material, cracking, and fouling build up for the internal surfaces of fluid systems in the scope of license renewal. The systems involved are detailed in the AMA and covered by plant procedures. The aging effects are minimized or prevented by controlling the chemical species that cause the underlying aging mechanisms. Chemical agents such as corrosion inhibitors and biocides are introduced to prevent mechanisms that could cause loss of material, cracking, or fouling. The fluid internal to these systems is tested periodically to monitor chemistry conditions. Tolerance ranges for chemistry parameters were reviewed for compliance with industry guidelines and Technical Specifications (TS). The existing chemistry control program has been reviewed by the NRC and internal audits and determined to be effective. Operating experience is rolled into the program as an ongoing process.

The inspectors discussed the program details with corporate and site chemistry personnel. Also, the inspectors reviewed the Surry periodic chemistry sampling documentation for the previous two years. That documentation demonstrated that systems' chemistry was monitored and consistently maintained by the established Chemistry Control Program. Further, the inspector looked at corrective action documentation on selected Surry fuel oil problems.

The inspectors discovered that the AMA for fuel oil (LR-1770) referenced procedure VPAP-2201, Nuclear Plant Chemistry Manual, as containing the information on fuel oil program. Since the AMA was last changed, a new procedure (VPAP-2205, which is applicable to both stations) had been issued to cover that program. The applicant planned to change the AMA to reference the newer procedure.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience information to determine aging effects. The applicant had provided adequate guidance to ensure the aging effects will be appropriately managed. There is reasonable assurance that the intended function of the fluid systems will be maintained through the period of extended operation.

7. Boric Acid Corrosion Surveillance Program

This is an existing program that is credited in AMAs to prevent loss of material or mechanical closure integrity due to boric acid wastage as an aging effect requiring management. The program uses systematic inspections, leakage evaluations, and corrective actions on systems in containment to ensure that boric acid corrosion does not lead to degradation of pressure boundaries or structural integrity of license renewal system components, supports, or structures. Periodic inspections are performed, using existing procedures at each refueling outage inside containment.

The inspectors reviewed the program documentation and discussed the program with the Engineering staff. The inspectors reviewed the documented results of previous inspections and condition reports which corrected identified leakage conditions. The AMA program identified the implementing procedures. During a April 2002 Surry containment refueling walk down inspection of borated systems, the NRC inspectors did not observe any appreciable acid buildup.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience information to determine aging effects. The applicant had provided adequate guidance to ensure the aging effects will be appropriately managed. When implemented, there is reasonable assurance that the intended function of the systems, structures, and components (SSCs) will be maintained through the period of extended operation.

8. Service Water (SW) System Inspection

For this AMA, the applicant plans to use the existing SW inspection guidelines' criteria, repair methods, and documentation requirements to continue system viability. The aging effects addressed by this program include loss of material, erosion, protective coating failure, silting, and biological fouling. The principal components that could experience degradation due to wastage or blockage are control room chillers, charging pump coolers, and component cooling heat exchangers. The Recirculation Spray heat exchangers are maintained in an isolated state and are inspected separately. The applicant has actively maintained the system by replacement of piping (North Anna SW pump header lines and Auxiliary Building piping) and weld repair (primarily Surry). Inspection activities have occurred and are planned.

The inspectors reviewed the applicable AMA design information, modification details, TS, and procedures and discussed the program with site and corporate functionaries. The inspectors walked down the entire system except those portions located in the North Anna containment with the system and corporate engineers. The inspectors entered or viewed multiple normally inaccessible portions of the system areas to assess the system's condition and level of maintenance. During the walkdowns the inspectors looked at structural details and other piping systems (particularly, safety system and adjacent non-safety system proximity) covered in other sections of this report.

The inspectors concluded that the applicant had conducted adequate historical reviews of plant specific and industry experience information to determine aging effects. The applicant had established tracking items to assure implementation of proposed actions to support the LRA. The inspectors concluded that the applicant had provided adequate guidance to ensure that the aging effects will be appropriately managed. When implemented as described, there is

reasonable assurance that the intended function of the SW system will be maintained through the period of extended operation.

9. Buried Piping and Valve Inspection

This yet-to-be-described program will be a one time inspection of several types of buried pipe. The systems included are: condensate (Surry), containment spray (Surry), fire protection, diesel fuel oil, recirculation spray (North Anna), quench spray (North Anna), residual heat removal, safety injection (high and low head, Surry), and service water. The applicant had issued a follow up action item to accomplish this plan. The inspections would be in accordance with work orders and would not be repeated unless unacceptable conditions are observed and a determination is made that additional inspections are required. The inspectors discussed the types of potential inspections yet-to-be-described with corporate engineering. The plan to generate potential inspections is within the scope of the license renewal process.

Additionally, at North Anna the applicant had issued an open item (PM task evaluation request) to inspect the cathodic protection system for the carbon steel culvert in the flood wall west of the main turbine building. This drainage path keeps hydraulic pressure from building on against the Unit 2 turbine building wall.

10. Battery Rack Inspection

The purpose of the battery rack inspection activities is to ensure the integrity of the supports for various batteries. Losses of material due to corrosion and cracking are potential aging effects. The applicant has a number of batteries described in the AMA program for inspection for aging effects. The AMA partially used existing plant procedures to accomplish the rack inspections. During the AMA preparation, the applicant recognized that three batteries' types do not have rack inspections (fire pump, AAC, and security diesel) at North Anna and there are outstanding action items to change or generate procedures. The inspectors looked at all battery racks during the site visits and found them in good repair.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience information to determine aging effects. The applicant had provided adequate guidance to ensure the aging effects will be appropriately managed. When completely implemented, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

11. Load Handling Cranes

Under 10 CFR 54, the applicant must evaluate the structural integrity of load handling cranes and devices. The long-lived passive components of these cranes include rails, towers or girders, load trolley steel [end trolleys], fasteners, base plates, and anchorage. The applicant chose to utilize existing programs for the evaluation via inspections activities. This program has been developed in accordance with ASME B30.2-1976 and ASME B30.11-1973, which address the load handling concerns identified in NUREG-0612. The procedures include specific and general steps for checking the condition of the structural members (rails and towers) and fasteners on the cranes, the runway along which the cranes move, and the base plates and anchorages for the runways and monorails. The applicant has stated they would implement one-time internal inspections of a representative sample of the box girders of the containment polar crane.

At the time of the inspections, the AMA did not list the existing overall Crane and Hoist program controlling corporate procedure, VPAP-0810, nor did it list the existing operations procedures at both sites (Controlling Procedure for Refueling) that would require all crane and hoist preparatory inspections and maintenance to be complete prior to refueling commencement. The applicant agreed to review and update the subject AMA with the additional procedures.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience information to determine aging effects. The applicant had provided adequate guidance to ensure the aging effects will be appropriately managed. When completely implemented, there is reasonable assurance that the intended function of the systems, structures, and components (SSCs) will be maintained through the period of extended operation.

12. General Condition Monitoring Activities

The applicant plans to perform these activities to assess aging via external visual inspections for SSCs that are located in normally accessible areas. The applicant's Health Physics personnel currently perform regular surveys of various areas and observe for leaks and the System Engineers perform regular system walkdowns and observe material conditions. The applicant also plans to utilize the current program for inspection of structures in accordance with the Maintenance Rule requirements for management of structures. This program is described in more detail in paragraph II.C.2. In addition to providing training to those personnel, the applicant plans to enhance site procedures for the radiation survey activities and engineering activities. The inspectors reviewed the applicant's procedures for surveys and engineering activities, reviewed AMA and AMR documents, reviewed system health reports, reviewed the open item tracking data base, and held discussions with engineering and radiation protection personnel.

Well defined guidance for engineering walkdowns was noted and procedures required regular radiation surveys. One minor inconsistency was noted, in that, the AMA report stated that surveys are performed at least weekly. The applicant's procedure allows some areas to be surveyed less frequently for practical reasons. For example, high radiation areas are only surveyed when required for entry. The applicant plans to correct the inconsistency and an open item was initiated to track completion. The inspector also noted that several other documents warranted consideration for inclusion regarding license renewal. These included procedures ENAP-0001, Station Engineering Organization, Responsibilities, and Authorities and C-HP-1032.010, Radiological Survey Records; and the System Engineering Handbook. The applicant agreed that these procedures should be considered and open items were established for the proposed changes. In addition, based on observations and discussions described in paragraph II.E.1, the applicant stated that outage walkdowns would be added to this program. The inspectors concluded that the applicant had provided adequate guidance to assure that aging effects will be appropriately managed via the general condition monitoring activities. When implemented as described, there is reasonable assurance that intended functions of SSCs will be maintained through the period of extended operation, in part, via the general condition monitoring activities.

13. Work Control Process

The applicant has credited the existing Work Control Process (WCP) for aging management on most in-scope systems. The WCP is the process for implementation of preventive maintenance (PM), corrective maintenance (CM), performance testing, and predictive maintenance activities.

These activities provide numerous opportunities to observe for both external and internal aging. The predictive fluid sampling portion also provides opportunities for assessing the condition of components. The applicant reviewed Work Order (WO) records for an approximate seven year period to determine how many opportunities had occurred for internal visual examinations. The applicant credited the WCP where, in their judgement, sufficient opportunities had existed over the seven year period to assure aging problems would be detected for various systems and material/environment combinations. Based on recent discussions with NRC personnel, the applicant had decided to perform an audit for a ten year period of opportunities afforded for inspections by the WCP process to assure a sufficient number of inspections will have been performed to assure all systems and material/environment combinations were covered. The applicant determined that procedural enhancements were necessary to assure adequate inspections were performed. The inspectors reviewed portions of the applicants data base for the historical review, reviewed the work control procedure, reviewed proposed wording for CM and PM procedure changes, reviewed general guidance procedures for the applicant's maintenance teams, reviewed AMA and AMR documents, and reviewed the open item tracking data base.

The applicant's WO data review appeared to be thorough and an open item had been established to track procedure changes. The proposed wording for the CM and PM procedure changes provided appropriate description of aging mechanisms and requirements for internal inspections. The inspectors noted that general maintenance procedures for the maintenance teams and inspections (MDAP-0025, Quality Maintenance Team Process and VPAP-1001, Inspection Program) should be considered for changes for license renewal, as well as the CM and PM procedures. The applicant agreed that the MDAP should be changed and the VPAP should be reviewed for possible changes. An open item was established to track this action. The inspectors concluded that the applicant had provided adequate guidance to assure that aging effects will be appropriately managed via the WCP. When implemented as described, there is reasonable assurance that intended functions of SSCs will be maintained through the period of extended operation, in part, via the WCP.

14. Infrequently Accessed Area Inspection Activities

The applicant plans to assure that one time inspections are performed prior to the expiration of the current license for selected areas which do not receive frequent access by plant personnel. Specific areas were defined in the AMA.

In 1998, as a result of an NRC violation involving corrosion in the Auxiliary Feedwater (AFW) piping tunnel, personnel at North Anna developed an inspection process for infrequently accessed areas. The applicant plans to credit these inspections where appropriate and assure similar inspections are performed at the Surry station. The AFW tunnel had been previously walked down by NRC to assure corrective action had been implemented. The inspectors reviewed documentation of the North Anna inspection process, reviewed the most recent inspection records for the AFW piping tunnel, reviewed AMA and AMR documents, and reviewed the open item tracking data base. Records showed that the North Anna AFW tunnel was being maintained.

Walkdowns of selected areas were performed at both stations as described in paragraph II.E below. The inspectors determined that the electrical manhole areas for both stations and the Surry Auxiliary Building to Decontamination Building tunnel should be included in the program. The applicant agreed that these areas should be added. The inspectors concluded that the applicant had provided adequate guidance in the AMA to assure that aging effects will be

appropriately managed via the infrequently accessed area inspections. When implemented as described, there is reasonable assurance that intended functions of SSCs will be maintained through the period of extended operation, in part, via the infrequently accessed area inspections.

15. Corrective Action System

The Corrective Action System does not provide for monitoring of any particular SSC within license renewal. However, when unexpected inspection results occur, the applicant has credited this existing program as the mechanism to perform necessary evaluations, repairs, or replacements; and to confirm that corrective actions are performed. This program had been recently reviewed by NRC with no significant findings (See reports 50-338,339/2001-006 and 50-280,281/2001-007). The inspectors reviewed the procedure for corrective actions and reviewed AMA documentation. The inspectors concluded that the applicant provided adequate guidance to assure that aging effects will be appropriately managed via the Corrective Action System.

16. Transient Cycle Counting

The applicant plans to utilize established procedures to monitor selected transients to confirm that fatigue cycles do not exceed the maximum established by analyses for the 60 year period. For North Anna, analysis resulted in the addition of the loss of charging system transient to those that were already being monitored. For Surry, the applicant had not been previously required to monitor transients. Therefore, the applicant reviewed historical data to establish baseline information and initiated a transient cycle monitoring procedure. For environmentally assisted fatigue, the applicant determined that only the pressurizer surge line required further evaluation for the period of extended operation. Therefore, the applicant plans to add the surge line weld at the top of the hot leg piping connection to the ISI augmented inspection program. The inspectors reviewed the applicant's procedures for counting transients; reviewed AMA documentation; reviewed the results of transient cycle counting for the first quarter, 2002; reviewed the technical report for historical data review; and held discussions with applicant personnel.

The inspectors concluded that the applicant provided adequate guidance to assure that aging effects will be appropriately managed via the transient cycle counting process. When implemented as described, there is reasonable assurance that intended functions of systems and components relative to fatigue monitoring will be maintained through the period of extended operation.

B. Review of Electrical Equipment Aging Management Activities

1. Non - EQ Cable Inspection Program

This is a new AMA that is yet to be developed. The Environmental Qualification (EQ) program is a well established program to ensure that electrical components, such as cables, that may be subject to a harsh environment are properly constructed to perform their intended function even when subject to that harsh environment. This new program will perform periodic visual inspections of non-EQ cables which are in the scope of license renewal. The inspections will look for adverse localized equipment environments caused by heat or radiation which can accelerate aging of electrical cables. The initial inspections are to be performed between year 30 and the end of the current operating license and subsequent inspections are to be

performed with a 10 year frequency. The inspectors reviewed the document LR-1772/LR-2772 Non - EQ Cable Monitoring Surry and North Anna Power Stations and found it acceptable for the early stage of development of this program. The applicant has done a search of past operating history, maintenance records, Licensee Event Reports, deficiency reports, and Plant Issue reports at North Anna and Surry to try to determine the past failure history of electrical cables. Inspectors reviewed a sample of the documentation and concluded that the applicant's review was thorough and conservative.

2. EQ Program

The inspectors reviewed procedure VPAP-0305 Environmental Qualification of Electrical Equipment (EQ) Program, Revision 7 which describes the VEPCO EQ program. The inspectors reviewed a sample of the Quality Documentation Review (QDR) Packages of electrical equipment which contain the vendor test results and calculations that provide the basis for EQ for various plant electrical components. The inspectors discussed the EQ program with responsible engineers and learned that informal EQ calculations have been performed to insure that the service life of EQ equipment can be extended to 60 years. The QDR packages for individual components are being updated to include life extension calculations as there is need to perform revisions to them. The applicant plans to have all QDR packages updated before the end of the current license. The inspectors concluded that the EQ program is functioning adequately.

3. Applicant Response to Station Blackout Issue

On April 1, 2002 NRC issued a memo to the industry informing them of the NRC staff position on the license renewal rule 10 CFR 54.4 as it relates to the Station Blackout (SBO) rule 10 CFR 50.63. The position holds that the plant system portion of the offsite power system that is used to connect the plant to the off site power source should be included in the scope of license renewal. This is necessary because this is the power path that would be used to recover from a SBO. The applicant is aware of the position and has agreed to adjust their programs to address the position but the license renewal documentation has not yet been revised to include the additional electrical equipment being brought into scope.

At both North Anna and Surry inspectors reviewed plant drawings with applicant engineers to understand what additional electrical equipment will be brought into scope. The inspectors examined accessible portions of the additional equipment with applicant engineers and found it in acceptable condition.

4. Electrical Manholes

At both stations there are many power instrumentation and control electrical cables routed through underground duct banks with numerous electrical manholes along the route. The manholes were used for original cable installation and are available for maintenance and cable replacement. The manholes are susceptible to flooding from rain water or ground water or other sources and they should be periodically pumped out to avoid having energized cables under water. There is an industry concern that submerged continuously energized power cables are susceptible to early failure. The inspectors asked the applicant to open a sample of the manholes containing Safety related power cables. At each station the applicant had done some manhole inspection prior to the NRC inspection.

At North Anna inspectors examined manhole number 3 and found it damp but not flooded with an operable sump pump. The cable tray supports were very corroded and there was evidence of significant past flooding. The applicant initiated a Plant Issue (PI) to have cable tray supports repaired or replaced. The inspectors noted that metal covers on the walls covering cable access holes were also corroded with some missing bolts. The applicant initiated a PI to repair or replace the covers and to determine the condition of the cables behind the covers. Due to past flooding occurrences, the applicant has established an organized maintenance program to periodically inspect manholes for flooding and pump them out if needed. The inspectors reviewed the procedure 0-MPM-1207-01 Pumping of Security and Electrical Cable Vaults, Revision 2 and found it to be of good quality.

At Surry the applicant had examined several manholes prior to the NRC inspection and found some flooded. The NRC inspectors examined three including two near the switchyard that had been previously full of water but had been pumped dry. Those two had no drains or sump pumps so the applicant initiated action to have plant personnel manually empty the manhole daily if needed until a future course of action was decided. Those manholes contained normally energized power cables from the switchyard to the reserve station service transformers and some of the cabling had been replaced in past years due to failure. Surry had not yet established an organized maintenance program like North Anna to periodically inspect manholes for flooding. This issue will be reviewed during a future inspection.

C. Review of Structural Aging Management Activities

1. Inservice Inspection Program - Containment Inspection

Technical Report LR-1734/LR-2734, “Inservice Inspection Program - Containment Inspection,” Revision 3, describes the containment inservice inspections which covers both reinforced concrete structure (Class CC) and steel containment liner (Class MC) to meet the requirements of 10CFR50.55a. By reference, 10CFR50.55a incorporates requirements from ASME Section XI, Subsections IWE and IWL containment inspections. The IWE/IWL inspection program plans include visual inspections of the concrete structures and steel liners. The inspection program plans incorporate code cases, relief requests, and supplemental requirements of 10CFR50.55a. Section 2.0 of the document specifies that the scope of Subsection IWE inspection includes the steel liner shell, plate, flange welds, bolted connections, electrical penetrations (including seals, flanges, and gaskets), piping penetrations (including flanges), hatches (including seals), fuel transfer tube and bolting, and any other containment seals and gaskets. The scope of Subsection IWL inspection includes the entire containment concrete. The VEPCO IWE/IWL program plan includes several relief requests which were granted by the NRC. The inspectors reviewed Relief Requests IWE2 to use Appendix J testing in lieu of visual examinations of seals, gaskets, and moisture barriers and IWE5 to use Appendix J testing in lieu of bolt torque or tension testing for pressure retaining bolted connections and surfaces and the associated NRC SERs and found them satisfactory.

Section 2.0 of LR-1734/LR-2734 also specifies that the inspection interval for IWL is five years and ten years for IWE. The 10-year interval for IWE is further divided into three periods. However, the initial implementation of the IWE/IWL inspections in September, 1996 allowed five years for the initial IWE inspection period. Both North Anna and Surry Units had just completed their first inspections and the inspection reports were in preparation. There were some important findings during these inspections.

As described in Engineering Transmittal, ET-MAT-99-0003, "Containment Liner and Coating Evaluation North Anna Power Station Unit 2," Revision 0, 9/30/99, during refueling outage in 1999, walkdown and inspection of the containment liner were performed as part of the IWE/IWL mandated inspections. It was discovered that at the liner - basemat floor interface there was evidence of some apparent rust. Under Work Order (WO) 417341-01, four areas at the liner to floor interface varying in length from 4 inches to 24 inches were excavated to a depth of 1 to 3 inches to reach the limit of any corrosion. Wall thickness measurements were made in a 2 x 2 inch grid pattern along the length of the excavations. The measured wall loss was about 0.035 inches out of the nominal 0.375 inch liner thickness. This agrees well with the observation of little or no visible loss of metal from the liner. There was one location in an excavated area located about ½ inch below the floor level that exhibited a wall thickness as thin as 0.282 inches for an area about 1 inch long and 1/4 inch wide. Since it was visibly evident that there was little or no loss of wall on the inside of the liner, based on the assessment by NDE personnel, it was concluded that the area probably represents a local thinning on the outside of the liner plate such as might have been caused by a gouge during erection. Analysis of the thinned area in ET-CE-99-0007 indicates that the structural and leak tight integrity of the liner is maintained.

A blister spot of the containment protective coating was found at the 246 foot elevation near column 5. It was subsequently removed and a corroded spot was revealed under the paint. Probing of the corroded spot revealed a deep pit believed to be through wall and subsequent pressure testing confirmed the hole to be through the liner. The applicant removed an area of liner about 5 inch by 7 inch to find that a piece of wood, a 4 inch by 4 inch timber, was in contact with the liner at the location of the through hole. Additional affected liner was removed and the entire affected liner was replaced in accordance with Design Change Procedure (DCP) 99-160, "Repair Through-Wall Defect in Containment Liner Plate North Anna Power Station, Unit 2," 9/25/99. The applicant's preliminary root cause analysis indicates that the contact of the liner plate with the wood timber interfered with the normal tendency for concrete's alkalinity to inhibit corrosion of embedded steel. The point of contact between steel and timber created a point of active corrosion, undoubtedly influenced by the residual moisture in the wood. The applicant concludes that the removal of the wood and the active corrosion cell should limit any future corrosion. The IWE inspection programs should be able to confirm this conclusion or allow additional remedial actions, as required.

ET-MAT-99-0003 also reported several coating anomalies, such as some corrosion near the equipment hatch, base plates and mounting studs removed near the sump without coating, and chipped and cracked top coat. However, the applicant assessed that overall the coating is in good condition.

The component cooling water (CC) system piping inside the Surry containment buildings was found by the applicant's examination to have flaking coatings and was rusty as discussed further in paragraph II.E.1 below. The NRC inspector was concerned that the flaky paint might block the containment sump screen. The applicant provided the inspector with an analysis performed by Stone & Webster Engineering Corporation (SWEC), dated 11/6/98 which indicated that is not a problem due to the paint chip size and the sump screen size difference. The SWEC analysis was based on a critical settling distance of 10 feet.

ET CCE-02-0001, "ASME Section XI, Subsection IWL, Containment Concrete Examination and Evaluation Report, North Anna Power Station, Unit 1&2," Revision 0, 2/27/02 documented the findings and observations during the August, 2001 inservice inspections. In the executive summary, the applicant stated that the overall, general condition of the concrete was very good. Age-related degradation was typically minor. However, several pieces of wood were discovered

embedded in the exterior concrete. A preliminary engineering evaluation was made assuming worst case scenarios. A repair plan was developed and implemented. The wood pieces were removed and concrete repaired as required. Steel reinforcing bars were not exposed. All but one of the wood pieces were small and shallow in embedment depth and did not extend beyond the first layer of reinforcing bars. One longer piece of wood sized 1-1/2 inches by 1-1/2 inches extended through the concrete dome to the steel liner. After removal of the wood, the liner was cleaned and examined and thickness measurement verified the liner was still at design thickness. The concrete surface within the hole was examined and no reinforcing bars were exposed. The area was grout repaired in accordance with the repair plan. The piece of embedded wood appear to have been left in place from the original forms used for the construction of the containment structure. Engineering assessment of the significance of the embedded wood (ET CCE-01-0007) concluded that the structural integrity and leak tightness were not compromised.

ET S-01-0177, "Containment Exterior Concrete Wall Inspection Report and Evaluation Surry Power Station Units 1&2," Revision 0, 9/18/01 describes the applicant's observation of a thick layer of efflorescence on the Unit 2 containment dome. Efflorescence occurs when water enters, runs through, and exits a concrete structure leaving a salt deposit at the exit point. When the the efflorescence was chipped away with a hammer, the applicant discovered a rather large rock pocket. A rock pocket exists in concrete when there are only aggregates left without cement pastes. The rock pocket, when fully chipped out, roughly measured 3 foot by 5 foot by 16 inch deep (maximum depth). It covered 3 horizontal, 2 diagonal, and 5 vertical rows of reinforcing bars. The rock pocket was subsequently repaired with concrete. There were other concrete surface anomalies found in the containment dome of Unit 2 but they were smaller and shallower. The NRC inspectors climbed up the Surry containment dome to check the repaired rock pocket and found it was satisfactorily repaired. The inspectors noticed there are still other anomalies on the exterior surface of the dome concrete which need to be repaired. The applicant informed the inspectors that a work order was already in place.

The inspector also reviewed the following Appendix J (Integrated Leak Rate Test (ILRT) Type A) testing reports:

The 1992 ILRT for Surry Unit 1
The 2000 ILRT for Surry Unit 2
The 1999 ILRT for North Anna Unit 2

All tests were satisfactory. The Type A test results of the Surry Power Station Unit 1 is 0.038685 %/day, for the Surry Unit 2 test was 0.0056475 %/day, and that for the North Anna Unit 2 test was 0.04533 %/day. The allowable for Type A test is 0.075 %/day.

Based on the results of the containment inservice inspection programs IWE/IWL, the applicant states that the existing containment inspection program is capable of managing the aging effects of the containment structures and the findings have demonstrated the effectiveness of the program. The NRC inspectors agreed with this assessment.

2. Civil Engineering Structural Inspection Program

Technical Report LR-1714/LR-2714, "Civil Engineering Structural Inspection Surry and North Anna Power Station," Revision 4, 2/25/02 describes that this program encompasses the provisions of the Maintenance Rule Compliance Program and the trending and evaluation for evidence of aging effects. All structures within the scope of license renewal are covered by this

inspection program. Section 2.1 of the document specifies that the overall VEPCO structural monitoring program includes periodic structural walkdown inspections; review by a cognizant civil/structural engineer of plant issues related to structures; and periodic review of results of other activities, such as roofing inspections, that could affect structural integrity. Section 2.5 of LR-1714/LR-2714 states that inaccessible areas, in general, will be assessed based on examinations for similar accessible areas. If an inaccessible area becomes accessible by excavation, the applicant committed, as a follow-up action, to provide direction to take the opportunity for examination of the uncovered areas.

Technical Reports CE-0087, "Guideline for Monitoring of Structures Surry Power Station," Revision 2, 12/3/97 and CE-0089, "Guideline for Monitoring of Structures North Anna Power Station," Revision 4, 12/1/99 provide the overall guidelines for monitoring concrete structures, steel structures, earthen structures, containment structures, masonry walls, and roofing. These guidelines also provide guidance programs for inaccessible areas, seismic gaps, and interface between structures and supports. Section 2.3.1.1 of CE-0087 describes baseline inspections and Section 2.3.1.2 states that, after the baseline inspection, there will be a routine inspection in 5 years and a detailed inspection in 10 years. Section 2.4 of the guidelines provides the method of how to evaluate results. Section 2.5 lists the qualification of inspectors.

The applicant had performed the baseline civil engineering structural inspection in 1996 and 1997 for Surry and North Anna, respectively. The results of the baseline inspection were documented in ET CCE-96-0013, "Condition Assessment of Plant Structures Surry Power Station," Revision 0, 12/19/96 and ET CCE 97-0011, "Maintenance Rule Condition Assessment of Plant Structures, Evaluation of Deviation Reports North Anna Power Station," Revision 0, 7/28/97.

The first routine inspections were conducted recently for both North Anna and Surry. Most of the structures at both sites were visually inspected. The only exception, as the inspectors were told, is the North Anna Auxiliary Building. Inspection reports are still under preparation.

At North Anna, the VEPCO inspector discovered a cracked steel clip angle in the turbine building. The angle is a connection piece to connect a horizontal beam to a column. The connection is partially hidden behind a pipe and very hard to observe. Afterward, VEPCO's engineering department performed an evaluation and found that the angle was under designed. The thickness of the angle is 3/8" and the evaluation found it should be 3/4" thick. The applicant is in the process of replacing all the under designed angles with angles of correct thickness. During the inspection, this action had not yet been completed.

The inspector walked down the North Anna intake structure and found the trash racks (underwater portion) are rusted. The applicant pointed out that the trash racks, even though they are rusty, are still in working condition. Nonetheless, a PI was issued to address this concern to indicate that the trash racks would be inspected periodically to ensure structural integrity. The inspectors also examined an electric cable manhole and found that the cable tray supports were badly corroded. The applicant told the inspectors that the rusty cable tray supports were discovered some time ago, and a work order is in place to either repair or replace them.

The inspectors also walked down the Surry high level and low level intake facilities and found there were many rusty metal components (both in the scope of license renewal and not in the scope). The inspectors also noticed there are many repaired and reconditioned metal components. The applicant informed the inspectors that, due to the location of the intake

facilities in salt water environments, carbon steel components are corroded constantly. The applicant is in the process of replacing all carbon steel with stainless steel or fiberglass material. Some of the fiberglass and stainless steel replacements are already installed in the low level intake facility. The inspectors requested documents which addressed this action. The applicant provided the inspectors with several PIs addressing rusted metal components and replacing metal grating with fiberglass ones.

During the walkdown of the Surry switchyard, the inspectors noticed that some of the concrete cable stands (posts) are cracked vertically almost the entire length of the stands. The applicant informed the inspectors that the stands are made of prestressed concrete and are used at both sites. When the cracks first appeared in 1992, the applicant developed a North Anna Site Engineering Services Implementing Procedure NASES 2.11, "500 KV Switchyard Concrete Stand Inspection," Revision 0, 3/26/92 to perform inspection, maintenance, and destructive testing of the switchyard concrete stands. Attachment 2 to that procedure contained the destructive test report of cracked concrete stands and concluded that the stands will support the 85 mile per hour maximum design wind load even in the present condition. However, the report did recommend a maintenance program to seal the cracks in the stands to prevent further damages to the concrete or tendons. Attachment 3 to the procedure provided a specification for sealing cracks in concrete.

The cracks at the Surry switchyard were discovered by the applicant in August, 1992. A visual inspection of the concrete stands was performed by the system engineer of Surry on September 24, 1992 in the 34.5KV, 230KV, and 500KV sections of the switchyard. The cracks were documented in a memorandum dated September 28, 1992 from D.L. Riley to T.E. Blaylock to indicate that the North Anna destructive testing applies to Surry and the stands were still capable of performing their intended functions, however, the cracks should be sealed using a similar procedure as that for North Anna. However, ten years later, the recommendation to seal the cracks still has not been implemented at Surry. The inspectors did not walk down the North Anna switchyard so it is unknown whether the recommendation to seal the cracks has been performed there. This issue will be reviewed during a future inspection.

3. Tank Inspection Activities

VEPCO has performed limited tank inspections in the past at Surry and North Anna as required by plant Technical Specifications or response to other initiatives. The applicant stated that there is no official inspection procedures prepared to inspect the interior of the tanks. Most of the tank inspections were preventive maintenance inspections, implemented through work orders, or performed using the inspector's experience. The applicant provided the inspectors a copy of the Surry "Internal Coating Specification, Demineralized Water Tank," Revision 0, 5/3/01 and indicated to the inspectors that this document is for the purpose of bidding to secure a vendor to furnish the inspection service rather than for the coating itself.

The applicant also stated, in a proposed tank inspection procedure LR-1756/LR-2756, "Tank Inspection Activities, Surry and North Anna Power Stations," that "Established Surry preventive maintenance inspection activities for tanks are currently limited to the condensate storage tanks and the fire protection/domestic water tanks." and "One time inspections of the underground fuel oil tanks for the emergency diesel generators were performed at Surry during a dual-unit outage in 1989." The Surry Condensate Storage Tanks had been periodically inspected. The Unit 1 Condensate Storage Tank was inspected on 4/1/92. 9/2/95, and 9/26/98; the Unit 1 Emergency Condensate Storage Tank was inspected on 3/91, 9/95, 10/98, and most recently

7/14/01. The Unit 2 Condensate and Emergency Storage Tanks had been inspected similarly. The Surry Fire Protection/Domestic Water Tanks were inspected on 5/94 and 6/99.

The applicant also indicated in the proposed procedure that "The only formal tank inspection at North Anna involve the fuel oil storage tank. Inspection of the emergency condensate storage tanks have been performed at North Anna, but they were implemented by individual work orders." The North Anna Unit 1 Emergency Condensate Storage tank was recoated in 1993 and the Unit 2 Emergency Condensate Storage Tank was opened and inspected in 1995 and 1998.

Since there is no official existing tank inspection procedure, the applicant is planning to develop the newly proposed tank inspection procedure LR-1756/LR-2756, which will enable the applicant to perform a one-time inspection on all tanks that are within the scope of license renewal and may experience aging effects requiring management. The one-time inspections of selected tanks will occur prior to the end of the current operating license. The scope of this procedure will be to inspect relevant internal and external surfaces of the following tanks: the emergency diesel generator tanks (fuel oil, coolant, and starting air), AAC diesel generator tanks (fuel oil, coolant, and starting air), security diesel generator fuel oil tank, underground fuel oil storage tanks, diesel driven fire pump fuel oil storage tanks, refueling water storage tanks, chemical addition tanks, emergency condensate storage tanks, casing cooling tanks (North Anna), service water pump house air receiver (North Anna), fire protection/domestic water storage tanks (Surry), and emergency service water pump diesel fuel oil storage tank (Surry).

The inspectors questioned why this inspection will be only a one-time inspection. The applicant responded that it will be actually a baseline inspection. If the inspection finds that a tank shows no degradation, then it will be a one-time inspection, otherwise, periodic inspection would follow. The proposed tank inspection program to manage aging effects of VEPCO tanks that are within the scope of license renewal appears acceptable when it is properly implemented.

D. Fire Protection

The inspectors reviewed the AMA document LR-1728/LR-2728 Fire Protection Program Surry and North Anna Power Stations, Revision 3. For fire protection no new activities are created but the AMA credits existing plant fire protection maintenance and surveillance procedures for managing aging of fire protection equipment. At North Anna the inspectors obtained a list of all fire protection periodic test (PT) procedures to compare it to the AMA. The inspectors noted that there were several PTs on the list that were not credited in the AMA but whose titles appeared appropriate as periodic tests for aging management. After consideration of the issue the applicant stated that the AMA will be revised to include four more existing PTs and to correct a number reference of another PT. Similarly at Surry, after review of a similar list of fire protection procedures the applicant agreed to add two more existing procedures to the AMA.

E. Visual Observations of Plant Equipment

During the inspection, the inspectors performed walkdown inspections of plant systems, structures, and components (SSCs), and electrical cable to observe material condition and inspect for aging conditions that might not previously have been recognized and addressed in the LRA. Portions of the following systems and structures were included:

North Anna and Surry

Component Cooling (CC)
Feedwater (FW)
Blowdown (BD)
Fuel Pit Cooling (FC)
Quench Spray (QS)
Chemical and Volume Control(CH)
Main Steam (MS)
Condensate (CN)
Auxiliary Steam (AS)
Service Water (SW)
Safety Injection (SI)

turbine building to auxiliary building tunnel
cable spreading rooms
new fuel storage area
emergency switchgear rooms
electrical cable manhole areas
Emergency Diesel Generators and support equipment
Spent Fuel Pool Fuel Handling Crane and associate refueling equipment
Batteries and racks for Security diesel, Station Black Out (SBO) Diesel, Emergency Diesel Generator (EDG), main safety-related station batteries, Anticipated Transient Without Scram (Black Batteries, at Surry), and Low Level Intake (Surry) batteries.
NA only- turbine building service water valve pit, service water valve house lower level, and service water pump house lower level
Surry only- black battery building, Recirculation Spray and Chilled Water

NRC performed visual inspections of the interior of the North Anna 1 containment on September 19, 2001 during a refueling outage. Those efforts were documented in previous NRC inspection report 2002-006 for all four units. In addition, 0n April 2, 2002, during the Surry Unit 2 refueling outage, an inspector performed walkdown inspections of accessible portions of plant SSCs and electrical cable inside the containment to observe material condition and inspect for aging conditions that might not have been previously recognized and addressed in the LRA. The following is a partial list of equipment observed:

Auxiliary FW and FW system piping
pressurizer (including supports and PORVs)
personnel and equipment hatches
SGs “A” and “B”, including supports
reactor cavity
CS and RS spray headers and piping
containment liner (various elevations)
ventilation ducting
electrical cable
three reactor coolant pump cubicles/loop rooms
three reactor coolant pumps and pump seal areas
reactor coolant system piping, including loop stop valves
SI and CA piping and valves
CC system piping and valves
containment electrical penetrations
pressurizer spray piping and valves
reactor vessel head
reactor coolant pump oil collection tank and piping
pressurizer relief tank
pressurizer surge line and whip restraint
RS heat exchanger and SW piping
RH flat, including pumps, valves, heat exchanger, and associated CC piping and valves

containment pipe penetration area
SI accumulators and valves
IA receivers
containment sump area
containment air recirculation fan and cooler
large service water piping (internal and external surfaces)

The observations of general material conditions included: inspection of piping components for evidence of leaks or corrosion, inspection of coatings (piping, tanks, and structural components), and inspection of electrical cable for indications of deterioration.

The material condition at North Anna was very good and no significant aging management issues were identified. In general, material condition at Surry was good and no significant aging management issues were identified, with the following exceptions:

1. Component Cooling (CC) System Piping

During inspection of equipment inside the Surry Unit 2 containment, the inspector noted many areas of significant surface corrosion on CC system piping and valves. The system had originally been painted, but due to continuous external condensation over many years, the coating had deteriorated and in a number of locations had completely disappeared. This condition had been noted previously by the NRC Resident Inspectors and applicant personnel. During discussions with applicant personnel, work and inspection records and reports were provided documenting a history of identification of this issue through applicant's normal walkdown inspections at various locations on the systems for both Surry Units since 1992. The latest was in March of 2002 during the Unit 2 refueling outage. In all cases, the solution was to clean a small area at the location the corrosion was identified and take wall thickness measurements to verify that minimum pipe wall thickness had not been violated. All wall thickness measurements showed the piping to be well above minimum piping Code thickness at the locations measured. However, the inspector noted that documentation of the various inspections over the last five or six years did not show a methodical evaluation of the condition to ensure that all of the piping was evaluated and the worst conditions identified.

During the current inspection system walkdowns of Surry Units 1 and 2, the applicant pointed out that the coating degradation and resulting surface corrosion extended to the chilled water sub-system of the CC system and portions of the regular chilled water (CD) system in the auxiliary building. The inspectors observed these areas and noted a similar condition to that of the component cooling piping inside the Unit 2 containment, except that the condition was less severe. Also, the applicant provided a chronological summary of previous inspections and resolutions for this issue. The following summarizes these activities:

4/92 - Deviation Report (DR) S-92-0595 identified rusty Unit 1 CC piping near "C" recirc fan

10/95 - engineering evaluated rusty Unit 1 CC piping and valves near RH HX

5/96 - DR S-96-1038 identified rusty Unit 2 CC piping near "B" RCP

4/00 - DR S-2000-0965 identified rusty Unit 1 CC piping near "B" recirc fan

3/02 - identified coating degradation and surface rusting on Unit 2 CC piping at containment penetration area - Plant Issue (PI) S-2002-1473 issued 4/16/2002

4/02 - NRC aging management inspection walkdown of Unit 2 containment observed corrosion of CC piping - PI S-2002-1489 issued to document NRC observations

5/02 - PI S-2002-1789 issued to identify corrosion on the uninsulated CD system piping

In all cases since 1992, wall thickness measurements were taken at areas of coating degradation and corrosion and showed pipe wall thickness to be well above minimum thickness.

The applicant's summary stated that the above Surry CC system coating degradation and corrosion was an example of the General Condition Monitoring Activities effectiveness in discovering and initiating corrective actions for potential degradation of plant equipment. However, further discussions with applicant personnel determined that the CC piping conditions had been identified through outage walkdowns and not through the walkdowns identified in LRA General Condition Monitoring Activities (Health Physics and System Engineering Walkdowns). The applicant stated that the Operations and Engineering outage walkdowns would be added to the list of existing inspection activities taken credit for under the General Condition Monitoring Activities in the LRA.

The inspectors concluded that the coating degradation and corrosion of the CC system piping had been identified by the applicant on a number of occasions since 1992 through their existing programs. In all cases where the problem was identified and evaluated, the applicant performed inspections and evaluations to show the pipe wall thickness remained above minimum wall and therefore no operability concerns existed. However, for longer term operations under license extension, the inspectors questioned the need for some type of refurbishment of the CC and CD systems coatings or monitoring to ensure that the required minimum wall thickness is maintained. At the close of the inspection, the applicant was evaluating the best approach to maintain this piping and had drafted a periodic monitoring process as corrective action under PI S-2002-1489. In addition, PI S-2002-1789 had been issued to also include the CD system in the resolution.

2. Additional Corrosion Issues

Some additional material condition observations were noted at Surry Station. These included several areas where coatings were degraded resulting in corrosion, corrosion on the bolting for Refueling Water Storage Tank level transmitters, and corrosion of piping and supports in the turbine building to auxiliary building tunnel. The applicant was tracking the level transmitter corrosion on Plant Issue number S-2000-0973. The tunnel area was very difficult to access due to hot piping, was damp with standing water, and contained debris such as old insulation. The applicant had included the tunnel in the Infrequently Accessed Areas AMA and was planning to perform an inspection at a later date. PI S-2002-1792 was initiated to document and track this problem. None of the issues appeared to effect current equipment functionality.

3. Paint on Stainless Steel Pipe

The inspectors also noted paint blotches and smears on much of the stainless steel piping in lower portions of the auxiliary building at the Surry station. This included portions of the Chemical and Volume Control and Safety Injection systems. The applicant had identified this problem and initiated Engineering Work Request (EWR) 89-284A on December 7, 1990 to document an evaluation of the problem. Samples had shown that the paint did not conform to requirements for levels of chloride and halogenated compounds. The applicant had determined that the paint was unlikely to cause stress corrosion cracking because the piping was of relatively low temperature and strength and the area typically remained dry. The EWR indicated, however, that any areas greater than 1-inch square should be removed. Areas larger than this were observed by the inspectors. The applicant initiated PI No. S-2002-1806 to document reevaluation of this problem.

4. General Material Condition Observations

The inspectors noted areas at Surry where coatings were in need of attention. The Surry CC heat exchangers had been weld repaired from the inside destroying the exterior coating in localized areas. The coating had not been repaired. The coatings on the walls of the Surry Unit 1 auxiliary FW pump room in the main steam valve house were in need of re-painting. This was in contrast to a much better condition of the Unit 2 pump room. The inspectors did not consider these observations to be aging management concerns.

III. Conclusions

The inspection concluded that the applicant's license renewal activities were conducted as described in the License Renewal Application and that documentation supporting the application is in an auditable and retrievable form.

Exit Meeting Summary

The results of this inspection were discussed on May 3 and May 17, 2002 with members of the VEPCO staff in exit meetings open for public observation at the North Anna and Surry sites. The applicant acknowledged the findings presented and presented no dissenting comments. Some proprietary material was reviewed during the inspection but none is included in this report.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Applicant

M. Adams, Site Engineering Manager - Surry
P. Aitken, IPA Supervisor - License Renewal
R. Allen, Maintenance Manager - Surry
R. Blount, Site Vice President - Surry
B. Corbin, Director - Nuclear Projects
J. Davis, Director, Safety & Licensing - North Anna
P. Dougherty, Engineer
B. Foster, Director, Safety & Licensing - Surry
B. Garber, Dominion Licensing
M. Haduck, Outage Coordinator - Surry
L. Hartz, Vice President - Nuclear Engineering
D. Heacock, Site Vice President - North anna
M. Henig, Supervisor, Licensing Renewal
D. Horn, Business Systems Specialist
M. Hotchkiss, Engineer
J. Leberstien, Technical Specialist - Licensing
S. Lock, Engineer
L. Morris, Technical Advisor
J. Norvelle, Director - Media Relations
R. Pavlik, Engineer
B. Rodill, Lead Engineer
W. Russell, Engineer
T. Snow, Engineer
D. Sommers, Supervisor - Licensing
C. Sorrell, Civil Engineer
L. Spain, Engineer
J. Spence, Training Supervisor - Surry
B. Standley, Supervisor Nuclear Engineering - North Anna
J. Temple, Engineer
L. Wroniewicz, Manager, Licensing Projects
R. Zuercher, Nuclear Public Affairs

NRC

B. Boger, Director, Division of Inspection Program Management, NRR
J. Canady, Resident Inspector - North Anna
G. McCoy, Resident Inspector - Surry
M. Morgan, Senior Resident Inspector - North Anna

LIST OF DOCUMENTS REVIEWED

Engineering Documents

North Anna Power Station Unit 1 Inservice Inspection Program Third Inspection Interval May 1, 1999 - April 10, 2009, Revision 2, Change2

North Anna Power Station Unit 2 Inservice Inspection Program Third Inspection Interval December 14, 2001 - December 13, 2010, Revision 1, Change 1

North Anna Power Station Unit 1 Inservice Inspection Plan For the Third Inspection Interval

North Anna Power Station Unit 1 Inservice Inspection Program Plan for the Second Inspection Interval Components and Component Supports, Revision 15

Surry Power Station Unit 1 Inservice Inspection Plan For Components and Component Supports For the Third Inspection Interval, Revision 11

Surry Power Station Unit 2 Inservice Inspection Plan For Components and Component Supports For the Third Inspection Interval, Revision 11

ASME Section XI North Anna Unit 1 Third Interval System Pressure Test Plan

ASME Section XI North Anna Unit 2 2nd Interval system Pressure Test Plan

Surry Unit 1 System pressure Test Data Base For Interval 3 (showing completion status)

Surry Unit 2 System pressure Test Data Base For Interval 3 (showing completion status)

ET CME 01-0014, Updated Preliminary Piping Inspection List for the 2001 Refueling Outage North Anna Power station, Unit 1, Revision 1

ET CME 00-0032, Updated Preliminary Piping Inspection List for the 2001 Refueling Outage North Anna Power station, Unit 2, Revision 0

Secondary Piping Inspection Program North Anna Unit 1, 2001 Outage Inspection List

Unit 2 2001 Refueling Outage Inspection List Secondary Piping Inspection Program North Anna Power Station

CME 00-0007, Updated Preliminary Piping Inspection List for the 2000 Refueling Outage Surry Power Station - Unit 2, Revision 0

CME 01-0016, Updated Preliminary Piping Inspection List for the 2001 RO Surry Power Station - Unit 1, Revision 1

Outage Scope of Work Crossunder, Crossover, and MSR's - Surry Unit 2 Refueling Outage '00

Steam Generator Monitoring and Inspection Program Plan, Surry Units 1 and 2, Revision 3

Steam Generator Monitoring and Inspection Program Plan North Anna Units 1 and 2, Revision 2

Planned S/G Feedring UT Inspection Surry Unit 2 Fall '00 RFO

CALC SM-1008, Surry and North Anna Reactor Vessel Calculations and Data to Support RV Aging Management Report

Virginia Electric and Power Company Letter to the NRC Serial 99-452A dated November 19, 1999, Evaluation of Reactor Vessel Materials Surveillance Data

System Health Reports for Surry and North Anna Stations, First Quarter, 2002

System Engineering Handbook, Revision 3

Engineering Work Request 89-284A, Evaluate Miscellaneous Paint on Stainless Steel/Surry/Units 1 & 2, dated 12/07/1990

North Anna Site Engineering Services Implementing Procedure NASES-2.11, "500 KV Switchyard Concrete Stand Inspection," Revision 0, 3/31/92

Stone & Webster SW-SPS-00005, "Paint Debris Evaluation, Surry Power Station," 11/6/98

Engineering Transmittal ET CCE 02-0001, "ASME Section XI, Subsection IWL Containment Concrete Examination and Evaluation Report, North Anna Power Station, Units 1&2," Revision 0, 2/27/02

ET 00-0286, "Containment Liner to Floor Joint Interface Inspection Report and Evaluation, Surry Power Station, Units 1&2," Revision 0, 11/30/00

ET MAT-99-0003, "Containment Liner and Coating Evaluation, North Anna Power Station Unit 2," Revision 0, 9/30/99

ET S-01-0177, "Containment Exterior Concrete Wall Inspection Report and Evaluation, Surry Power Station, Units 1&2," Revision 0, 9/18/01

DCP-99-160, "Repair Through-Wall Defect in Containment Liner Plate/North Anna/Unit 2," Revision 3, 9/24/99

CE-0087, "Guideline for Monitoring of Structures , Surry Power Station," Revision 2, 8/24/98

CE-0089, "Guideline for Monitoring of Structures, North Anna Power Station," Revision 4, 12/1/99

ET CCE-96-0013, "Condition Assessment of Plant Structures, Surry Power Station Units 1&2," Revision 0, 12/19/96

ET CCE-97-0011, "Maintenance Rule Condition Assessment of Plant Structures, Evaluation of Deviation Reports, North Anna Power Station Units 1&2," Revision 0, 7/28/97

April, 1992 Reactor Containment Building Integrated Leak Rate Test, Surry Power Station Unit 1, 7/9/92

Integrated Leakage Rate Test Final Report, Surry Power Station Unit 2, 11/20/00

Integrated Leakage Rate Test Final Report, North Anna Power Station Unit 1, October/6/99

Memorandum from D.A. O'Connor to D.L. Riley - Surry switchyard concrete stands dated 8/7/92

Note from D.L. Riley to T.E. Blaylock - Physical Condition of Concrete Stands in Surry Switchyard dated 9/28/92

Work Order WO-00445055-01 Visual inspection of Surry Emergency Condensate Storage Tank 1-CN-TK-3 dated 7/17/01

WO-00421024-01 Internal visual inspection of Surry Condensate Storage Tank 2-CN-TK-1 dated 10/2/00

Licensing Documents

Application for Renewed Operating Licenses - North Anna Power Station Units 1 and 2
Application for Renewed Operating Licenses - Surry Power Station Units 1 and 2
North Anna Power Station Updated Final Safety Analysis Report
Surry Power Station Updated Final Safety Analysis Report

License Renewal Project Aging Management Review Technical Reports

LR-1400, Steam and Power Conversion, Revision 6
LR-2400, Steam and Power Conversion, Revision 5
LR-1402, Reactor Coolant System, Revision 4
LR-2402, Reactor Coolant System, Revision 2
LR-1410, Closed Water Systems, Revision 2
LR-2410, Closed Water Systems, Revision 2
LR-1412, Engineered Safety Features, Revision 2
LR-2412, Engineered Safety Features, Revision 3
LR-1500, Pressurizer, Revision 4
LR-2500, Pressurizer, Revision 3
LR-1501, Reactor Vessel, Revision 3
LR-2501, Reactor Vessel, Revision 2
LR-2502, Steam Generator, Revision 5
LR-1503, Reactor Vessel Internals, Revision 3
LR-2503, Reactor Vessel Internals, Revision 3
LR-2403, Open Water Systems North Anna Power Station, Revision 2
LR-1411, Primary Process Systems, Revision 2

License Renewal Project Aging Management Activity Technical Reports

LR-1772/LR-2772 Non - EQ Cable Monitoring Surry and North Anna Power Stations, Revision 1

LR-1724/2724, Secondary Piping and Component Inspection, Revision 3
LR-1731/2731, Inservice Inspection Programs: Augmented Inspection Activities, Revision 3
LR-1732/2732, Inservice Inspection Program: Component and Component Support Inspections, Revision 3
LR-1736/2736, Inservice Inspection Program - Reactor Vessel, Revision 2
LR-1738/2738, Inservice Inspection Program Steam Generator Inspections, Revision 3
LR‘1750/2750, Reactor Vessel Integrity Management, Revision 4
LR-1752/2752, Reactor Vessel Internal Inspection, Revision 3
LR-1706/2706, Boric Acid Corrosion Surveillance Surry and North Anna Power Stations, Revision 2
LR-1707/LR-2707, Buried Piping and Valve Inspection Activities Surry and North Anna Power Stations, Revision 3
LR-2710, Chemistry Control Program for Primary Systems North Anna Power Station, Revision 2
LR-2712, Chemistry Control Program for Secondary Systems North Anna Power Station, Revision 2
LR-1770/LR-2770, Fuel Oil Chemistry Surry and North Anna Power Stations
LR-1722/LR-2722, Inspection Activities: Load Handing Cranes and Devices Surry and North Anna Power Stations, Revision 3
LR-2754, Service Water System Inspections North Anna Power Station, Revision 4
LR-1766/LR-2766, General Condition Monitoring Activities, Revision 1
LR-1762/LR-2762, Work Control Process, Revision 2
LR-1768/LR-2768, Infrequently Accessed Area Inspection Activities, Revision 2
LR-1774/LR-2774, Corrective Action System, Revision 0
LR-1760/LR-2760, Transient Cycle Counting, Revision 3
LR-1012/LR-2012, Cycle/Transient Events Compilation, Review, and Projections, Revision 0
LR-1734/LR-2734, Inservice Inspection Program - Containment Inspection, Revision 3
LR-1714/LR-2714, Civil Engineering Structural Inspection, Surry and North Anna Power Station, Revision 4
LR-1756/LR-2756, Tank Inspection Activities, Surry and North Anna Power Stations

Existing Plant Procedures and Programs

General

C-HP-1032.010, Radiological Survey Records, Revision 1
C-HP-1032.020, Radiological Survey Criteria and Scheduling, Revision 1
ENAP-0001, Station Engineering Organization, Responsibilities, and Authorities, Revision 5
MDAP-0025, Quality Maintenance Team Process, Revision 10
VPAP-1001, Inspection Program, Revision 4
VPAP-2002, Work Request and Work Order Tasks, Revision 18
VPAP-1601, Corrective Action, Revision 15
VPAP-0305 Environmental Qualification of Electrical Equipment (EQ) Program, Revision 7
0-MPM-1207-01 Pumping of Security and Electrical Cable Vaults, Revision 2

Inservice Inspection

VPAP-1103, ASME Section XI Visual Examination Program (VT-1,2,3 &General), Revision 006
NASES-6.04, Controlling Procedure for the System Pressure Test Program, Revision 6
Surry Power Station PT 0-OPT-ZZ, Alternate Pressure Tests For Hydrostatic/Pneumatic Testing, Revision 2

Dominion Augmented Inspection Manual , Revision 30
Standard STD-GN-0033, Secondary Piping and Component Inspection Program, Revision 9
VPAP-0807, Secondary Piping and Component Inspection Program, Revision 2
1-PT-54, North Anna Vessel Irradiation Program, Revision 6
1-PT-4, Reactor Vessel Exposure, Revision 4 (Surry)
NAF-200, Reload Core Design and Safety Analysis Scheduling and Initialization, Revision 15

Load Handling Cranes

North Anna
O-MPM-1303-01, Frequent and Periodic Inspections of Monorails and Overhead Hoists, Revision 14
VPAP-0810, Crane and Hoist Program, Revision 8
1-PT-96.1, Refueling Systems Circuit Test - Manipulator Crane without Dummy Fuel Assembly, Revision 11
1-PT-96.2 Refueling Systems Circuit Test - Manipulator Crane with Dummy Fuel Assembly, Revision 10
2-PT-92.2, Manipulator Crane Operability (Auxiliary Hoist), Revision 8
2-OP-4.1, Controlling Procedure for Refueling, Revision 42

Surry
2-OPT-FH-001, Fuel Handling System, Revision 4
0-MCM-1304-01, Turbine, Polar, and Fuel Handling Crane Maintenance, Revision 1-P1
1-OP-FH-001, Controlling Procedure for Refueling, Revision 11

Service Water

North Anna
0-PT-75.16, Service Water Leakage Walkdown, Revision 2
0-EPM-2303-01 Inspection of Service Water Cathodic Protection System, Revision 5
PM Task Evaluation Request Tracking Number N02-029 Drainage Culvert in Floodwall [issued 2-19-02, North Anna]
VPAP-0811, Service Water System Inspection and Maintenance Program, Revision 3
[applicable to both sites]

Surry
0-MPM-1901-02, Low Level Intake Structure Screenwells 1D, 2A, 2B Service Water Inspection, Revision 1
Purchase Order 70007559, Dredging of Intake in 2000 (approximate five year cycle), 4/14/2000
0-MPM-1901-01, High Level Intake Structure Screenwells and Associated Piping Inspection, Revision 8
VPAP 0811 Annual Effective Review Report, Surry Units 1 & 2, December 18, 2000

Batteries

North Anna
0-PT-82.16, AAC Diesel Battery Category A Inspection, Revision 3
1-PT-86A, Quarterly DC Distribution System Test for Battery 1-I, Revision 33

Surry
0-EPM-0105-06, Miscellaneous Battery Checks, Revision 3

Boric Acid Inspections

North Anna
1-PT-46.21, RCS Pressure Boundary Components Affected by Boric Acid Accumulation, Revision 11
VPAP-2002, Work Request and Work Order Tasks, Revision 18
VPAP-2101, Radiation Protection Program, Revision 19
1-PT-48, Visual Inspection of Reactor Coolant Pressure Boundary Components, Revision 9
1-PT-48.1, Visual Inspection of ASME XI Class 2 Pressure Boundary Components Inside Reactor Containment

Surry

1-OPT-RC-10.1, Reactor Coolant Leakage Walkdown at Cold Shutdown, Revision 4
ENG-84, Evaluation of Safety Related Components with Excessive Boric Acid, Revision 1
1PT-11, Reactor Coolant Pressure Test, Revision 10

Chemistry

EPRI TR-105714-V1R4, PWR Primary Water Chemistry Guidelines, Revision 4
EPRI TR-102134, PWR Secondary Water Chemistry Guidelines, Revision 5
VPAP-2205, Diesel Fuel Oil Testing Program, Revision 0
1-PT-89.2A, Fuel Oil Analysis: 1-EG-TK-2A and 1-EG-TK-1H
VPAP-2201, Nuclear Plant Chemistry Program, Revision 11
CH-91.001, Auxiliary Cooling Water System Chemistry Control Program, Revision 0

Transient Cycle Counting

1/2-Log-13, Reactor Coolant System Cycle/Transient Log, Revision 4
1/2-PT-160, Reactor Coolant System Cycle/Transient Log Review, Revision 6
1/2-OSP-RC-001, Reactor Coolant System Cycle/Transient Log Review, Revision 1

Plant Drawings

North Anna
11715-FB-24L, Ventilation & Air Conditioning Service, Sheet 11, Revision 15

Surry
11448-FC-2A, Foundation Key Plan - Turbine & Service Bldgs, Revision 5
11448-FC-5C, CW Discharge Tunnel - Surry Power Station Unit 1, Revision 6
11448-FC-5D, CW Discharge Tunnel - Surry Power Station Unit 1, Revision 3
11448-FC-5F, Service Water Lines Encasement, Revision 6
11448-FC-9Q, High Level Intake Structure - Sheet 1, Foundation Mat & Wall Elevations, Revision 6
11448-FP-4A, Service Water Lines - Surry Power Station, Unit 1, Revision 25

Plant Records

North Anna Power Station Unit 1 2000 Refueling Outage Owners Report of Inservice Inspections for Interval 2

Examination Summary Surry Power Station Unit 1 2000 Refueling Outage 3rd Interval, 2nd Period

Examination Summary Surry Power Station Unit 2 2000 Refueling Outage 3rd Interval, 2nd Period

ASME Section XI North Anna Unit 1 2nd Interval, Third Period System Pressure Test Plan (documenting completion of 3rd period tests)

Surry Power Station Unit 1 Completed Periodic Test Procedure 1-PT-11, Reactor Coolant Pressure Test dated 12/5/01

Surry Power Station Unit 2 Completed Periodic Test Procedure 2-PT-11, Reactor Coolant Pressure Test dated 10/29/00

Technical Report EP-0021, North Anna Unit 1, 2001 Refueling Outage Results of Secondary Piping & Component Inspection Program, Revision 0

Technical Report ME-0140, North Anna Unit 2, 2001 Refueling Outage Results of Secondary Piping & Component Inspection Program, Revision 0

Technical Report EP-0022, Surry Unit 1, 2001 Refueling Outage Results of Secondary Piping & Component Inspection Program, Revision 0

Technical Report ME-0138, Surry Unit 2, 2000 Refueling Outage Results of Secondary Piping & Component Inspection Program

Steam Generator Condition Monitoring Evaluation and Operational Assessment - North Anna Unit 1 , September 2001 Refueling Outage

Steam Generator Condition Monitoring Evaluation and Operational Assessment - North Anna Unit 2, March 2001 Refueling Outage

Steam Generator Condition Monitoring Evaluation and Operational Assessment - Surry Unit 1 Refueling Outage Inspection Replacement EOC 12 (RFO 17) October 2001

Steam Generator Condition Monitoring Evaluation and Operational Assessment - Surry Unit 2 Refueling Outage Inspection Replacement EOC 13 March 2002

MRS-FSR-1129-VPA, Surry Unit 1 Westinghouse Steam Generator Field Services Report October 14th, 2001 through October 28th, 2001

MRS-FSR-1108-VPA, North Anna Unit 1 Westinghouse Steam Generator Field Services Report September 9th, 2001 Through September 26th, 2001

Technical Report NE-1284, Reload Safety Evaluation North Anna 1 Cycle 16 Pattern UY, Revision 0

Technical Report NE-1286, Reload Safety Analysis Checklist North Anna 1 Cycle 16 Pattern UY, Revision 0

Technical Report NE-1310, Reload Safety Evaluation Surry 2 Cycle 18 Pattern GW, Revision 0

Technical Report NE-1309, Reload Safety Analysis Checklist Surry 2 Cycle 18 Pattern GW, Revision 0

Completed Surry Unit 1 PT 1-PT-4, Reactor Vessel Exposure, dated 5/29/2001

Completed Surry Unit 2 PT 2-PT-4, Reactor Vessel Exposure, dated 5/24/2001

Completed North Anna Unit 1 PT 1-PT-54, Vessel Irradiation Program, dated 12/18/2000

Completed Surry Unit 1 PT 1-PT-4, Reactor Vessel Exposure, dated 11/20/2000

Surry 2002-1 System Health Reports for the Component Cooling, Condensate, Feedwater Water, Main Steam, and Blowdown Systems

Engineering Outage Summary Report - 1995 Unit 1 Refueling Outage Surry Power Station

Engineering Outage Summary Report - 1996 Unit 2 Refueling Outage Surry Power Station

Engineering Outage Summary Report - 2000 Unit 1 Refueling Outage Surry Power Station

Engineering Outage Summary Report - 2002 Unit 2 Refueling Outage Surry Power Station

Cycle/Transient Log Results for Surry and North Anna, First Quarter, 2002

Qualification Documentation Review (QDR) Packages of Electrical Equipment
- QDR-N-35.1/QDR -S 35.1 ASCO Solenoid Valves, Revision 30
- QDR-N-3.3/QDR-S-3.2 MOV Limitorque Inside Containment, Revision 7
- QDR-N-15.1/QDR-S-15.1 CONAX Containment Penetration Assembly, Revision 11
- QDR-S-15.5 Amphenol Containment Penetration Assembly, Revision 9

Plant Issue (PI) and Deviation (DR) Reports

N-1999-2208 - 1/4" hole found in the North Anna Unit Containment liner at Elevation 241 dated 9/22/99
S-2002-1754 - Deficiencies found on the canal liner at Surry dated 5/11/02
S-2002-1792 - Standing water and rust pipe supports in the pipe tunnel between auxiliary building and turbine building dated 5/15/02
S-92-0595 - Evaluate CC Piping Corrosion/Wall Thinning
S-96-1038- Heavy Rust on CC Piping
S-2000-0965 - Significant Rust on CC Piping
S-2002-1473-R1- Operations Concern with Surface Rusting of CC Piping
S-2002-1489-R1- NRC Identification of CC Piping Corrosion During Aging Management Inspection
S-2002-1789 - Corrosion of CD System Piping
S-2000-0973 - Corroded Bolting at Refueling Water Storage Tank Level Transmitters
S-2002-1806 - Paint on Stainless Steel Piping
N-1999-2209 - Corrosion of the equipment hatch door of North Anna Unit 1 dated 9/22/99
N-1999-2113 - Corrosion of containment liner to floor interface dated 9/15/99
S-1999-2152 - R2 - Rust metal plates covering pits in accessible areas at the Low Level Intake structures dated 8/22/99
S-2001-0954-R1 - Replacing metal grating with fiberglass grating dated 3/30/01
Deviation Report DR S-98-2980, “Corrective Action Assignment and Response for Deviation Reports,” Revision 0, 11/13/98

ATTACHMENT 2

NORTH ANNA AND SURRY POWER STATIONS
LICENSE RENEWAL INSPECTION SAMPLE
AGING MANAGEMENT ACTIVITIES

Existing AMAs

Augmented Inspections (extension of section XI)
ISI-Components and Component Supports
ISI-Reactor Vessel
ISI-Reactor Vessel Internals
Reactor Vessel Integrity (sample coupons)
Secondary Piping and Component Inspection (FAC)
Steam Generator Inspections
Boric Acid Corrosion Surveillance
Battery Rack Inspections
Service Water System
Load Handling Cranes and Devices
Civil/Structural Inspections
ISI - Containment
Corrective Action Program
Transient Cycle Counting
Environmental Qualification
Fire Protection
Chemistry Control - Primary
Chemistry Control - Secondary
Fuel Oil Chemistry

AMAs Requiring Enhancement

General Condition Monitoring
Work Control Process

New AMAs

Infrequently Accessed Area Inspections
Buried Piping Inspections
Tank Inspections
Non-EQ Cable Monitoring

ATTACHMENT 3

LIST OF ACRONYMS USED

AAC	Alternate AC Diesel Generator System
AMA	Aging Management Activity
AMR	Aging Management Review
AS	Auxiliary Steam System
ASME	American Society of Mechanical Engineers
BD	Blowdown System
CA	Compressed Air
CC	Component Cooling Water
CD	Chilled Water System
CE	Containment Access
CH	Chemical Volume and Control System
CM	Corrective Maintenance
CN	Condensate System
CV	Containment Vacuum System
CW	Circulating Water System
DR	Deficiency Report
EG	Emergency Diesel Generator
EPRI	Electric Power Research Institute
EQ	Environmental Qualification program
ESGR	Emergency Switchgear Room
FAC	Flow Assisted Corrosion
FC	Fuel Pit Cooling
FH	Fuel Handling
FW	Feedwater
GW	Gaseous Waste
HC	Post-Accident Hydrogen Removal System
HELB	High Energy Line Break
IA	Instrument Air
ISFSI	Independent Spent Fuel Storage Facility
ISI	Inservice Inspection
KV	Kilovolt
LM	Leakage Monitoring
LR	License Renewal
LRA	License Renewal Application
LTOPS	Low Temperature Overpressure Protection System
MCR	Main Control Room
MS	Main Steam
NEI	Nuclear Energy Institute
NSR	Non Safety related
NRR	NRC Office of Nuclear Reactor Regulation
NSSS	Nuclear Steam Supply System
PI	Plant Issue
PM	Preventive Maintenance
P/T	Pressure/Temperature
PTS	Pressurized Thermal Shock
QDR	Quality Documentation Review
QS	Quench Spray

RAI	Request for Additional Information
RCP	Reactor Coolant Pump
RC	Reactor Coolant System
RH	Residual Heat Removal
RI	Risk Informed
RS	Recirculation Spray
RSST	Reserve Station Service Transformer
RV	Reactor Vessel
RWST	Refueling Water Storage Tank
SA	Service Air
SBO	Station Blackout event
SDBD	Design Basis Document
SG	Steam Generator
SI	Safety Injection
SR	Safety related
SSC	Systems, Structures, and Components
SW	Service Water
TLAA	Time-Limited Aging Analysis
UFSAR	Updated Final Safety Analysis Report
VEPCO	Virginia Electric and Power Company
VP	Vacuum Priming System
VSC	Vacuum Priming Seal Water