



ENGINEERING DEPARTMENT  
Ronald Sanacore, Senior Vice President

December 5, 2008

Mr. Gary Little  
Manager-Insurance  
Progress Energy  
Treasury Department  
410 S. Wilmington St. PEB 19A3  
Raleigh, NC 27602

Subject: ANI Nuclear Liability Insurance Inspection  
Brunswick Steam Electric Plant  
Dates: November 4-6, 2008  
Policy Reference: NF-218 / Certificate NW-597

Dear Mr. Little:

Enclosed please find a copy of ANI's Nuclear Inspection Report for the Nuclear Liability Insurance Inspection conducted at the Brunswick Steam Electric Plant during November 4-6, 2008.

We very much appreciate the courtesies extended by the Brunswick staff. Mr. Steve Tabor was especially helpful and facilitated the achievement of our objectives in a mutually efficient manner. Throughout the inspection, I found the Brunswick staff professional and ready to assist in the inspection efforts.

Four **new** liability recommendations were offered as a result of this inspection. One previous recommendation was **closed**, five noted as **open** and three noted as **pending**. Your response to the **new** and **open** recommendations within 60 days from receipt of the report would be appreciated.

Should you have any questions regarding the report, please do not hesitate to call me at (860) 682-1340, or contact me via e-mail at bwendland@amnuclins.com.

Sincerely,

*William G. Wendland*  
William G. Wendland, P.E.  
Director - Nuclear Projects

Enclosure

cc: S. Tabor, E. Adams, T. Fischer

Our inspections, and reports and other communications we issue, are for our licensee purposes only. We do not undertake to render any service to or on behalf of our licensee or others or to determine or warrant the safety or healthfulness of any property or operation, or compliance with any law, rule, regulation or specification. We do not authorize anyone to rely on us for the safety of persons or property.

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## NUCLEAR LIABILITY INSURANCE INSPECTION REPORT

*Insured:* Carolina Power & Light Company


*Liability Policy:* NF-218

*Facility:* Brunswick Steam Electric Plant

*Worker Policy:* NW-597

*Address:* P.O. Box 10429  
Southport, NC 28461

*Report Date:* December 5, 2008

*Inspector:*   
William G. Wendland, P.E.  
Director-Nuclear Projects

*Document:* L110608.218

*Inspection Dates:* November 4-6, 2008

### PURPOSE

The inspection was a routine nuclear liability insurance inspection.

### SCOPE

- Brunswick Nuclear Plant Performance Evaluation – ANI Engineering Rating Factor
- Storm Drain Stabilization Pond
- Turbine Building Ventilation Update
- Tour of RCA Areas, Ponds and the intake canal.

### RESULTS

Four **new** liability recommendations were offered as a result of this inspection. One previous recommendation was **closed**, five noted as **open** and three noted as **pending**.

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## RECOMMENDATIONS

### New

- LR 08-01      **Plume Characterization Associated with Well ESS-2C** – The distribution of contaminants in the leak plume associated with well ESS-2C should be characterized horizontally and vertically including maximum concentrations and areas actually or potentially affected. Leak location, migration pathway, contamination levels, effects on existing groundwater, potential for migration off-site, potential for contamination of local aquifers and drinking water supplies, as well as, radiological dose assessments should be considered. Strategies for remediation of the groundwater contamination should be developed which would minimize the potential for migration off-site.
- LR 08-02      **Communicating Inadvertent Radiological Spills / Leaks** – ANI should be included into the notification procedure when the Brunswick Station notifies outside agencies of an inadvertent radiological spill / leak pursuant to the Industry's GWPI.
- LR 08-03      **Cathodic Protection** – An engineering evaluation of the cathodic protection system should be accomplished as part of an overall evaluation of the integrity of buried underground piping transporting radiologically contaminated liquids.
- LR 08-04      **Dose Assessment in RCA Areas due to Airborne Tritium** – The potential for occupational dose due to the presence of airborne tritium in RCA areas should be evaluated, documented and retained.

### Previous Liability Recommendations (Open, Pending and Closed)

#### Open

- LR 07-03      **Groundwater Protection (EPRI Guidelines)** – An evaluation should be conducted to ensure the fundamental elements of the EPRI GW Guidelines are incorporated into the GW evaluations conducted at the Brunswick site.
- Status      The site recently conducted a self-assessment using the NEI GWPI Guideline. Select issues identified in the self-assessment support that this type of evaluation would be beneficial. The recommendation is considered **open**.

LR 07-04      **Storm Drain Stabilization Pond Groundwater Leak (STAB Pond)** – The distribution of contaminants in the leak plume should be characterized horizontally and vertically including maximum concentrations and areas actually or potentially affected. Leak location, migration pathway, contamination levels, effects on existing groundwater, potential for migration off-site, potential for contamination of local aquifers and drinking water supplies, as well as, radiological dose assessments should be considered. Strategies for remediation of the pond and groundwater contamination should be developed which would minimize the potential for migration off-site.

Status            STAB Pond Plume – To date the plume has not been characterized, although it is believed that data does exist to generate a model of the plume. It was indicated that plume characterization would be considered subsequent to the other work ongoing at the site relative to the site’s hydrological assessment and the STAB pond work.

Off-Site Migration – The potential for off-site migration and possible effects associated with local aquifers is currently being considered and evaluated.

STAB Pond Remediation – Several strategies are being developed to remediate the pond. The current strategy involves installation of an extraction well(s), selecting alternate pathways rather than to the present STAB pond and an alternate pond.

The recommendation is considered **open**.

LR 07-05      **Integrity of Underground Piping** – Integrity assessments of all underground piping systems that contain or could contain radioactive materials should be performed. Inspection and testing methods may include: visual, UT, acoustic emission monitoring, hydrostatic or pressure drop testing, helium sniff, cameras / pipe crawlers, dye injection, etc. Engineering judgment should be used. Piping located in a sealed, engineered trench with leak detection capabilities may not need to be routinely inspected / tested; however, these piping systems should be included in the formal evaluation and documented appropriately. (Ref. ANI Guideline 07-01)

Underground piping in contaminated systems in the industry has experienced leakage of contamination to groundwater, contributing to increased nuclear liability insurance exposure.

Status A site risk assessment of underground piping systems is complete. We noted, however, that actual inspections and integrity assessment is not specifically scheduled as there are no target dates identified. The recommendation is considered **open**.

LR 07-06 **Integrity of Storm Drains** – The integrity of the entire storm drain system located within the Protected Area should be periodically evaluated. The evaluation should consider inspection for debris, line breaks or any discontinuity that would contribute to an unplanned and unmonitored release of radioactive materials to the groundwater. (Ref. ANI Guideline 07-01) Storm Drain Sampling for Radionuclides - Storm drain effluent should be periodically sampled for tritium and gamma emitters. If these analyses indicate the presence of plant-related radionuclides, subsequent analyses should be performed for hard-to-detect radionuclides (e.g., Sr90, Fe55, Ni63, alpha emitters, etc.). The analyses should be based on the plant's source term, isotopic ratios and transport characteristics. (Ref. ANI Guideline 07-01)

Status Storm Drain Integrity – Select sections of the storm drain system have been inspected. Indication of the potential for leaks in the inspected portions of the storm drain system were observed and viewed to be a potential source for groundwater contamination. We acknowledge that typical storm drain systems were not designed to maintain leak-proof integrity. From a nuclear liability insurance perspective, it is appropriate to know of potential leak pathways so that unanticipated and unmonitored contamination of groundwater can be managed.

Sampling for Hard-to-Detect Nuclides (HTDs) – Storm drains are routed to the Storm Drain Collection Basin (SDCB) for discharge to the Storm Drain Stabilization Pond (SDSP), which is the final release point. The SDCB is monitored for gamma emitters, tritium and has an installed radiation monitor. The SDSP, which is the final release point, is monitored for gamma and tritium prior to release. A plan for analysis for HTDs is currently being developed.

The recommendation is considered **open**.

LR 07-07 **Sampling for Other Radionuclides** – If the gamma isotopic or tritium analyses results taken from the yard drains, potable water wells, groundwater observation / monitoring wells, sanitary waste or other effluent / environmental monitoring sample points indicate the presence of plant-related radionuclides, the station should perform analyses for hard-to-detect radionuclides (e.g., Sr90,

Fe55, Ni63, alpha emitters, etc.). The analyses should be based on the plant's source term, isotopic ratios, and transport characteristics. Note: If the tritium results are >MDA but are consistent with, or approximate to, environmental background levels, the results would not constitute "contamination due to plant-related radionuclides." (Ref. ANI Guideline 07-01)

**Status** We acknowledge that select samples are analyzed for select HTDs. However, from our perspective, we view that the HTD analysis should be expanded to include the HTDs that are typically part of the plant's source term specifically strontium, iron-55, nickel-63 and alpha emitters particularly if tritium or other gamma emitters are present. We understand that plant procedures are being revised to include analyses for HTDs. We indicated that the groundwater wells surrounding each Spent Fuel Pool and select wells surrounding the Storm Drain Stabilization Pond, wells ESS-2C, ESS-16, ESS-22C, ESS-18C and ESS-19C should be periodically analyzed for hard-to-detect radionuclides (e.g., Sr90, Fe55, Ni63, alpha emitters, etc.).

The analysis of the hard-to-detect radionuclides should be performed on these wells yearly. If tritium unexpectedly increases, then the frequency should also increase.

The recommendation is considered **open**.

### **Pending**

**LR 07-01** **Site Hydrogeological Evaluation** – A complete site hydro-geological study should be performed. The design of the well monitoring program should be determined by the local hydro-geological materials and structures. The design of the well monitoring program should be determined by the local hydro-geological materials and structures. Sentinel wells should be placed proximate to high risk systems, components, or structures (e.g., piping, tanks, etc.) to provide early detection of a leak. The location of new monitoring wells should also consider known or suspected leaks, spills or other releases of contaminated water to the soil.

**Status** The Storm Drain Stabilization Pond hydrogeological evaluation is completed. The site hydrogeological assessment, which includes the owner controlled and protected areas, is targeted to be completed by the end of 2008. The recommendation is considered **pending**.

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LR 07-02      **2006 Hydrogeological Evaluation** – The wells recommended in the 1995 and 2006 Hydrogeological Evaluations should be installed as recommended in the reports.

Status          Installation of these wells is on hold pending the outcome of the site’s hydrogeological assessment as discussed in the status section of ANI Recommendation LR 07-01. The recommendation is considered **pending**.

**Closed**

LR 98-09      **RWP / Minor Maintenance Work Order Cross-Reference** – Radiological conditions and dose for minor or routine maintenance activities which are controlled by standing or general RWPs, should be cross-referenced to the job specific work order ticket. These work tickets should be retained based on the recommendations provided in ANI Bulletin 80-1A, for the life of the nuclear liability insurance policy, plus 10 years.

Status          A new staff member was assigned responsibility to address this recommendation that has experience with this particular issue at another ANI insured facility. Under this new leadership progress was achieved. The recommendation is **closed**.

## DISCUSSION

### ANI Engineering Rating Factor (ERF) – Brunswick Nuclear Plant Performance Analysis

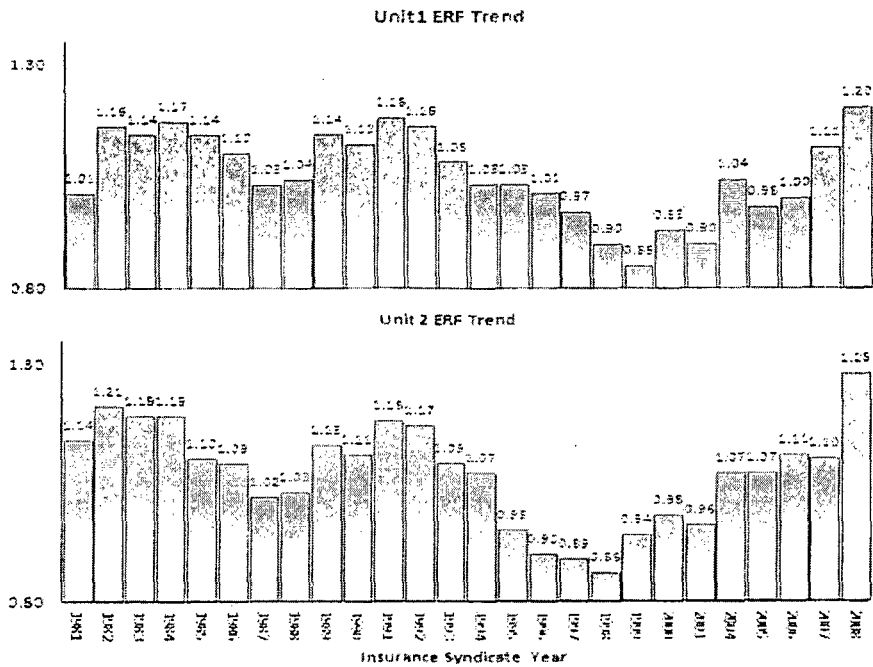
A presentation of Brunswick Nuclear Plant performance relative to the industry and peer facilities as reflected in ANI’s Engineering Rating Factor and dollar contribution to the Nuclear Liability Insurance policy premium was provided. The following tables and graphs summarize the major contributors to the ERF and trends for 2008. The overall ERF trend for both units is increasing.

Major ERF Contributors 2008	
Unit 1 ERF = 1.20	Unit 2 ERF = 1.28
<ul style="list-style-type: none"> <li>▪ Noble Gas Releases</li> <li>▪ Airborne Iodine &amp; Particulate Releases</li> <li>▪ Airborne Tritium</li> <li>▪ NRC Violations w/ Paid Fines</li> <li>▪ Radwaste Shipments for Burial</li> <li>▪ Safety System Failures</li> <li>▪ Safety System Actuations</li> </ul>	<ul style="list-style-type: none"> <li>▪ Noble Gas Releases</li> <li>▪ Airborne Iodine &amp; Particulate Releases</li> <li>▪ Airborne Tritium</li> <li>▪ NRC Violations w/ Paid Fines</li> <li>▪ Radwaste Shipments for Burial</li> <li>▪ Safety System Failures</li> <li>▪ Unplanned Automatic Scrams</li> </ul>

Increasing Subfactor Data (Adverse) Trends
<ul style="list-style-type: none"> <li>• Noble Gas Releases</li> <li>• Airborne Iodine &amp; Particulate</li> <li>• Airborne Tritium</li> <li>• Waterborne Tritium</li> <li>• Waterborne Mixed Activity</li> <li>• NRC Violations w/ Paid Fines</li> <li>• Safety System Failures</li> <li>• Unplanned Automatic Scrams</li> <li>• Safety System Actuations</li> </ul>



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**Plant Status during Inspection**

Both units were operating at 100% power, with minor maintenance in progress.

**Conferees during this Inspection**

- Mr. Ed Wills Plant General Manager
- Mr. Dave Gerber Buried Pipe Program Manager
- Mr. Bryant Harllee RP Supervisor
- Mr. Randy Ivey Recovery Manager
- Mr. Jerry Johnson Radiation Protection and Chemistry Manager
- Ms. Phyllis Mentel Manager Support Services
- Mr. Mike Millinor Senior Analyst, Environmental and Chemistry
- Mr. Chuck Nelson Senior Analyst, Environmental and Chemistry
- Mr. Shuji Nishioka Deputy General Manager-Japan Atomic Energy Insurance Pool
- Ms. Teena Roeder Chemistry
- Mr. Tim Silar Silar Services
- Mr. Martin Souther Structural Systems Engineer
- Mr. Steve Tabor Specialist-Self Evaluation
- Mr. John Vincelli Superintendent E&RC