



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARZETTA STREET, N.W.  
 ATLANTA, GEORGIA 30323

Report Nos.: 50-325/92-14 and 50-324/92-14

Licensee: Carolina Power and Light Company  
 P. O. Box 1551  
 Raleigh, NC 27602

Docket Nos.: 50-325 and 50-324

License Nos.: DPR-71  
 DPR-62

Facility Name: Brunswick 1 and 2

Inspection Conducted: April 27 - May 29, 1992

Inspector: J. J. Lenahan

7/1/92  
 Date Signed

Accompanying Personnel: R. Wright, May 5-7, 1991  
 J. J. Blake, May 27-29, 1992

Approved by: J. J. Blake  
 J. J. Blake, Chief  
 Materials Processes Section  
 Engineering Branch  
 Division of Reactor Safety

7/1/92  
 Date Signed

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of inspection and repairs to counterfeit bolts in concrete masonry walls, review of short term structural integrity issues, repairs to non-keyed reinforced concrete walls, results of the licensee's investigation of counterfeit anchor bolts, instrument maintenance procedures, concerns involving deficiencies in structural steel construction and installation of electrical conduits, and licensee action on previous inspection findings.

Results:

In the areas inspected, one violation, Failure to Perform Timely Operability Assessment of Structural Steel Construction Deficiencies, Paragraph 7; and one Deviation, Failure to Install Structural Steel in Accordance with FSAR Commitments, Paragraph 7, were identified.

Two unresolved items were identified: Possible deficiencies in HVAC and conduit, supports as a result of missing/loose nuts and bolts on hardware in the diesel generator building, Paragraph 5; and Structural Steel Drawings not Reflecting As-Built Conditions, Paragraph 7. Inspector follow-up items were identified regarding completion of pipe support design evaluations and repairs, Paragraph 3, and evaluation type and capacity of attachments to masonry block walls, Paragraph 2.c. Weaknesses were identified in plant materials condition, Paragraph 5, in the instrument maintenance program, Paragraph 6, and regarding delays in implementation of corrective actions, Paragraph 7.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*J. Brown, Manager, Nuclear Engineering Department (NED), Brunswick Project
- M. Dalla Pozza, Construction Engineer
- \*T. Eason, Quality Control Supervisor
- \*S. Floyd, Manager, Regulatory Compliance
- \*R. Godley, Manager, NRC Compliance
- R. Helme, Manager, Technical Support
- \*J. Holder, Manager, Outage Management and Modification
- T. Jones, Senior Specialist, Regulatory Compliance
- \*W. Langlois, Principal Engineer, Civil, NED, Brunswick
- A. Lucas, Manager, Nuclear Engineering Department (NED)
- B. Marlar, Project Engineer, NED, Brunswick
- G. Miller, Manager, Nuclear Systems Engineers
- W. Monroe, Principal Engineer, Onsite NED
- P. Newton, System Engineer, Structures
- \*R. Richey, Vice-President, Brunswick Nuclear Plant
- \*J. Spencer, Plant General Manager
- \*W. Styron, Principal Engineer, NED
- \*R. Tripp, Senior Engineer, NED
- S. Vann, Senior Engineer, NED
- L. Williams, Lead Civil Engineer, NED

Other licensee employees contacted during this inspection included engineers, technicians, and administrative personnel.

#### Other Organizations

- C. Coles, Civil Engineer, United Engineers and Constructors

#### NRC Resident Inspectors

- \*R. Prevatte, Senior Resident Inspector
- \*P. Byron, Resident Inspector
- D. Nelson, Resident Inspector

- \*Attended exit interview

## 2. Repairs to Masonry Block Walls (37701)

- a. Background. In 1987, the licensee identified deficiencies with concrete expansion anchors which supported structural angles at the base and sides of masonry block walls in the diesel generator building. The purpose of the structural angles is to provide lateral restraint to resist seismic loads. The licensee did not perform an adequate evaluation to determine the extent of the problem until April 1992. Additional details concerning the failure of the licensee to take adequate corrective actions, and the chronology of events concerning the diesel generator building are stated in NRC Inspection Report numbers 50-324/92-10 and 50-325/92-10. The licensee performed rigorous testing of the bolts in the concrete expansion anchors starting on April 6, 1992 and identified numerous deficiencies. The deficiencies involved counterfeit bolts, that is, bolts which were specified to be restrained/supported by self-drilling concrete expansion anchors, and in turn which would support the structural angles, were cut off and simply tack welded to the angles. The licensee found that only a minimum number of bolts were supported by concrete expansion anchors on some angles, although the number of counterfeit bolts varied from wall. All structural angle restraints, including those at the top of walls, on all walls, contained the counterfeit bolts. The licensee performed operability reviews and determined that some walls did not meet design criteria and would affect operability of safety related equipment. Further investigation of bolting by the licensee disclosed that through-bolts supporting the 1/4 inch thick missile shields on some EDG block walls were also counterfeit. Subsequent to these investigations, the licensee discovered that structural angle restraints for non-keyed reinforced concrete walls also contained counterfeit bolts and these walls were declared inoperable. The inoperable walls affected operability of numerous safety related system, resulting in shutdown of both units. The licensee submitted a Licensee Event Report, number 1-92-012, to the NRC in a letter dated May 22, 1992, documenting this problem. The inspector examined the licensee's program for investigation of the counterfeit bolts, including the expanded samples and review of application of concrete expansion bolting practices in other area, repairs to the masonry block walls, and repairs to the non-keyed reinforced concrete walls. Details of the inspection are specified below.
- b. Review of Licensee's Investigation/Inspection on Concrete Expansion Anchors

During April-May, 1991, the licensee performed a 100 percent inspection of concrete expansion anchors installed during the original construction of the EDG masonry block walls and the EDG poured concrete walls.

Also included in this inspection program were through-bolts installed in masonry walls which support the 1/4-inch thick missile shield on some EDG block walls. During original construction, the masonry wall work was classified as non-safety related. There were no requirements to inspect this work and thus no records exist documenting the work. The licensee is still investigating to determine who was responsible for original installation of the concrete expansion anchors. The licensee identified the following deficiencies:

- Bolts were cut off and welded to the angle supports. No holes had been drilled in the concrete.
- Holes had been drilled in the concrete, and complete bolts had been installed. However, no sleeves were inserted in the holes and the bolts were welded to the inside of the angle supports. Some bolts had been cut.
- Anchor bolts were installed through the angles into sleeves in concrete, but the sleeves rotated in the holes.
- Masonry wall through-bolts were cut off. Bolts were restrained by welding square washer plates to 1/4-inch steel plate on one or both sides of wall.
- Through-bolts had not been installed in some bolt holes.

The large number of improperly installed anchor bolts invalidated the seismic integrity of the walls. The anchor and through-bolts were inappropriately modified by construction personnel during construction of the plant to give the appearance that the bolts had been properly installed when, in fact, the bolts were actually "fake," that is, counterfeit.

The inspector examined the licensee's inspection procedure, Guideline for Field Inspection of Masonry Blockwalls, which provides requirements for inspecting the anchor bolts installed in the masonry walls during original construction to determine if they meet design requirements, or are counterfeit. The procedure requires determining the length of the anchor bolt using ultrasonic testing (UT), loosening the bolt to verify that it was not welded to the angle, and retightening the bolt to its proper torque. The procedure also requires checking the length of the masonry wall through-bolts. The inspector witnessed the inspection of the through-bolts in wall number 10 in the diesel generator building. These bolts, which were inspected using UT, showed 36 of 241 through-bolts

installed in the wall were counterfeit. The washers/bolts had been tack welded to the 1/4-inch thick steel plate.

The inspector reviewed licensee inspection reports documenting the results of inspection of the masonry wall anchor bolts and through-bolts. This data included calibration of the UT equipment, results of UT testing, and sketches showing location of counterfeit bolts. This data was evaluated by the licensee's Nuclear Engineering Department (NED) who issued Field Revision 26 to Emergent Structural Modification 91-011 to remove the counterfeit bolts and repair the walls to restore the seismic integrity of the masonry block walls and the non-keyed poured concrete walls.

The licensee also reviewed other concrete expansion anchor bolt applications at the site to determine if similar problems with counterfeit bolts existed in other areas. This included UT exam of concrete expansion anchor installed in masonry walls under IEB 80-11 modifications.

IEB 80-11, Masonry Wall Design, required licensees to perform a design reevaluation of all masonry walls in the proximity of safety-related equipment. During this design reevaluation, the licensee determined that some walls required modification to be seismically qualified. Some of the modification involved installation of concrete expansion anchors. However, QC records were available to document inspection of this work. The IEB 80-11 modification work was inspected by NRC and closed out in NRC Inspection Report Numbers 325/88-22 and 324/88-22.

The results of the UT exams were compared to installed bolt length data on IEB 80-11 modification QC inspection records. The inspector reviewed these inspection records. A few minor discrepancies were identified, but the overall UT results confirmed the bolt length data on the QC records. The discrepancies were attributed to data recording errors and did not affect the seismic integrity of the IEB 80-11 modifications. The licensee also performed an audit of their inspections completed to meet the requirements of IE Bulletin 79-02, Pipe Support Base Plate Designs Using Concrete Expansion Anchors. This audit was performed by three engineers with extensive experience in concrete expansion anchors design and installation. The inspector reviewed the results of the audit, documented in an undated report titled, "Addendum to Supplemental Response to IE Bulletin 79-02, 79-07, and 79-14, dated July 26, 1982." The audit team concluded that the licensee's procedures for inspecting and testing concrete expansion anchors



installed on pipe supports was adequate, that the inspection results were properly documented, and that tack welding or falsification was not the reason for frozen nuts or studs identified on some concrete expansion anchors during the IEB 79-02 inspections. The licensee summarized the results of the audit in a letter to NRC dated April 15, 1992, Serial Number NLS-92-118. The licensee concluded that concrete expansion anchors installed in pipe supports were acceptable. The licensee also committed to inspect concrete expansion anchors installed in electrical conduit and cable tray supports, structural steel, heating/ventilation/air conditioning (HVAC) equipment, and equipment foundations. The inspector reviewed a draft of the procedure for these additional inspections. The actual performance of the anchor inspections had not been started as of ending date of this inspection.

c. Repairs to Concrete Masonry Walls

The inspector examined the repairs on the diesel generator building walls, including repairs to the through-bolts for masonry walls covered with steel plate, the non-keyed poured reinforced concrete walls, and the masonry wall angle restraints. The work was completed under Field Revision 26 to Emergent Structural Modification 92-011. The repair details are shown on Modification Sketch Number SK-91011-C-1000, Sheets 1 through 115. The inspector performed a cursory review of the completed repairs on selected walls and verified that the modifications/repairs had been completed in accordance with design requirements. Licensee Quality Control (QC) inspection personnel performed a 100 percent inspection of all completed construction activities. QC personnel performed inspections of approximately 4,500 separate work items, including torquing of new concrete expansion anchors; visual inspection of welds, grouting, new structural steel plates and washers; and other miscellaneous work items. A QC assessment was performed of the work activities which showed that 696 items were rejected by QC inspection personnel for a reject rate of 15 percent. The majority of the problems were minor, such as documentation deficiencies, material traceability, and drawing errors, but one significant finding involved NED personnel giving the craft verbal instructions to cut maxi-bolt sleeves. The verbal instructions were not documented on the drawings. A large percentage of other deficiencies identified by QC also were the result of craft receiving verbal instructions from engineering and engineering not revising the drawings to document the instructions.

d. Reevaluation of IEB 80-11, Design Analysis

The licensee performed a reevaluation of their IEB 80-11 analysis because of the problem identified with the EDG masonry walls due to the counterfeit bolts. During the reevaluation, the licensee identified six walls in the control building which had previously been classified as non-safety related during the original IEB 80-11 wall evaluation. However, a change of design function, specifically control room habitability, resulted in reclassifying these walls as safety-related. Analysis of three of the walls showed that they met seismic design criteria. However, the remaining three required modifications. The modification instructions were issued under Field Revision 39 to Emergent Structural Modification 91-011. The details are shown on Sketch Number SK-91011-C-1040, Sheets 1 through 12. The inspector observed portions of the installation of the modifications and examined the partially completed work.

The licensee also examined all other masonry walls which had been classified as non-safety related during the original IEB 80-11 Evaluation. The licensee identified ten additional walls which are now incorrectly classified as non-safety related. The licensee attributes the most likely reason for the incorrect safety classification to installation of safety-related equipment under plant modifications in proximity of the walls since completing the original IEB 80-11 evaluation. The licensee is in the process of analyzing the walls to determine if any modifications are required. The inspector walked down the control building, the reactor building, the diesel generator building, and diesel generator tank building and examined masonry walls. During the walkdown, the inspector noted numerous examples of missing hardware from various systems. These are discussed in paragraph 5, below. The inspector also noted that fire protection piping was attached to masonry block walls in the reactor building and in the diesel generator building using concrete expansion anchors. The inspector questioned the acceptability of these type attachments for piping and several other items, e.g., HVAC duct, large diameter conducts, etc. Licensee design engineers are in the process of evaluating the capacity of these type of attachments. The inspector identified Inspection Follow-up Item (IFI) 325, 324/92-14-01, Evaluation of Attachments to Masonry Block Walls, to the licensee to track this problem.

e. Conclusions

The licensee's program to inspect, test, and evaluate the counterfeit anchor bolts was very thorough after the work was started in April 1992. The lack of timeliness in the corrective action for this



problem is discussed in NRC Inspection Report Number 325, 324/92-12. The modifications to the EDG walls were completed in accordance with design requirements. Additional inspections will be performed by NRC in future inspection of the licensee's inspection and testing program for concrete expansion anchors installed in other areas, and of the evaluations to masonry block walls classified as non-safety related in the original IEB 80-11 program which are now considered safety-related.

Violations or deviations were not identified.

3. Short Term Structural Integrity (STSI) - (37702)

STSI items are those identified by licensee personnel which, after evaluation by NED, are determined to be operable, although they do not meet the design criteria established by the FSAR. The general design criteria used to perform operability reviews are specified in Design Guide II.20, Civil/Structural Operability Reviews. The inspector reviewed the status of items currently classified as being STSI. The inspector noted that the majority of the items on the STSI list involved pipe support modifications. Discussions with licensee engineers disclosed that these items are being identified during the Design Turnover Project (DTOP) Phase II analysis of piping stress isometric drawings. The majority of the modifications required to the supports to restore the FSAR design margins are minor.

Further discussion with licensee engineers disclosed that the DTOP program was undertaken to disposition nonconformance S-86-021, issued March 28, 1986, titled, "Seismic Supports Have Discrepancies Between Installed Configuration and As-Built Drawings." The schedule for completing the DTOP program was extended several times, primarily due to the scope of the project being expanded. DTOP had been reviewed by NRC Region II inspectors during inspections conducted in 1987 through 1990 as part of the close out for IEB 79-14, Seismic Analysis for As-Built Safety-Related Piping Systems. The licensee proposed a schedule for completion of DTOP work in December 1991. Based on this proposed schedule, IEB 79-14 and other associated open items were closed in 1989 and 1990. However, after closeout by NRC, the licensee cut the budget for completion of the work and extended the completion date to December 1992. The inspector expressed concern to licensee management regarding delay in completions of the DTOP design work, and the completion of actual field work to modify pipe supports and closeout the STSI items associated with pipe supports in a timely manner. NRC will review the licensee's schedule for closeout of DTOP and completion of associated field work. This was identified to the licensee as IFI 325, 324/92-14-02, Complete Evaluation and Repairs to Pipe Supports and Closeout of NCR S-86-021.

The inspector reviewed the STSI listed below which effected structural steel:

- STSI 77, Missing Bolt for Miscellaneous Steel at Angle Seat Connection. Identified March 13, 1989, Corrective Action Completed July 12, 1990.
- STSI 1441, Missing Bolt in Connection Between Miscellaneous Steel and Baseplate at Elevation 0'9". Identified in 1990, Corrective Action Completed January 10, 1992.
- STSI 167 and 168, Cracked Steel Beam for Pipe Supports. Identified and corrected in 1991.
- STSI 28, Incorrect Size Beam in RHR Corner Room. Identified 1987, Corrective Action Completed December 1990.

The licensee's STSI program will be reviewed in future inspections by NRC Region II. The NRR Structural and Geosciences Branch is also reviewing the STSI program.

Violations or deviations were not identified.

#### 4. Construction Concerns

The inspector reviewed the following two areas of concern to the NRC: undersized structural steel beams in the reactor building, and conduit support installation deficiencies in the Unit 2 control room.

##### a. Undersized Structural Steel Beam

- (1) Concern: The NRC had reason to believe that a 8W17 (8" Wide-flange, 17 lb/ft) structural beam had been installed in an area that the design drawings specified the use of a 8W31 (8" Wide-flange, 31 lb/ft) structural beam.
- (2) Discussion: During this inspection, the inspector determined that the beam in question is located in the Unit 1 North RHR corner room, elevation 8'-8", six feet north of column line 19 R and four feet east of column line R. Discussions with licensee engineers and review of design modification packages disclosed that in fact the beam was actually a 8W17, not the 8W31 specified on drawing number F-01223, Reactor Building, Unit 1, Miscellaneous Steel. The actual problem involved three 8W17 beams which had been installed in place of the 8W31 beams specified on drawing F-01223. The problem, which was discovered by the licensee in

1987 and was documented as STSI Item 28, was evaluated in calculated number 89-105-26, titled Long Term Repair for North RHR Frame, Elevation 8'-8". A repair method, which involved installing an additional vertical support for one beam, and addition of beams to the platform was issued in September 1990. The field work was completed in December 1990. The inspector walked down the platform and verified the work was completed in accordance with design requirements.

- (3) Conclusions: The concern was substantiated. Incorrect size beams had been installed during construction, and the installed beams were not capable of carrying design loads. However, this problem had been corrected by the licensee. Other problems regarding structural steel design and construction at the site are discussed in paragraph 7, below.

b. Conduit Installation Deficiencies

- (1) Concern: NRC was concerned that there might be bolts missing from the end of unistrut supports in the ceiling of the Unit 2 Control Room. The bolts attach the unistrut to concrete expansion anchors. The unistruts support safety-related conduit.
- (2) Discussion: The inspector, accompanied by two licensee engineers, walked down the Unit 2 control room area and examined conduit supports. The conduits are supported from unistrut sections attached either to the control room ceiling, using concrete expansion anchors, or to unistrut sections embedded in the concrete ceiling during original construction. The conduit and supports are located above the acoustical tile ceiling in the control room, between the top of the acoustical tile and the bottom of the concrete floor slab above the control room. There were no missing bolts from concrete expansion anchors in the area inspected. However, one of the licensee engineers did identify a missing bolt from one of the conduit support structure frames. The engineer documented this problem on a trouble ticket.
- (3) Conclusions: The concern regarding missing bolts from concrete expansion anchors supporting unistrut sections in the Unit 2 control room was not substantiated.

Violations or deviations were not identified during this part of the inspection.

## 5. Housekeeping and Material Condition (62700)

The inspector performed walkdown inspections in the control building, the Unit 1 and 2 reactor buildings, the diesel generator building, and the diesel generator tank building. During the walkdown inspections, the inspector identified numerous hardware and housekeeping deficiencies. The inspector expressed concern to licensee management regarding the large number of deficiencies and the failure of licensee personnel to identify these deficiencies. Examples of the deficiencies were as follows:

- Loose nuts/bolts in concrete expansion anchors supporting base plates for conduit/cable tray supports in the diesel generator building.
- Missing anchor bolts in HVAC supports in the diesel generator building. A trouble ticket, number 89AQISI, dated July 19, 1989, was hanging on one of the supports with a missing bolt. However, the inspector was not able to determine if the licensee had identified the other supports with a missing bolt. The inspector questioned why this trouble ticket was open for three years and why the deficiency had not been corrected.
- Missing clamps/straps on unistrut conduit supports in the diesel generator building. The inspector also identified two conduits in the Unit 1 reactor building, along column line K, elevation 25, which appeared to be inadequately supported.
- Loose bolts on two structural steel frames in the diesel generator building.
- Area on east exterior wall of diesel generator building where concrete reinforcing steel was exposed to atmosphere and corroded.
- Corrosion of spare penetrations sleeves into diesel generator tank building on top of elevation 23 slab.
- Corroded studs/nuts on service water piping/valve in service water pit on top of northeast corner of diesel generator tank building. The pit had an accumulation of approximately six inches of rainwater in it. Technicians who were performing maintenance on an MOV had to stand on the service water piping because of the water in the pit. There is no floor drain in the pit.

- Copies of electrical maintenance procedures were found by the inspector in the Unit 1 dry well. These apparently had been left by maintenance personnel.
- On the elevation 8'-8" platform in the Unit 1 north RHR room, a copy of a work order, number 91-ATUBI, was found, along with some gasket material, tools and debris. Discussion with licensee planners disclosed that this ticket had not been worked since February 11, 1992. In other areas of the Unit 1 north RHR corner room, the inspector found a tool in a yellow bag, a piece of conduit, and a piece of 2"x4" wood.
- Loose nuts/bolts were identified on portions of the Unit 1 dry well platform steel.
- Loose bolts on a transformer enclosure in the diesel generator building.
- A bent bolt on a support for a fire protection line in the diesel generator building.

The inspector identified the above deficiencies to licensee system engineers during the inspection so that licensee personnel would be aware of the exact locations of the problems. Regarding structures and supports with missing hardware, the inspector questioned operability of the systems. Pending further review by the licensee and NRC, this issue was identified to the licensee as Unresolved Item 325, 324/92-14-03, Possible Deficiencies in HVAC and Conduit Supports.

Several of the above problems may have been the result of original construction practices. The above deficiencies were for the most part, when considered individually, minor. However, collectively, they are indicative of a problem regarding failure of licensee personnel to pay attention to detail. The failure of licensee personnel to identify these problems is the result of an attitude which has been permitted to develop at the site where in such conditions are deemed to be acceptable by management. Prompt management attention is required to correct these deficiencies and to train all personnel in the need to identify material conditions and housekeeping problems. The above conditions are considered to be a weakness.

#### 6. Instrument Maintenance Program (62704)

The requirements for installing and maintaining instrument tubing compression fittings were discussed with licensee maintenance and quality control personnel. These discussions disclosed that the licensee does not have written procedures to cover work and QC inspection activities for the installation of



compression fittings. The licensee depends on the "skill of the craft" who receive training on the requirements for installing Compression fittings. The licensee also conducts special onsite training for this activity. The inspector reviewed the CP&L Instrumentation and Control Technicians lesson plan titled "Installation of Tubing and Tubing Fittings." This training consists of discussion of terms and definitions related to tubing and fittings, installation methods, tubing bending, causes of tubing/fitting failures, precautions, and a practical exercise wherein the technician is required to fabricate some tubing and fittings. However, there is no discussion regarding use of "go/no go" gauges, ferrule orientation, not interchanging hardware from different manufacturers, and other recommendations contained in the vendor's manuals. QC Supervisors stated that there were no specific requirements for QC personnel to inspect compression fittings, and that hold points for these inspections were not normally established in work packages. The licensee stated that they were reviewing Information Notice 92-12, Failure of Primary System Compression Fitting, and will evaluate the need for written procedures for compression fitting installation. The lack of detailed written procedures for installation and inspection of compression fittings was identified to the licensee as a weakness in their instrument maintenance program.

Violations or deviations were not identified.

#### 7. Action on Previous Inspection Findings (92701, 92702)

(Closed) Unresolved Item 325, 324/89-18-02: Apparent Deficiencies in Design of Supplemental Structural Steel. Supplemental structural steel are miscellaneous steel beams which span between the main building framing steel in site structures and steel used to construct various platforms. The supplemental beams supports various safety related and non-safety related equipment, including HVAC, conduit, piping, instrumentation, electrical raceways and various other equipment. Herein after, supplemental steel will be referred to as miscellaneous steel, to coincide with terminology used by the licensee. The licensee does not have as built drawings for miscellaneous structural steel, or design calculations verifying that as-built miscellaneous steel meets design allowable stress values. Licensee design engineers have walked down nine areas in the reactor buildings where as-built drawing have been prepared for the miscellaneous steel during the walkdown inspection. Licensee design engineer identified several deficiencies with the structural steel platforms. The majority of these involved missing or undersized welds at connections. Trouble tickets were issued to document and disposition (repair) the problems. The deficiencies are discussed in more detail below. A design analysis will be performed for each area to determine compliance with FSAR criteria. The evaluation has been completed for one area, resulting in identification of three connections and five beams which required repairs.



The licensee has identified numerous other deficiencies in structural steel construction. These include:

- Problem documented in unresolved item 375, 324/88-41-02, with the overloaded and damaged beam supporting a portion of the standby gas treatment system.
- A damaged 8W17 beam in Unit 1 Reactor Building near column lines 2R and S at elevation 0-9". The damage was caused by numerous (15) torch cuts on the beam. This problem was evaluated in calculation number IRB1-0045-89105. Sketch number SK-S-89-105-238 was issued in January 1991 to repair this problem.
- Missing 8W17 beam documented in Adverse Condition Report number B 92-320 on in May 1990.
- The incorrect size structural steel beams installed during original construction discussed in paragraph 4 above. The installed steel did not conform to drawing requirements. A similar problem was also identified on the Unit 1 south RHR platform regarding a ST8WF39 which was not installed during construction. These specific problems have been repaired.
- The necessity to undertake repairs covered by Field Revisions 16, 17, and 18 to Emergent Modification 89-106. These repairs were identified during the analysis of the platform on Elevation 60 of the Unit 2 Reactor Building, Column lines R and 22R, 23R. This platform is one of the nine walked down and as-built to resolve NRC concerns under Unresolved item 325, 324/89-18-02. The modifications are in addition to those identified on trouble tickets during the walkdown inspections. The modifications involve repairs to three connections and five beams to comply with FSAR criteria. The analysis on the remaining eight platforms has not yet been completed.
- The deficiencies identified during the walkdown inspections while preparing as-built drawings for use in design analysis of miscellaneous steel platforms. The walkdowns covered a total of nine platforms in the Unit 1 and 2 Reactor Buildings. These platforms were located on various elevations of both reactor buildings. Numerous deficiencies were identified, all in connections. Problems involved loose or missing bolts, undersized or missing welds, torch cut holes in structural steel, configuration differences.

The inspector, accompanied by licensee engineers, walked down various structural steel platforms in the north and south RHR corner rooms of the Unit 1 and 2 reactor buildings. Numerous problems were identified with the platforms at column lines R to S, 2R to 3R on elevations 0-9", 4-1" and 8-8" in the Unit 1 north RHR corner room. These included torch cut holes in structural steel beams and clip angles, connections to embeds which did not comply with details shown on construction drawings, weld details differing from those shown on drawings, and problems with alignment of the beams. Deficiencies were also identified with structural steel construction in the Unit 2 RHR corner room platforms, but these were not as extensive or serious as those identified with the Unit 1 north platforms.

The inspector noted that the licensee does not have as-built drawings showing as-built conditions for structural steel construction. This problem, which will be reviewed in a future inspection by NRC, was identified to the licensee as Unresolved Item 325, 324/92-14-04, Structural Steel Drawings Do Not Reflect As-Built Conditions.

The inspector discussed the above deficiencies identified on the structural steel platforms with licensee NED personnel. These discussions disclosed that the licensee had identified some of the problems during walkdowns in 1991. However, the licensee had not conducted an operability review to determine if the deficiencies affected operability of any safety-related systems. CP&L Engineering Procedure EWP-12, Engineering Evaluation Procedure, requires that an operability assessment be performed within 30 days of identification of deficiencies in safety-related components and/or systems. Failure to perform these operability evaluations in a timely manner was identified to the licensee as Violation Item 325, 324/92-14-05, Failure to Perform Timely Operability Assessment of Structural Steel Deficiencies.

Based on the numerous problems with miscellaneous structural steel construction identified by both NRC and the licensee, the inspector concluded that the licensee did not assure that the steel was erected in accordance with details shown on the construction drawings during the original construction of the Brunswick plant. In FSAR Sections 17.1A.3.4.4.4. d.1 and d.3, the licensee committed to NRC that all structural steel construction was inspected for conformance to American Institute of Steel Construction (AISC) specifications, and that field welds were

visually inspected for conformance with American Welding Society (AWS) specifications. FSAR Section 3.8.4.5.b states that structural steel was designed in accordance with AISC-1963 specifications. The licensee failed to comply with this commitment in that the problems listed above demonstrated that the structural steel was not inspected for conformance with AISC and AWS specification requirements. Design evaluation of platform steel indicate that stresses in the structural steel exceed AISC and FSAR allowable values. This problem was identified to the licensee as Deviation Item 325, 324/92-14-06, Failure to Construct Structural Steel in Accordance with FSAR Commitments.

## 7. Exit Interview

The inspection scope and results were summarized on May 29, 1992, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

- a. Inspector Follow-up Item 325, 324/92-14-01, Evaluate Attachments to Masonry Block Walls, paragraph 2.c.
- b. Inspector Follow-up Item 325, 324/92-14-02, Complete Evaluation and Repairs to Pipe Supports and Closeout of NRC S-86-021, paragraph 3.
- c. Unresolved Item 325, 324/92-14-03, Possible Deficiencies in HVAC, Conduit, and Structural Steel Supports, paragraph 5.
- d. Unresolved Item 325, 324/92-14-04, Structural Steel Drawings Do Not Reflect As-Built Conditions, paragraph 7.
- e. Violation Item 325, 324/92-14-05, Failure to Perform Timely Operability Assessment of Structural Steel Deficiencies, paragraph 7.
- f. Deviation Item 325, 324/92-14-06, Failure to Construct Structural Steel in Accordance with FSAR Commitments, paragraph 7.