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

Report No.: 50-400/84-43

Licensee: Carolina Power and Light Company
411 Fayetteville Street
Raleigh, NC 27602

Docket No.: 50-400 License No.: CPPR-158

Facility Name: Harris 1

Inspection Conducted: November 27-30, 1984

Inspectors: _____ 12/14/84
W. P. Ang Date Signed

_____ 12/17/84
L. P. Modenos Date Signed

Approved by: _____ 12/13/84
J. J. Blake, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection entailed 52 inspector-hours at the site, in the areas of pipe support baseplate designs using concrete expansion anchors (IEB 79-02) and seismic analysis for as-built safety-related piping system (IEB 79-14).

Results: No violations or deviations were identified.

REPORT DETAILS

1. Licensee Employees Contacted

*R. M. Parsons, Project General Manager
*E. J. Wagner, Engineering General Manager
*A. H. Rager, Construction Inspection Manager
*G. L. Forehand, QA/QC Director
*E. E. Willett, Manager, Pipe/Instrumentation
*D. C. Whitehead, QA Supervisor
*A. Fuller, Principal Engineer - Hangers
*P. W. Howard, Senior Engineer - Hangers

NRC Resident Inspectors

*R. Prevatte
*G. Maxwell

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on November 30, 1984, with those persons indicated in paragraph 1 above. The licensee was informed of the inspection findings listed below. The licensee acknowledged the inspection findings with no dissenting comments.

Inspector Follow-up Item 400/84-43-01, SG Feedwater Pump 1A-NNS Misalignment, para. 5.b.

Unresolved Item 400/84-43-02, Pipe Support Inspection Records, para. 5.a.

Unresolved Item 400/84-43-03, QA Surveillance Close-out, para. 5.c.

Inspector Follow-up Item 400/84-43-04, Approval of Permanent Waiver, para. 5.d.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. New unresolved items identified during this inspection are discussed in paragraph 5.

5. Pipe Support Baseplate Designs Using Concrete Expansion Anchors (IEB 79-02) and Seismic Analysis for As-built Safety-Related Piping Systems (IEB 79-14)

a. A follow inspection to RII report 50-400/84-34 was performed to verify licensee compliance with IEB 79-02 and IEB 79-14 requirements and licensee commitments. Discussions with the licensee indicated that approximately 500 of 18,000 safety-related pipe supports had completed the revised pipe support inspection program. The following pipe supports were selected, available quality records obtained, and inspected as noted below. The inspector noted the following conditions for each pipe support.

(1) Component Cooling System Pipe Support CC-H-105 Seismic I Weld Data Report (SWDR) and continuation sheet from original phase 2 inspection traveller from the voided phase 1 and phase 2 inspection program were not in the package. A new traveller and SWDR for the revised pipe support inspection program were in the package. The licensee's pipe support inspection had not been completed. NRC and licensee QA inspections of the pipe support identified no discrepancies with the pipe support.

(2) Chemical and Volume Control Pipe Support CS-H-425 entire package for old phases 1 and 2 inspections were missing. A new package had been generated for the revised pipe support inspection program. The licensee had issued a work directive to remove and reinstall the pipe support prior to the NRC inspection on November 26, 1984. An NRC inspection in the area of the location of the pipe support confirmed that it had been removed.

(3) Chemical and Volume Control Pipe Support CH-H-264 old and new inspection records and forms were on file. NRC and licensee QA inspections of the pipe support revealed no discrepancies.

(4) Service Water System Pipe Support SW-H-2796. This support and affected piping has been deleted by design change notice 530 - 1241.

(5) Service Water System Pipe Support SW-H-1841. The entire inspection package was missing and a new package was assembled during the NRC inspection. Reproductions of old Phase I pipe support inspection and field weld SWDR were found in the construction inspection and QC offices. NRC and licensee QA inspections of the pipe support identified no discrepancies.

(6) Feedwater Support FW-H-136 and FW-H-11 records were also obtained but were not inspected. The supports were not safety-related.

During subsequent discussions with the licensee, the licensee noted the following:

(1) None of the above noted pipe supports had completed the revised inspection process. The licensee considered the missing records to be in-process records. The missing records would have been identified during records review and corrective action such as reinspection or removal and reinspection of the pipe support would be accomplished.

(2) The missing records may have been stolen. To preclude any potential theft or alteration of records that ultimately become quality assurance records when completed, the licensee changed the process for handling pipe support quality documentation. On November 30, 1984, memorandum MS-13748 was issued requiring that copies of completed QC SWDR and CI TP-34 inspection reports be forwarded to the QA vault for storage. A copy of the above noted reports will stay with the hanger package for subsequent final review of the entire package.

(3) QA assisted the NRC during the pipe support records search. QA committed to continue the inspection regarding the missing records by performing a surveillance to assure that missing records are identified and appropriate corrective action is taken.

Pending implementation of the above noted licensee commitments, this was identified as Unresolved Item 400/84-43-02, Pipe Support Inspection Records.

b. An inspection of Steam Generator (SG) feedwater pump records revealed that deficiency notice (DN) M-010 was written on July 30, 1982, stating that "the welding sequence in conjunction with the coupling face readings and the lack of sufficient rigid restraints indicate severe nozzle loads have been imposed on the discharge nozzle of the steam generator feed pump 1A-NNS". The deficiency notice was still open and the licensee had not decided on the corrective action required for DN-M-010. The licensee indicated that the corrective action would include a determination of the cause of the problem including potential cold springing of the piping. Pending licensee completion of corrective action for DN-M-010, this was identified as Inspector Follow-up Item 400/84-43-01, SG feedwater pump 1A-NNS misalignment. In conjunction with the above noted inspection of the SG feedwater pump 1A-NNS, a review was performed to determine if the feedwater pumps and the discharge piping in the immediate vicinity of the pumps were designed and constructed using the correct safety and seismic classification. The Harris Final Safety Analysis Report (FSAR) commits to NRC Regulatory Guides 1.26, Quality Group Classification, and 1.29, Seismic Design Classification. Based on NRC Regulatory Guides 1.26 and 1.29, the SG feedwater pumps

and immediate discharge piping are not required to be safety-related nor are they required to be seismic category 1. FSAR Chapters 10.1 (Figure 10.1.0-3), 10.2 and 10.4, further confirm this. The inspector noted that FSAR Table 3.2.1-1, page 3.2.1-40, indicated that "other" SG feedwater piping were seismic category 1. The licensee stated that the table was correct but Figure 10.1.0-3 provided better definition of the seismic category 1 boundaries than the table.

c. An October 14, 1983 memorandum from D. C. Whitehead to Al Rager regarding surveillance report QASC-83-860 was reviewed for compliance with 10 CFR 50 Appendix "B" requirements. The memorandum forwarded QA Surveillance Report QASC 83-860. The report documented a surveillance performed by QA by "assisting pipe hanger construction inspection in performing the preliminary inspections" of pipe supports. The report further identified that 13 of 18 pipe supports inspected were rejectable, listed the "incorrectly installed" pipe supports and identified the discrepancies. Surveillance Report QASC 83-860 had been closed out by QA prior to this NRC inspection. A review performed by the NRC and QA determined that discrepancies on 12 of the 13 pipe supports had been identified in the applicable pipe support inspection records. The discrepancy for auxiliary feedwater system (AFW) pipe support AF-H-245, interference with valve 3AFV-89-SB-1, had not been identified in other inspection records. CP&L Corporate Quality Assurance procedure CQA - 28, revision 5, QA Surveillance, paragraph 7.4.3 allows nonconforming conditions within the scope of CI and QC inspection to be noted and turned over to the responsible inspection group for handling in accordance with appropriate procedures. The licensee stated that the in-process condition noted on AF-H-245 was not considered to be a nonconforming condition, was not recorded elsewhere, but had been corrected. To assure that QA surveillance reports are being correctly closed-out, the licensee committed to review additional QA surveillance reports and ascertain that QA surveillance reports are being correctly closed-out. Pending completion of the licensee's commitment, this was identified as unresolved item 400/84-43-03, QA surveillance close-out.

d. The inspector selected the following sample of DDRs for review of final disposition by the licensee, DDRs-1795, 1784, 1776 and 1775.

DDR 1795 and 1784 identified problems with pipe hangers incorrectly labeled, field welds as shop welds, changes to drawings not clearly indicated and hanger sketches showing incorrect and/or contradictory weld symbols. As a result of these DDRs, the licensee conducted an audit to identify generic problems. The audit resulted in revising of Work Procedure (WP) -110 which describes the steps to be followed for the installation of seismic pipe support, writting a new procedure WP-139 which determines the functions of the Work Procedure Group (WPG) and describes the steps to be taken in the preparation and control of pipe hanger work packages, writting a new procedure WP-140 which emcompasses the engineering review of QA records for installation of seismic pipe hangers and support for seismically analyzed pipe prior to

release to the QA turnover group. The inspector reviewed all of these procedures and the following hanger work packages and concluded that these DDRs have been dispositioned appropriately:

1-CS-H-3160	Rev. 0
1-SW-H-111	Rev. 7
1-CC-H-1484	Rev. 1
2-SW-H-915	Rev. 3S1

DDR 1776 identified problems with pipe hangers being removed or loosened without authorization and fasteners were unmarked contrary to the requirements of WP-110. As a result of the new hanger program established after the audit referenced above, all pipe hangers that are finished are to be inspected and tagged as complete. No work can be performed on these supports without proper authorization. An internal training program by the Special Projects Hanger Department identifies a final checklist be performed by the inspector to assure tags are in place; however, this commitment has not been mandated to be included in the field procedure. The inspector walked down the following hanger work packages to verify markings and tagging of supports and found them acceptable:

1-SW-H-1567
1-SW-H-2339

DDR 1775 identified numerous problems with material substitution and control. The utility has established a material control program according to work procedure (WP) 110, Rev. 11, and training classes have been held to instruct hanger personnel concerning implementation of the program. The material control program requires a "Field Material Verification" of all the supports. When the field material verification cannot be identified on Exhibit 4 of WP 110, then it is identified under item number 7 - described as the sampling program. At the present time, about 7400 hangers have had material verification sheets filled out. About 1000 of these reports have been reviewed by the Final Engineering Review Group (FERG). Two hundred of the 1000 have been sent to special projects for disposition of material following under the sampling program. Special projects review and disposition of the sampling program references three permanent waivers (PW) PW-4647, 1634, and 1639. These PWs allow the acceptance of some unidentified material on the basis they have had an engineering review of the stock material on site which are not marked for material verification and have concluded that the percentage of unclassified material identified is very small and insignificant. The materials identified also have a yield strength above the allowable stresses used in the design calculation of 60% of the A-36 steel.

The inspector reviewed the following work packages identified in DDR 1775 for verification and found them acceptable:

1-CC-H-1242
1-SW-H-1570
1-SW-H-2337

However, the justification for the permanent waivers has not had any Project Management attention or review. It appears that the issue is too general and covers a broad area that requires more than just an engineering review before implementing the PWs. Until Project Management reviews and takes action an the engineering justification, this item will be identified as Inspector Follow-up Item 84-43-04, Approval of Permanent Waivers.

DDR 1775 also identified material issued for pipe hangers 1-CC-H-105 and other numerous supports from a voided P.O. No. 21022. However, this P.O. No. 21022 was created as a fictitious number assigned to the site fabrication shop for storage purposes. Material for most of these supports were obtained from P.O. No. 19019. The inspector reviewed the documentation of pipe hanger 1-CC-H-105 and determined that P.O. No. 21022 was voided by the purchasing department but was open as far as the fabrication shop was concerned. This created the confusion of the intended use of the P.O. The inspector found no problems in this area.

IEB 79-02 and 79-14 were left open pending completion of bulletin requirements and licensee commitment.

No violations or deviation were identified.

Exhibit 4

RESPONSE TO INSPECTOR FOLLOW-UP ITEM 84-43-04

SCOPE: This response substantiates plant-wide acceptance of structural steel materials which are not marked with identifying material type or verifying purchase order control numbers. For specific items and quantity, see Attachment 1. The approval is limited to material installed prior to June 1, 1984. This response also shows management involvement and concurrence with the program.

PURPOSE: The intent of this document is to establish the presence of the required material quality, taking credit for the existing material control program and research performed to provide back-up for the program.

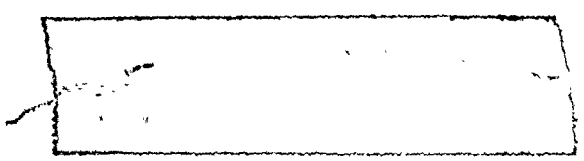
BACKGROUND: Nonconformances issued have indicated a weakness with material verification at the point of installing fabricated structural steel. This condition has been found to be true for vendor fabricated as well as site fabricated items. Nonconformances issued indicate documentation control problems, not lower grade material. Material verification is required in order to adequately prepare a Seismic Weld Data Report (SWDR). In order to allow installation to proceed past this hold point, a permanent waiver was initiated (PW-AS-4647) to accept the possibility of material of lesser grade than A-36 being substituted for the required material. The research conducted by Office Engineering to provide the resolution basis was a review of purchase orders for stock structural shapes and plate. Those purchase orders which provided no specific requirement for material type were assumed as not A-36, although in fact they may have been A-36 or better. Percentages of suspect material were defined for each shape classification and are given in Attachment 1. Other material was ordered and documented as ASTM-A-36 or better.

BASIS FOR ACCEPTANCE: The justification for approval of the subject permanent waiver, as well as this response, is threefold:

1. The procedures and implementation of the material control program at SHNPP provided an acceptable basis for material control.

2. The small percent possibility of material other than A-36 being available based on documented research.

3. Routine design allowables are below the



minimum yield strengths of the substitute materials.

Vendor-fabricated Seismic Class 1 material is receipt inspected by QA. This inspection provides reasonable assurance that the correct material was supplied. Issue to the field is based on release from the warehouse by specific description and purchase order number. Site fabricated material is controlled by the WP-18 procedure for general structural fabrication, which requires transfer of identifying numbers from the stock material to the fabricated item.

As described above, material verification is achieved at several hold points, the final one being the point of installation. Numbers identifying material type which were present upon initial receipt or fabrication may no longer be present due to blasting for painting or due to corrosion prior to cleaning and painting. In some instances, attachments are made over identifying numbers.

The percentages of unclassified material supplied in the initial revision of PW-AS-4647 per Attachment 1 are very small with the exception of sheet steel. These percentages were revised at the request of HPES to exclude those purchase requisitions initiated after the establishment of the WP-18 program (see Attachment 2). The revised percentages took credit for vendor supplied certification in follow-up to our request as well as the WP-18 exclusions. These substantially lower percentages indicate that only angle and sheet steel have above 2% unclassified. The two material designations were provided with engineering disposition (see Attachment 3).

General structural design is routinely based on AISC allowable stress. The allowable stress for A-36 material is below the yield strengths indicated for these possible substitutions. This indicates that although the original design margin will be reduced with the use of a substitute material, the fabricated item will not be stressed to the point of failure.

RESPONSE: The undersigned acknowledge that material verification at the point of installation of structural steel items is not always possible. These items are acceptable on the basis of an acceptable material control program, the small percent possibility ($<2\%$) of materials other than A-36 being used, and routine design allowables which are below the yield strengths indicated. The approval is isolated to those items installed prior to June 1;

1984. The SHNPP material control program is not to be in any way changed by this position.

RECOMMENDED BY:

H. L. Williams

G. L. Forehand

K. V. Hate

J. W. McKay

APPROVED BY:

R. M. Parsons

L. I. Loflin

N. J. Chiangi

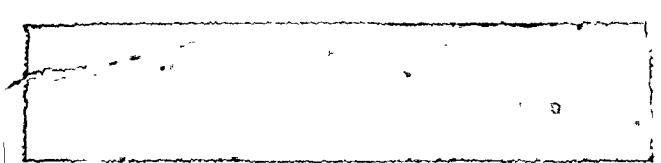
ATTACHMENT 1

The following is a list of the different types of structural steel & the percentage in question of the total amount of each type.

Material	Percent In Question
Angle	5.2
Plate	2.1
Channel	9.5
Beam	1.9
Flat Bar	0.8
Sheet Steel (A570)	20.3
Tube Steel (A500)	0.3
All Structural Steel	4.6

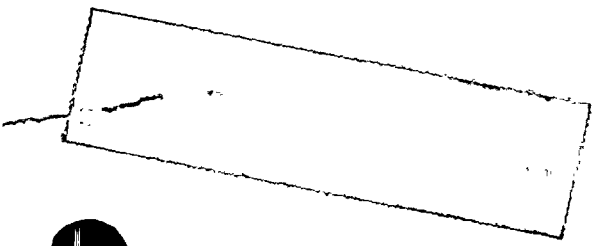
ASTM grades of steel with lower structural properties than the steel specified.

ASTM Grade	Yield Strength(PSI)	Intended Use
A131	34,000	Constr. of ships shapes, pls, bars, rivets.
A283	24,000	General use Pls. shapes, etc.
A284	30,000	General use Pls.
A414	25,000	Sheet Steel for press vess.
A570	30,000 (GR. 30)	Sheet Steel
A611	25,000	Sheet Steel



ATTACHMENT 2

Mat'l Desc.	Original Total Unclassified	Acceptable Material or Better (Minus)	Sub Total Unclassified	Post WA18 Procedure Exclusions (Minus)	New Total Unclassified	Total with paperwork (Plus)	Total Combined	Percentage Unclassified New	Percentage Unclassified Original
Angle	246,952#	59,710#	187,242#	-	187,242#	4,514,735#	4,701,977#	4.0	5.2
Beam	26,478#	11,830#	14,648#	480#	14,168#	1,345,503#	1,359,671#	1.0	1.9
Channel	116,072#	97,662#	18,410#	-	18,410#	1,107,547#	1,125,957#	1.6	9.5
Flat Bar	6,176#	3,400#	2,776#	542#	2,234#	756,630	758,864#	0.3	0.8
Plate	31,372#	17,920#	13,452#	8,063#	5,389#	1,429,349#	1,434,738#	0.4	2.1
Sheet Steel	36,337#	-	36,337#	25,437#	10,900#	142,976#	153,876#	7.1	20.3
Tube Steel	2,112#	-	2,112#	2,112#	-	840,917#	840,917#	-	0.3



ATTACHMENT 3

Justification for PW-AS-4647

Scope: The PW identifies that stock material and fabricated items exist on site which are not marked to allow material verification. The possibility therefore exists that material of a lesser grade than specified by design is in use.

Assumptions: The problem identified is one of material control rather than material quality. Several hold points exist between material receipt and material installation which work to prevent installation of the wrong product. The background information for this waiver was collected by HPCS on the basis of a review of purchase requisitions for stock material. The initial survey of requisitions was modified by HPES in an effort to more closely define where material quality may be a problem. The WP-18 procedure for site fabrication is an additional hold point for material verification, therefore, the evaluation was restricted to the time period prior to WP-18 initiation (5/28/79).

Conclusion: The percentage of unclassified material identified is in most cases small enough to be insignificant. The exceptions to this are sheet steel and angle. Prior to May, 1979 these items were not used to fabricate structural supports. The uses of sheet steel and angle during this time were non-permanent plant items, HVAC penetrations, and Turbine Building floor slab forming. The only possible Class I use was HVAC penetrations, and therefore, engineering concerns are restricted to this item.

HVAC penetrations can be divided into three major categories:

1. Penetrations which are sleeves only
2. Penetrations which are supports
3. Penetrations which are ducts

A review of Drawing 2168-G-528S01 R9 indicates that sheet steel is used only as a Mitered Angle Frame connecting the duct to the penetration. The stresses at this connection are very low per J. Bielanski (Ebasco) and the 10GA. sheet steel offers a greater capacity than the 16 GA. duct which is subject to the same stresses. On this basis the material identified as possible substitution for the sheet steel is acceptable.