



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30303

Report No.: 50-413/84-85

Licensee: Duke Power Company  
422 South Church Street  
Charlotte, NC 28242

Docket No.: 50-413

License No.: NPF-24

Facility Name: Catawba Unit 1

Inspection Conducted: August, 21-24, 1984

Inspector: J. J. Blake  
for W. P. Ang

9/4/84  
Date Signed

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

9/4/84  
Date Signed

SUMMARY

Scope: This routine unannounced inspection involved 24 inspector-hours on 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 systems (IEB-79-14).

Results: No violations or deviations were identified.

## REPORT DETAILS

### 1. Licensee Employees Contacted

- \*R. L. Dick, Vice President, Construction
- \*G. W. Greer, Corporate QA Manager
- \*E. M. Couch, Project Administrator
- \*T. B. Bright, Engineering Manager, Construction
- \*L. R. Davison, Project QA Manager
- \*R. M. Dulin, Senior Design Engineer
- \*R. A. Morgan, Senior QA Engineer
- \*J. W. Willis, Senior QA Engineer
- \*R. A. Cassel, Design Engineer
- \*T. A. Barron, QA Engineer
- J. N. Underwood, Supervising Design Engineer
- P. L. Stiles, Supervising Design Engineer
- D. H. Stout, Supervising Design Engineer

#### NRC Resident Inspectors

- \*P. K. VanDoorn
- P. Skinner

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on August 24, 1984, with those persons indicated in paragraph 1 above. The licensee was informed of the inspection finding listed below. The licensee acknowledged the inspection finding with no dissenting comment.

(Open) Unresolved Item 50-413/84-85-01, Pipe Support Inspection Questions.

### 3. Licensee Action on Previous Enforcement Matters

(Closed) Violation 413/83-22-02, Inadequate Design Control for Design Calculations. Duke Power Company letter of response dated March 30, 1984, had been reviewed and determined to be acceptable by Region II. The inspector held discussions with the Senior Design Engineer and Supervising Design Engineer and examined the corrective actions as stated in the letter of response. The inspector concluded that Duke Power Company had determined the full extent of the subject noncompliance, performed the necessary survey and follow-up actions to correct the present conditions, and developed the necessary corrective actions to preclude recurrence of similar circumstances. The corrective action identified in the letter of response have been implemented.

(Closed) Violation 413/84-19-01, Pipe Support Discrepancies. Duke Power Company letters of response dated April 9, 1984 and April 19, 1984, had been reviewed and determined to be acceptable by Region II. The inspector held discussions with the licensee's design engineers and QA staff and examined the corrective actions as stated in the letters of response. The inspector concluded that the Duke Power Company had determined the full extent of the subject noncompliance, performed the necessary survey and follow-up actions to correct the present conditions, and developed the necessary corrective actions to preclude recurrence of similar circumstances. The corrective actions identified in the letter of response have been implemented.

Region II report 50-413/84-68 left this item open since the design calculations for support 1-R-CA-0091 did not reflect the as-found condition. A review of additional pipe support calculations (paragraph 5) indicated that the noted condition was an isolated case. The calculations for 1-R-CA-0091 was reperformed by the licensee. The new calculations indicated that the as-found condition was technically acceptable without additional modification. This item was closed.

(Closed) Violation 413/83-40-01, Failure to Follow Procedure for Hanger Installation and Inspection. Duke Power Company letters of response dated January 13, 1984 and February 15, 1984, had been reviewed and determined to be acceptable by Region II. The inspector held discussions with the licensee's construction engineers and QA staff and examined the corrective actions as stated in the letters of response. The inspector concluded that Duke Power Company had determined the full extent of the subject noncompliance, performed the necessary survey and follow-up actions to correct the present conditions, and developed the necessary corrective actions to preclude recurrence of similar circumstances. The corrective actions identified in the letter of response have been implemented.

Region II report 50-413/84-68 left this item open due to configuration discrepancies identified by the NRC inspector on pipe supports 1-R-W1-1186 and 1-R-WL-1192. The discrepancies were subsequently identified by the licensee on nonconforming item reports (NCIR) 18695 and 18700. A review of the noted NCIRs indicated that the licensee had evaluated the noted conditions and determined them to be acceptable. In addition, the licensee attributed the discrepancies to pipe movement subsequent to the inspection and performed inspections of the remainder of the piping and supports on the affected piping and found no further discrepancies. This item is closed.

(Closed) Unresolved Item 413/83-51-01, Pipe Support Calculation Documentation. Region II report 50-413/84-34 left this unresolved item due to questionable use of "Engineering Judgement" in the design calculations for pipe support 1-R-CA-232. The licensee reperformed the calculations for pipe support 1-R-CA-232 and performed a sampling evaluation of the use of engineering judgement on ten pipe supports in each of three areas including member stresses, welds, and baseplate/anchor bolts. The evaluation was documented on memorandum MASR-84-457 dated August 16, 1984. The evaluation confirms that "judgements made were all suitable." No further examples were

noted during inspection of additional pipe supports calculations (paragraph 5). The licensee committed to improve the quality of Unit 2 pipe support calculations by providing sufficient justification within the calculations for the use of engineering judgement. This item was closed.

4. Unresolved Items\*

New unresolved items identified during this inspection are discussed in paragraph 5.

5. Seismic Analysis for As-Built Safety-Related Piping Systems (IEB 79-14) and Pipe Support Baseplate Designs Using Concrete Expansion Anchors (IEB 70-02)

A follow-on inspection to the NRC Region II inspection documented in Inspection Report No. 50-413/84-68 was performed to verify licensee compliance with IEB 79-14 and IEB-79-02 requirements and licensee commitments. On February 29, 1984, and December 15, 1983, the licensee submitted its final responses to IEB 79-14 and IEB 79-02, respectively. An inspection was performed at the Duke Power Company Design Office and at the site. During the Design Office inspection, the following design calculations and procedures were selected and inspected.

- Rigorous Analysis Problem           NDD - RHR Piping
- Alternate Analysis Problems        CN-1492-NB-152A and  
  CN-1492-NB-267A
- Pipe Support Calculations          1-R-ND-504  
  1-R-ND-506  
  1-R-ND-153  
  1-R-ND-265  
  1-R-ND-152  
  1-R-ND-503

Specification No. CNS-1206.02-04 - 0000, Revision 6, Alternate Analysis Criteria for Reactor Building and Auxiliary Building Pipe and Supports.

The calculations were compared with construction certifications to verify that the calculations reflected the as-built condition of the piping and pipe supports. No discrepancies were noted.

(Open) CDR 413/84-01, Reported Cracks on Two Welds in the RHR Systems. An inspection of the affected piping stress analysis problem indicated that the piping had been analyzed in accordance with both FSAR and code requirements and met the applicable acceptance criteria. The licensee attributes the

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\*An Unresolved Item is a matter about which more information is required to determine whether it is acceptable or may involve a violation or deviation.

failure to low cycle fatigue induced by vibration. The licensee had to perform further vibration testing but had not completed the testing. Pending completion of committed vibration testing and appropriate corrective action, the item was left open.

(Open) Unresolved Item 413/83-51-02, Overlap Modelling Technique - Region II report 50-413/84-34 left this item open pending verification of the modelling technique for small bore pipe and the applicability of the analysis program "Quickpipe" for Catawba. The small bore modelling technique was reviewed and discussed with the licensee. The small bore modelling technique appeared to comply with NRC and FSAR requirements. The applicability of the "Quickpipe" analysis program was discussed with the licensee. The licensee indicated that "Quickpipe" was an Impell program that was a simplified version of "Superpipe" which is the rigorous analysis program stated in the Catawba FSAR. The licensee further stated that "Quickpipe" had been benchmarked with "Superpipe" and found to be acceptable. The licensee stated that they would contact NRR to determine if "Quickpipe" had to be submitted for approval. Pending confirmation of the applicability of "Quickpipe" for Catawba, the unresolved item was left open.

During the inspection on site, portions of the RHR piping shown on piping stress isometric drawing NDD-1, Revision 9 were inspected.

In addition, the following pipe supports and applicable inspection records were also inspected:

1-R-ND-506, 152, 505, 265, and 153

The piping and pipe supports inspected were in the vicinity of the repaired welds reported on CDR 413/84-01. The following items were observed during the inspection:

- a. Pipe Support 1-R-ND-504 had been disassembled and was not installed. The piping system being supported appeared to be in operation during the inspection. The operability evaluation for the affected piping was requested. The licensee indicated that an operability evaluation had been performed but since this was identified on the last day of the inspection, there was insufficient time to obtain and review the record.
- b. Piping supports 1-R-ND-265 and 506 met drawing requirements but appeared to have had baseplates replaced and/or relocated. The inspector was unable to identify the work in the inspection records. The licensee was requested to provide the records for the work if in fact the baseplates had been replaced or relocated.
- c. Pipe support 1-R-ND-152 was found to have a pipe clamp installed 90° from the drawing required orientation. Pipe support 1-R-ND-506 was found to have fasteners longer than the required drawing fasteners and spacers installed to compensate for the extra length. The spring can rod for 1-R-ND-506 was also found to be bent. The licensee felt that

the conditions noted were either found to be acceptable during inspection or conditions that resulted from activity in the area subsequent to the inspections. The licensee agreed to evaluate and review the noted conditions.

Pending further inspection and confirmation of the above noted findings, items (a), (b), and (c) above were identified as unresolved item 413/84-85-01, Pipe support inspection questions.

(Closed) Inspector Followup Item (IFI) 413/83-46-03; IEB 79-02 and IEB 79-14 Records. The inspector followup item identified a need for more detailed pipe support inspection records. A review of pipe support inspection records during this inspection and previous inspections indicated that, although the records could be more detailed, they met the minimum requirements. A discussion with the licensee during previous inspections indicated that the licensee would evaluate the need to improve the records for Unit 2. The IFI was closed.

No violations or deviations were identified.