



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA ST., N.W., SUITE 3100
 ATLANTA, GEORGIA 30303

Report Nos.: 50-413/82-31 and 50-414/82-29

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

Docket Nos.: 50-413 and 50-414

License Nos.: CPPR-116 and CPPR-117

Facility Name: Catawba 1 and 2

Inspection at Catawba site near Rock Hill, South Carolina

Inspector: J. J. Lenahan *J. J. Lenahan* 1/18/83
 Date Signed

Approved by: T. E. Conlon *T. E. Conlon* 1-19-83
 Date Signed
 T. E. Conlon, Section Chief
 Engineering Program Branch
 Division of Engineering and Operational Programs

SUMMARY

Inspection on December 28-30, 1982

Areas Inspected

This routine, unannounced inspection involved 16 inspector-hours on site in the areas of IE Bulletin 79-02 and licensee identified items.

Results

In the areas inspected, no violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *H. L. Atkins, QA Surveillance Supervisor
- R. Curry, Civil Engineer, Support/Restraint Group
- L. R. Davison, Project QA Manager
- *S. W. Dressler, Construction Engineer
- T. Henderson, Civil Engineer, Tech Support
- *H. D. Mason, QA Engineer
- R. A. Morgan, Senior QA Engineer
- R. Pratt, Civil Engineer, Civil-Environmental Division
(Telephone Conversation)
- *J. C. Roger, Project Manager
- J. W. Willis, Inspection Superintendent

Other licensee employees contacted included two construction craftsmen and two civil QC inspectors.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on December 30, 1982, with those persons indicated in paragraph 1 above. The licensee was informed of the inspector findings listed below. The licensee acknowledged the inspector findings with no dissenting comments.

- Unresolved Item 413/82-31-01, Possible inadequate corrective action to disposition NCI 14069.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

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 6.

5. IE Bulletin 79-02 (Revision 2) - Pipe Support Baseplate Designs Using Concrete Expansion Anchor Bolts - Units 1 and 2

a. Summary of Licensee's Responses to IEB No. 79-02

The licensee has submitted three responses to IEB No. 79-02. These responses were dated as follows: July 5, 1979; August 15, 1979; and January 17, 1980. The licensee anticipates submitting the final response for Catawba Unit 1 for IEB No. 79-02 in early 1983.

b. Review of Procedures Controlling Installation and Inspection of Concrete Expansion Anchors

The inspector reviewed the following procedures which address the requirements for installation and inspection of concrete expansion anchors:

- (1) Specification Number CNS-1196.02-00-0000, Specification for the Field Installation of Concrete Expansion Anchors
- (2) QA Procedure Number M-52, Concrete Expansion Anchor Installation Inspection
- (3) Construction Procedure Number CP-115, Installation of Concrete Expansion Anchors
- (4) Construction Procedure Number CP-439, Concrete Expansion Anchor Testing
- (5) Construction Procedure Number CP-441, Abandoned Drill Hole Repair

Acceptance criteria examined by the inspector appear in FSAR Section 17 and the licensee's commitments contained in responses to IE Bulletin 79-02.

Within the areas inspected, no violations or deviations were identified.

6. Licensee Identified Item (10 CFR 50.55(e))

Prior to this inspection, the licensee identified the following items as significant deficiencies reportable under 10 CFR 50.55(e):

- a. (Open) Item CDR/413/82-07: Overtorquing of ITT-Phillips Concrete Expansion Anchors. This item was reported to NRC on March 3, 1982. The licensee submitted an interim report to NRC on April 2, 1982, and a final report to NRC on August 3, 1982. During routine inspection of a pipe support, QC inspectors identified an excessive baseplate to concrete surface gap. Upon reinspection of the support it was discovered that the gap no longer existed. The QC inspectors checked

the torque on the concrete anchors used to attached the baseplate to the concrete and found the torque to be in excess of the torque specified in construction procedures. That is, the plate to concrete gap was reduced by overtorquing the concrete expansion anchors to bring the plate against the concrete. Routine inspections of other pipe supports disclosed similar resolution of excessive plate to concrete gaps. These problems were documented and dispositioned as non-conforming item (NCI) report numbers 12361, 12607, 12998, 13166, 13485, 13486 and 13651. As a result of the recurrence of this problem another NCI, number 14069, was written and a sampling program was undertaken to determine the extent of the problem of overtorquing of expansion anchors on pipe support baseplate. NCI 14069 referenced the previously written NCIs listed above. The sampling program identified a number of additional anchors which apparently had been overtorqued. A number of anchors was also identified which had measured torques below the specified installation torques. The licensee conducted a series of tests to evaluate the stress conditions in the anchors due to possible overtorquing. Based on the results of these tests, acceptance criteria for maximum allowable torque values were established.

During investigation of the overtorque problem, 397 supports were inspected. Out of approximately 1650 anchors on these supports, 18 anchors on 14 supports were found to have torque values in excess of the maximum acceptable torque established by the testing program. A total of nine anchors were found on five supports with torque values below the specified limits. The licensee analyzed the supports assuming that the 27 anchors with torque values outside of the acceptance limits (18 with high torque and 9 with low torque) had failed. The results of this analysis showed that system operability would have been maintained.

The licensee's planned corrective actions listed in their final report to resolve this problem were as follows:

- (1) Retrain construction craftsman in the proper resolution of excessive plate to concrete gaps
- (2) Addition of an inspection point to the QC procedure for concrete expansion anchor inspection (M-52) to require visual inspection of the concrete around expansion anchors to detect any possible distress in the concrete which may have resulted from overtorquing of the anchors.
- (3) Retorque those nine anchors which had low torque values
- (4) Replace the 18 anchors which had high torque values.

The licensee's final report stated that the above corrective actions would be completed by January 15, 1983.

The inspector reviewed procedure M-52 and verified that an inspection point had been added to the procedure to require visual inspection of the concrete around expansion anchors. The inspector reviewed the NCIs listed above. Review of the results of the sampling program to determine the extent of the overtightening problem and the corrective action recommended to disposition NCI 14069 disclosed the following unresolved item.

Attachment 9 to NCI 14069 is a summary of the corrective action required to be completed by site personnel to correct the problems identified during the sampling program to disposition and close out the NCI.

Review of the results of the sampling program disclosed that during determination of the anchor torque value, additional discrepancies were identified on three supports and noted on the torque sampling data sheets. Correction of these problems was not included as part of the corrective action as Attachment 9 to NCI 14069. In addition, the inspector noted the corrective action listed on Attachment 9 to NCI 14069 did not include retorquing those nine anchors which were found to have low torque values during the sampling program. A summary of the supports which had discrepancies identified during the sampling program for which corrective action was not stated on Attachment 9 to NCI 14069 is listed in the table below.

TABLE

<u>SUPPORT NUMBER</u>	<u>DISCREPANCY IDENTIFIED</u>
1-R-TE-1507	3 anchors with low torque
1-A-RN-3418	2 anchors with low torque
1-A-NI-4210	1 anchor with low torque
1-A-RN-3015	1 anchor with low torque
1-A-RN-3362	2 anchors with low torque
1-R-BW-1519	Washers on anchors are cupped
1-A-RN-3699	Excessive gap between baseplate and concrete
1-A-RN-3103	Concrete chipped behind plate.

The inspector discussed the failure to include correction of the above problems as part of the corrective action on Attachment 9 to NCI 14069 with licensee QA/QC personnel. These discussions disclosed that these problems may have been dispositioned as part of inspections documented in either the hanger document (inspection) packages or on other documents. Therefore, this was identified to the licensee as Unresolved Item 413/82-31-01, "Possible inadequate corrective action to disposition NCI 14069," pending further review by the licensee and NRC. Item CDR 413/82-07 remains open pending resolution of the above unresolved item and inspection of the completed repair to the expansion anchor by NRC.

- b. (Open) Item CDR 413-414/82-23: Abandoned drill hole repairs. This item was reported to NRC on November 8, 1982. The licensee submitted an interim report to NRC on December 8, 1982.

During installation of concrete expansion anchors, interference is occasionally encountered before a hole of sufficient depth can be drilled in the concrete and the anchor needs to be relocated. Where this occurs, the drilled hole is abandoned and repaired in accordance with approved construction procedures. One of the materials used to repair the drill holes was Sika Top 122. During drilling of a hole for an anchor in the Auxiliary Building it was necessary to partially drill into an abandoned drill hole which had been repaired with Sika Top 122. The repair material was found to be weak and would not support torquing of the anchor to the required load. QA personnel investigated this problem and found that construction craft personnel were not following the approved construction procedure for mixing the two components for Sika Top 122. Craft personnel were mixing and placing the Sika Top 122 at a "dry pack" consistency instead of the wet mortar or grout consistency obtained when following the manufacturer's mixing directions. This was apparently partially due to misunderstanding the manufacturer's representative when he was on site to explain the proper methods for mixing and placing Sika Top 122. The QC inspector also had the same misunderstanding. This problem was documented on non-conforming item (NCI) report number 15679. The licensee has initiated a testing program to determine the quality of the repairs made with Sika Top 122 placed at a dry pack consistency. This testing program includes the following:

- (1) Drilling holes in a test slab and repairing the holes using Sika Top 122 mixed and placed at a "dry pack" consistency as craft personnel had been doing prior to when this problem was identified.

Anchors will then be installed in the test slab in or near the holes repaired with the Sika Top 122 and axially loaded to failure.

- (2) Making and testing cube specimen from Sika Top 122 mixed at a "dry pack" consistency.
- (3) Compiling a list of hangers where anchors were installed in or near drill holes repaired with Sika Top 122.
- (4) Test a selected sample population of anchors which may have been installed in or near the drill holes repaired with Sika Top 122. Anchors will be load tested to 125 percent of their design capacities.

The inspector reviewed the results of the testing program on anchors located in the test slab. This program has been completed. The results were satisfactory. The cube testing program is underway. The inspector reviewed the results of the cube tests completed to date. The results appear satisfactory.

A list of hangers installed in or near drill holes which were repaired with Sika Top 122 has been compiled. A total of 82 anchors have been selected for testing to 125 percent of their design capacity. The testing is scheduled to begin in early 1983.

The inspector discussed this problem with licensee engineers and QA personnel. These discussions disclosed that Sika Top 123 is now being used to repair abandoned drill holes. This material is being used because it is material which is specified to be placed at a "dry-pack" consistency. Construction craftsmen have been retained to follow construction procedures and manufacturer's instructions in mixing and placing Sika Top materials. The inspector observed repair of abandoned drill holes using Sika Top 123 materials. The drill holes were located in the auxiliary building in the following locations:

- (1) South face of wall along column line 57, east of column line PP, elevation 586 near hanger 1-A-NF-3028.
- (2) North face of wall along column line 57, approximately 15 feet east of column line PP at elevation 581.
- (3) Holes in elevation 560 slab 10 feet east of column line EE and 5.5 feet south of column 57.

Approved procedures were being followed in repair of these holes. Item CDR 413-414/82-23 remains open pending completion of the licensee's testing program, examination of the licensee's corrective action, and review of the licensee's final report.