



ENCLOSURE 3
UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-413/84-15 and 50-414/84-11

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

Inspection at Catawba site near Rock Hill, South Carolina

Inspector *T. E. Conlon* for 3-16-84
J. R. Harris Date Signed

Approved by: *T. E. Conlon* 3-16-84
T. E. Conlon, Section Chief Date Signed
Engineering Program Branch
Division of Engineering and Operational Programs

SUMMARY

Inspection on February 1 - 2, 1984

Areas Inspected

This special, unannounced inspection involved 14 inspector-hours on site in the area of structural concrete.

Results

Of the one area inspected, no violation or deviation was identified.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

*L. R. Barnes, Planning and Control Manager
J. Warren, QC Engineer, Civil
R. McCrary, Civil Engineer Construction
M. Green, Civil Engineer, Design
L. Hodges, Civil Engineer, Construction
C. Arnold, Civil Engineer, Construction
H. Nekooasl, Junior Field Engineer

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on February 2, 1984, with those persons indicated in paragraph 1 above.

3. Licensee Action on Previous Enforcement Matters

(Open) Unresolved Item (413, 414/80-33-01) Identification of Concrete Honeycomb. Licensee provisions for identifying and tracking repair of honeycomb that occurred prior to 1979 are not clear. Discussions with responsible engineers indicated that the licensee is doing a 100 percent reinspection of concrete surfaces in Unit 1 and Unit 2. Reinspection of Unit 1 is scheduled for completion by March 1, 1984, and Unit 2 reinspection is expected to be completed by April 1984.

During this inspection the inspector examined the nonconformance log and final concrete inspection logs for pour numbers 2532, 2741, 2978, 2972, 3013 and 2067. Examination of these records showed that honeycomb is now being identified and repaired in accordance with procedures and specifications. The inspector also examined a memo by I. W. Pearce of Duke design engineering concerning review of nonconforming item reports on honeycomb occurring at the Catawba site from May 1977 to October 1980. The memo discussed the probable causes of honeycomb and suggested measures which could be taken to minimize honeycomb. Suggestions included: vibration of rebar where vibrators could not reach the concrete, use of small diameter vibrators (pencil vibrators), use of form vibrators and use of special mixes incorporating a paper plasticizing admixture.

Because of a concern raised in the Catawba licensing hearings that honeycomb might occur internally and not be visible at the surface, the inspector discussed the cause and occurrence of honeycomb with the U. S. Army Corps of

Engineers Waterways Experiment Station in Vicksburg, Mississippi and the Portland Cement Association in Skokie, Illinois. Discussions confirmed this inspector's observations that the probability of honeycomb occurring internally without any surface manifestation is highly unlikely. Experience has shown that the reinforcing steel located near the outer faces of the structures interferes with the flow of the plastic concrete and causes a separation of mortar and coarse aggregate. Inadequate vibration in the area adjacent to the reinforcing steel sometimes results in honeycomb occurring in the space between the reinforcing steel and concrete surface. Discussions with the U. S. Army Corps of Engineers Waterways Experiment Station concrete technologists also indicated that numerous concrete cores taken by them from concrete structures have not shown any honeycomb. The only type of voids identified were occasional small air holes commonly referred to as bug holes. Discussions with Portland Cement Association concrete technologists and a NRC Region III civil inspector indicated that nondestructive tests were performed on concrete structures at the Marble Hill Nuclear Plant to determine if any internal honeycomb was present. Numerous surface honeycomb areas were present but testing showed no internal honeycomb.

Based on the experience of this inspector and observations and testing done by the above referenced testing laboratories and NRC experience at the Marble Hill site, the inspector concluded that the presence of any significant internal honeycomb in the Catawba structures is highly unlikely. Some minor air holes or bug holes resulting from entrapped air may be present. It is not considered that the presence of scattered air holes or bug holes would have any effect on the integrity of the structures.

This unresolved item remains open pending NRC's review of the licensees final inspection report on honeycomb at Catawba Unit 1.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Bulging of Concrete Forms in Decontamination Pit

CONCERN Concern was expressed indicating that improper bracing of forms caused the forms to sag three inches during a concrete placement in the decontamination pit. The three inch sag in the forms resulted in a three inch bulge in the hardened concrete wall.

DISCUSSION The decontamination pit is not necessary for the safe operation or safe shutdown of the plant. The decontamination pit is located in the spent fuel building and is used to wash radioactive contamination from the exterior of casks containing spent fuel prior to loading of the casks on a truck for shipment to a waste storage area. The pit consists

of reinforced concrete walls lined with stainless steel. The stainless steel liner serves as a leak proof barrier to contain the contaminated water resulting from the cleaning process. Following cleaning, the contaminated water is drained and processed to waste storage. The main purpose of the concrete walls is to support the stainless steel liner. Any bulge in the concrete walls resulting from a bulge in the concrete forms would not have any affect on the structural integrity of the concrete walls. The effect of the bulge in the wall would only be that the stainless steel liner could not be installed until the bulge was removed.

The inspector examined the decontamination pit and discussed the placement of the concrete walls with responsible construction and design engineers. Discussions disclosed that the forms did break loose during placement of the lower walls and a 2 to 3 inch bulge was caused in a four foot square area of an inner wall. The resulting bulge was chipped away to the lines shown on the drawings so that the steel liner could be installed. Observations by this inspector confirmed that the wall dimensions were restored to the dimensions shown on the drawing and that the steel liner was also installed as shown by the drawings.

FINDINGS - The forms did break loose during placement of walls in the decontamination pit and a 2 to 3 inch bulge occurred in the hardened concrete of an inner wall of the decontamination pit. However, the buckling of the forms and resulting bulge in the hardened concrete did not affect the structural integrity of the concrete wall. The main effect was the additional cost required to remove the bulge in order to allow placement of the steel liner. Concrete formwork is not nuclear safety-related. Failure from improperly braced forms results in aesthetically unacceptable appearances or results in expensive repairs to remove the bulge.