



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

Report Nos.: 50-438/84-09 and 50-439/84-09

Licensee: Tennessee Valley Authority
500A Chestnut Street
Chattanooga, TN 37401

Docket Nos.: 50-438 and 50-439

License Nos.: CPPR-122 and CPPR-123

Facility Name: Bellefonte 1 and 2

Inspection at Bellefonte site near Scottsboro, Alabama

Inspector: *J. E. Conlon* for 4-18-84
J. R. Harris Date Signed

Approved by: *T. E. Conlon* 4-18-84
T. E. Conlon, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Inspection on April 3-6, 1984

Areas Inspected

This routine, unannounced inspection involved 30 inspector-hours on site in the areas of employee identified concerns in structural concrete.

Results

Of the areas inspected, one violation was identified (Failure to properly evaluate and classify NCR 1885 as significant, paragraph 5.b).

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *L. S. Cox, Project Manager
- *R. E. Young, Construction Engineer
- *B. J. Thomas, Construction Quality Manager
- *T. M. Brothers, Assistant Construction Engineer
- *J. T. Barnes, Quality Assurance Section Supervisor
- *P. C. Mann, Nuclear Licensing Unit Supervisor
- *D. E. Nixon, Construction Quality Control Unit Supervisor

Other licensee employees contacted included four construction craftsmen and five technicians.

NRC Resident Inspector

*J. York

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on April 6, 1984, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspection findings. The following item was opened.

- Violation 438/84-09-01 and 439/84-09-01, Failure to properly evaluate, and classify NCR 1885 as significant, and reportable to NRC under 50.55(e) criteria.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Employee Concerns, Discussions and Findings

- a. Concern - Red Head Self Drilling Expansion Anchors Set In Concrete Honeycomb

A concern was expressed indicating that "Red Head" self drilling expansion anchors (SSD anchors) were sinking into the concrete when installed in concrete honeycomb. The worker identified the area of

concern as the A-12 wall at the 'R' column line on the 610 elevation in the auxiliary building.

Discussion

Honeycomb is defined in Section 201 of the American Concrete Institute Manual of Concrete Practice as voids left in concrete due to failure of the mortar to effectively fill the spaces among coarse concrete aggregate particles. Experience has shown that the reinforcing steel located near the outer face of the walls interferes with the flow of the plastic concrete and causes a separation of mortar and coarse aggregate. Honeycomb is visible on the surface and usually occurs in the space between the reinforcing steel and the wall surface as a result of inadequate vibration in the areas around the reinforcing steel.

The inspector examined the entire A-12 wall and adjacent walls on the 610 elevation in the auxiliary building. No honeycomb was visible and examination of documentation showed that no honeycomb repairs had been made. Some small air pockets due to accumulation of air bubbles at the formed surface were visible. However, these are considered to be of a cosmetic nature and do not have any structural significance. Examination of pull tests on the SSD anchors supporting pipe hangers 2KE-1001, 2KE1005, 2KD-14-R4 and 2KE-1002-R1 in the A-12 wall near the 'R' column line showed no failure of SSD anchors set in concrete in the A-12 wall.

Findings

Examination of the A-12 wall on the 610 elevation in the auxiliary building showed no visible honeycomb or results of honeycomb repair. Examination of pull tests on SSD anchors set in concrete in the A-12 wall showed no evidence of anchors failing due to honeycomb or other concrete defects.

b. Concern - Substandard Concrete in Wall Between Control Building and Auxiliary Building at Elevation 669

A concern was expressed that "bad" concrete was used to construct the wall between the control building and auxiliary building at elevation 669. The worker stated that they could not keep "Red Head" anchors in the wall and that they had to resort to using wedge bolts.

Discussion

The inspector examined the wall between the control building and auxiliary building between elevations 669 and 687 and noted that self drilling shell expansion anchors (SSD anchors) were being replaced with wedge bolt anchors. Discussions with responsible engineers and craft

disclosed that there had been numerous failures with the 3/4 inch SSD anchors in the M and P line walls between elevations 680 and 687. These problems have been identified by the licensee in nonconforming condition report (NCR) numbers 1381 and 1885.

The problem was first identified in NCR 1381 on February 13, 1981. Evaluation of NCR 1381 by the licensee resulted in the problem being classified as significant and reportable to the NRC under 10 CFR 50.55(e) criteria. The licensee reported the item to NRC on March 10, 1981, and sent four evaluation reports to the NRC dated April 9, 1981, July 27, 1981, November 9, 1981, and January 29, 1982. The reports indicated that the problem was in the M and P line walls between column lines C8 and C10 and elevations 680 to 687. These reports showed that six concrete cores were taken in the area of excessive SSD anchor failures and that three additional cores were taken from an adjacent area where the SSD anchor installation was acceptable. Visual examination of cores from the failure area revealed that a 1-inch layer near the surface was a different color than the remainder of the core. The color difference indicates a significantly different degree of hydration near the surface. Test results on these cores showed that the outer three inches of the concrete was slightly below design strength. Tests on the three cores taken from the area that was acceptable were above design strength. Proposed corrective action in NCR 1381 required that all 3/4 inch SSD anchors in the M and P line walls between column lines C8 and C10 and between elevation 680 and 687 be removed and replaced with wedge bolt or grouted anchors. The wedge bolts and grouted anchors are embedded deep enough to ensure that the reduced strength of the concrete surface will not affect their capacity. Examination of proof test reports for all anchors installed on the entire project during October, November, and December of 1980, showed that the failure rate for the remaining SSD anchors were within specification. Evaluation by design engineers showed that the slightly understrength surface condition will have no detrimental effect on the structural capacity of the walls.

Excessive failure of SSD anchors in the M and P line walls of the central building was identified again on July 15, 1982, in nonconforming condition report 1885. Concrete cores taken in the area of excessive SSD anchor failures showed that the outer surface of the concrete was understrength. The problem area was extended to cover all concrete in pour number C7-3a. Boundaries of this pour are between elevations 680 to 687, column lines C9 to C13 on the M and P line walls and the C13 wall connecting the M and P walls in the control building. Rework is currently underway to replace all SSD anchors with wedge bolt or grouted anchors. Future installation of SSD anchors in concrete walls from pour number C7-3a is prohibited.

Review of NCR 1381 and NCR 1885 disclosed the following violation: Procedures BNP-QCP-10.4, R10 EN-DES-EP1.2.6 and EN DES-EP2.02 require that nonconformances be evaluated for significance and also reportability to the NRC under 50.55(e) criteria. Procedures BN-QCP-10.4, R10 and EN-DES-EP 1.2.6 indicate an item shall be classified as significant if it requires or meets one or more of the following:

- a. Any item or condition requiring extensive redesign, repair, or rework.
- b. Any item or condition which, if uncorrected, could adversely affect the safety of plant operations, or could have generic implications at this and other TVA nuclear plants.
- c. Repetitions of a particular nonconformance. Repetitious nonconformances for an activity where a small rejection rate is considered normal or administrative matters such as late arrival of records from suppliers may not necessarily require upgrading unless the nonconformances are numerous.

Contrary to procedure requirements nonconformance number 1885, involving numerous failures of 3/4 inch SSD anchors in the control building M and P line walls, was not classified as significant, and was not reported to the NRC in accordance with 50.55(e) requirement. Extensive rework of SSD anchors is being done because of excessive failures of SSD anchors due to understrength surface concrete in the M and P, and C13 walls that were placed during pour number C7-3a. Failure of the anchors could lead to failure of safety systems being supported by the SSD anchors. The failure of the SSD anchors reported in NCR 1885 on July 7, 1982, is a repeat of the same problem identified in nonconformance 1381. This nonconformance which also identified numerous failures of SSD anchors in the M and P line walls of the control building was classified as significant and was reported to NRC Region II as reportable under 10 CFR 50.55(e) criteria. Failure to properly evaluate and classify NCR 1885 as significant and reportable to the NRC was identified to the licensee as violation 438, 439/84-09-01.

Findings

There is a problem with the concrete in walls between the auxiliary building and control building and problems were encountered with SSD anchors set in the concrete walls. The problem was identified by the licensee in two nonconforming condition reports and was identified to NRC Region II as a reportable item on March 10, 1981 for the first finding. Examination of licensee reports to the NRC and nonconformance reports 1381 and 1885 showed the problem is being properly addressed and corrected. Examination of NCR 1885 indicated that the licensee failed to properly evaluate, classify the significance and the reportability of NCR 1885. This was identified to the licensee as a violation of procedures BN-QCP-10.4 and EN DES-EP 1.26.