



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

Report Nos. 50-400/79-07, 50-401/79-07, 50-402/79-06, and
50-403/79-06

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

Facility Name: Shearon Harris

Docket Nos. 50-400, 50-401, 50-402, and 50-403

License Nos. CPPR-158, CPPR-159, CPPR-160, and CPPR-161

Inspection at Shearon Harris Nuclear Power Plant near Raleigh, North Carolina

Inspectors: *J. R. Harris* 5/17/79
J. R. Harris Date Signed
J. J. Lenahan P.E. 5/17/79
J. J. Lenahan Date Signed

Accompanying Personnel: O. Thompson, (NRR) (April 17 and 18 only)

Approved by: *J. C. Bryant* 5/17/79
J. C. Bryant, Section Chief, RCES Branch Date Signed

SUMMARY

Inspection on April 10-13 and 17-18, 1979

Areas Inspected

This routine, unannounced inspection involved 48 inspector-hours onsite in the areas of structural concrete; site preparation; dams; geologic faults; construction status; and licensee action on previous findings.

Results

Of the six areas inspected, no apparent items of noncompliance or deviations were identified in three areas; two apparent items of noncompliance were found in two areas (Deficiency- Failure to have accurate revolution counter on concrete transporting truck - paragraph 6, and Infraction - Failure to place embankment or fills at specified moisture content - paragraph 3); one apparent deviation was found in one area (Failure to control moisture content of powerblock fill reinforcement - paragraph 3).

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DETAILS

1. Persons Contacted

Licensee Employees

- *R. M. Parsons, Site Manager
- *N. J. Chiangi, Manager, Engineering and Construction QA
- ***G. L. Forehand, Principal QA Specialist
- *T. H. Wyllie, Manager of Nuclear Construction
- ***A. M. Lucas, Resident Engineer
- ***J. F. Nevill, Senior Engineer-Civil
- ***W. O. Pridgen, Junior Engineer-Civil
- *D. S. Canady, Geologist
- **S. D. Floyd, Licensing Engineer
- *R. G. Black, Licensing Engineer

Other Organizations

- I. Ciloglu, Geologist, Ebasco
- S. Harper, Geologist, Ebasco
- P. Shiebel, Geologist, Ebasco
- **M. Pavone, Civil Engineer, Ebasco
- **S. Goyah, Civil Engineer, Ebasco
- *W. D. Goodman, Construction Manager, Daniel Construction Company

*Attended exit interview April 13, 1979.

**Attended exit interview April 18, 1979.

***Attended both exit interviews April 13 and 18, 1979.

2. Exit Interview

The inspection scope and findings were summarized on April 13 and 18, 1979, with those persons indicated in Paragraph 1 above. The licensee acknowledged the noncompliance discussed in paragraphs 3 and 6 and the deviation discussed in paragraph 3.

3. Licensee Action on Previous Inspection Findings

- a. (Closed) Unresolved Item (78-08-04): Calibration of Laboratory Drying Oven and Liquid Limit Device. The inspector examined controlled tool calibration specifications and calibration data records for the above items. This item is closed.
- b. (Closed) Unresolved Item (78-08-05): Moisture control of Select Backfill Against Category I and Safety Related Structures. PSAR appendix 5 E states that material used as backfill against category I structures will be compacted to 95 percent standard proctor density at optimum moisture content. Discussions with responsible engineers and review of records indicate select backfill against Category I and



safety related structures has been controlled only at the specified density. No specified moisture content was used to control placement of select backfill. This item is closed as Unresolved Item 78-08-05 and upgraded to Deviation number 400/79-07-01, 401/79-07-01, 402/79-06-01 and 403/79-06-01, "Failure to Control Moisture Content of Powerblock Fill During Placement".

- c. (Closed) Unresolved Item (78-08-06): Moisture Control for Embankment Cores. Shearon Harris Specification CAR-SH-CH-4 and PSAR Appendix 2E specify that the moisture content of core fills at time of compaction be controlled to within plus or minus 2 percent of optimum. Discussions with responsible engineers and review of records indicate that embankment cores in the West Auxiliary Dam and Separating Dike have been placed using field control methods which allow moisture contents of plus or minus 4 percent of optimum. This item is closed as Unresolved item 78-08-06 and upgraded to Infraction Number 400/79-07-02, 401/79-07-02, 402/79-06-02, and 403/79-06-02, "Failure to Place Embankment Core Fills At Specified Moisture Content".

4. Unresolved Items

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

5. Independent Inspection Effort

- a. Safety related backfill. Discussions with NRR indicate that backfills against, around, under, and over Category I structures are safety related fills. Examination of the PSAR and discussions with responsible licensee engineers indicated that fill support for nuclear service water piping and diesel generator fuel pipe lines apparently are not addressed adequately in the PSAR. Some Category I piping appears to have been placed in areas not adequately evaluated for foundation support. NRR was represented on site during the inspection by Mr. O. Thompson. Mr. Thompson is reviewing the design basis for this item. This item was identified to the licensee as Unresolved Item 400/79-07-03, 401/79-07-03, 402/79-06-03 and 403/79-06-03, "Category I Piping Fill Support".
- b. Foundation preparation and geologic faulting in the main dam core trench. The inspector examined excavations for the left and right abutments, licensee identified faults and geologic mapping of faults. Faults examined included A₂, A₅, F₂, F₃ and an unclassified fault in the east abutment near dam centerline station 11+52. Faults A₂, A₅, F₂, and F₃ are considered to be incapable. The east abutment fault is still being investigated by the licensee. Findings on Faults A₂, A₅, F₂, and F₃ were discussed with T. Cardone of the NRR Geoscience Branch. Observations of faults are as follows:

- (1) A₂ strikes N34°E, dips 81°SE and is shown by 1-4 inch right lateral offset of quartz and epidote veins. The fault dies out at dam centerline Station 3+02 toward the northeast and near dam centerline Station 2+70 in the South wall of the core trench.
- (2) A₂ strikes N51°E, dips 85°SE and is shown by 4 1/2 - 5 inches of right-lateral separation of 2 pegmatite veins. The fault extends between dam centerline Stations 2+20 and 2+40. It crosses a pegmatite vein with no offset near dam centerline Station 2+34 and dies out at an epidote vein near dam centerline station 2+20.
- (3) F₂ strikes N64°E, dips 80°NW and is shown by 6 inches of left-lateral separation of a mafic vein. The fault terminates at a mafic dike near dam centerline station 2+20 toward the northeast and dies out near dam centerline station 1+97 toward the South. Two pegmatite veins cross F₂ showing no offset.
- (4) F₃ is located in the West wall of the conduit excavation opposite conduit centerline station 5+48. The feature is a normal near vertical fault striking N44°east. The fault is shown by 5 inches of normal offset of a 5 inch wide apalite dike. Previous mapping of the conduit trench shows that the fault crosses two northeast fractures with no offset and dies out 1 foot east of conduit centerline station 5+51. The final mapping and report on this fault will be examined in a future NRC inspection.
- (5) East abutment fault. This fault is located 17 feet upstream of dam centerline station 11+51. The fault has a north 68° east strike with a shallow northwest dip along a shistose layer. Faulting is shown by about 12 inches of left lateral separation of a 5 to 4 inch wide quartz vein. This fault is still being mapped and studied by the licensee. The final report and mapping will be examined in a future NRC inspection.

6. Containment (Structural Concrete I) - Observation of Work and Work Activities, Units 1, 2, 3 and 4

The inspector examined partial placement of pour number 1 w PSL 236 055 at elevation 236 in the waste process building (shared by 4 units). Acceptance criteria examined by the inspector appear in section 3.8 of the PSAR, Specification CAR-SH-CH-6, "Concrete" and Procedure WP-05, Concrete Placement.

Observations indicated forms were tight and leak proof and specified mixes were being delivered. Concrete was pumped with correct piping materials and tested at specified intervals and locations. Examination of inprocess testing data showed temperature, slump and air were within specified limits. The pour was continuously monitored by QC personnel and preinspection completion was shown by the signed pour card.

Observation of concrete at the pump delivery point disclosed the following noncompliance. Specification CAR-SH-CH-6, paragraph 12 states "Each truck shall be equipped with an accurate revolution counter". Truck number 30 did not have a working revolution counter at 6:00 p.m. A subsequent check by the inspector at 6:30 p.m. showed the revolution counter was repaired. Failure to have a working revolution counter was identified to the licensee as Noncompliance Item 400/79-07-04, 401/79-07-04, 402/79-06-04 and 403/79-06-04, "Concrete Truck Revolution Counters". Since the inspector observed that the concrete was placed within the specified time and since acceptance of pumped concrete is based on QC inspection at the point of placement rather than the truck delivery point to the pump this item is considered to be a deficiency.

7. Lakes, Dams and Canals - Observation of Work and Work Activities,
Units 1, 2, 3 and 4

The inspector observed partial placement of impervious fill in the west auxiliary dam core trench and results of fill operations in the separating dike. Acceptance criteria examined by the inspector were:

- a. PSAR Appendix 2E
- b. CAR-SH-CH-4, "Embankments, Dams, Dikes and Channels"
- c. Procedure TP-08, Soil Control Program - Class I Dams, Fill and Backfill"
- d. CQA-9, Soil Control

Observations indicated that impervious fills are being placed with field control methods which permit the moisture content to vary from plus or minus 4 percent of optimum. Appendix 2E of the PSAR and Specification CAR-SH-CH-4 state embankment cores shall be placed to within plus or minus 2 percent of optimum moisture content. As discussed in paragraph 3, this was identified to the licensee as an item of noncompliance.

During discussions on safety related fills (fills placed in around or against Category I structures) on April 18 between licensee representatives and NRC representatives from NRR and Region II I&E, the licensee indicated that a review of his records showed impervious fill in the separating dike had been placed at moisture contents outside of specified limits. The licensee indicated he was generating a nonconformance report and that fill operations were stopped.

Subsequent to the inspection, on April 19, Region II I&E discussed fill operations with licensee management by telephone. The licensee stated that he would discontinue placing of all safety related fills until procedures and specifications have been revised to permit control of specified compaction limits. Evaluation of fills placed outside specified limits will be reviewed by NRC I&E RII and NRR.