



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

Report No. 50-327/79-52

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

Facility Name: Sequoyah Nuclear Plant

Docket No. 50-327

License No. CPPR-72

Inspection at Sequoyah near Chattanooga, Tennessee and TVA Corporate offices, Knoxville Tennessee

Inspector: *A. R. Herdt* 10/23/79
 L. Modenos Date Signed

Approved by: *A. R. Herdt* 10/23/79
 A. R. Herdt, Section Chief, RC&ES Branch Date Signed

SUMMARY

Inspection on October 2-4, 1979

Areas Inspected

This special, announced inspection involved 20 inspector-hours onsite in the areas of concrete expansion anchors (IE Bulletin 79-02) and seismic analysis for as-built safety-related piping systems (IE Bulletin 79-14).

Results

Of the two areas inspected, no items of noncompliance or deviations were identified.

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DETAILS

1. Persons Contacted

Licensee Employees

- *G. G. Stack, Project Manager
- *J. E. Wilkins, Construction Engineer
- *R. C. Miles, Unit 1 Coordinator
- *E. Burke, EIIV - Construction
- *C. Wagner, Coordinator Unit 1
- *R. R. Funk, Civil Engineer
- *R. Guthrie, Civil Engineer

Other licensee employees contacted included construction craftsmen, technicians, and engineers.

NRC Resident Inspector

- *W. T. Cottle

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on October 3, 1979, with those persons indicated in Paragraph 1 above and October 5, 1979, by M. Gouge in Knoxville.

3. Licensee Action on Previous Inspection Findings

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. IE Bulletin 79-02, Concrete Expansion Anchors

In response to IE Bulletin No. 79-02, Tennessee Valley Authority (TVA) submitted their response to the Bulletin on July 5, 1979, for Sequoyah Nuclear Plant (SNP) Units 1 and 2. The response was reviewed by IE:Region II. Routine testing of anchors had been employed as prescribed by TVA General Construction Specification No. G-32. Out of 34,672 anchors installed, 11,555 had been tested, 126 failed the test resulting in a failure rate of 1.1%. The pull testing of the anchors had been done prior to installation of the support and without any visual inspection of shell and cone. This prompted NRC to ask TVA to select a sample of anchors to perform a visual inspection to verify proper installation. TVA submitted the following anchor inspection program: Identify in safety-related systems a

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minimum of 50 base plates that are readily accessible. A minimum of 120 anchors are to be inspected including at least 30 in each of the four sizes used. The inspection program to be performed and data recorded is to be performed in the same manner as at Browns Ferry Nuclear Plant (BFNP). Anchors outside of the acceptance criteria are to be pull tested to G-32 proof loads. If more than four anchors are found to be outside the anchor acceptance criteria, an additional 240 anchors, will be inspected including at least 60 in each of the four sizes used. This would be carried through until the acceptance criteria above is satisfied. The results of the inspection program were reviewed by the inspector which was identified by Construction Work Plan No. 4996 plus Attachment A "Program for Verifying Correct Installation of Self-Drilling Type Concrete Anchors in Unit 1 Safety-Related Piping/Duct Supports for Response to NRC IE Bulletin 79-02". Three out of 130 inspected failed the inspection, two cracked shells and one deep plug which failed the pull test. Fifteen additional bolts did not pass the minimum thread engagement requirements of G-32 which is one bolt diameter. Based on test data conducted at Singleton Laboratory for BFNP correlations of thread engagement of A307 bolts in self-drilling anchors to tensile capacity, the actual thread engagement to develop self-drilling anchors is:

<u>Bolt Diameter</u>	<u>Engagement to Develop Ultimate of Anchor</u>
1/2	.0.375 diameters
5/8	0.25 diameters
3/4	0.25 diameters
7/8	0.25 diameters

From this data SNP will submit a revised acceptance criteria of 60% diameters as the minimum thread engagement.

The NRC inspector selected the three identified failures and had the TVA inspectors perform a visual inspection on the remaining bolts on CVC-550 and CVCH-523, which identified the cracked shell and a pull test on CVCH-566 for the remaining two bolts on that plate which failed the pull test.

item 2 of the Bulletin requires a Factor of Safety (FS) for self-drilling anchors to be 5. SNP design for SSE loadings is 3.125 and 4.5 for OBE. NRR has discussed this problem with TVA and suggested that they could take credit for their high strength of concrete at the site rather than the 3000 psi used in their calculations. Taking into account for the higher strength concrete of about 6000 psi the FS will increase about 44%. Item 1 of the Bulletin requires that plate flexibility be accounted for in the calculation of anchor bolt loads. TVA originally assumed rigid supports, now that flexibility is considered the FS is reduced by 25%. Therefore between the increase of higher strength and the decrease of the plate flexibility the final FS is 3.87 for SSE and 3.96 for OBE which is still below 5. TVA will

submit a test program to justify their present factor of safety. This IE Bulletin 79-02 remains open until all inspections and evaluations are completed and evaluated by the NRC.

No items of noncompliance or deviations were identified.

6. IE Bulletin 79-14, Seismic Analysis for As-Built Safety-Related Piping Systems

In response to IE Bulletin 79-14, TVA submitted their response for SNP on September 7, 1979. TVA initiated within the last six months a final verification through a system of written procedures and documentation that all safety-related piping is installed such that piping analyses will correspond to actual piping configuration. When the installation of piping system is complete to the point of tentative or final transfer to TVA Power Production, the as-built configuration is noted on the drawings and sent to EN-DES for final justification.

SNP has completed approximately 97% as-built walk down checks for piping configuration. Approximately 1200 supports remain to be checked with about 500 supports to be installed. All of the above supports and piping configurations have to be completed and checked prior to startup of the unit.

The following SNP procedures were reviewed:

SNP Inspection Instruction No. 63 "Piping Inspection" Rev. 7

SNP Inspection Instruction No. 36 "Orientation and Alignment" Rev. 6

SNP Inspection Instruction No. 42 "Valve Installation Inspection" Rev. 9

The following NCRs which identify piping problems referred to design for disposition and SMR support modification requests were reviewed and traced down for final engineering evaluation and disposition.

NCR 1840 dated 9/27/79

NCR 1418 dated 3/15/79

NCR 1722

SMR 1063 dated 9/27/79

SMR 1070 dated 3/8/78

This IE Bulletin 79-14 remains open until all inspections and evaluations are completed and evaluated by the NRC.

No items of noncompliance or deviations were identified.

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