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TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

September 30, 1980

Mr. James P. O'Reilly, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region II - Suite 3100
101 Marietta Street
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

PHIPPS BEND NUCLEAR PLANT - REPORTABLE DEFICIENCY - HIGH PRESSURE
CORE SPRAY DIESEL GENERATOR SWITCHGEAR WIRING DISCREPANCIES (NCR
PBNP-033)

Initial notification of the subject deficiency was made to NRC-OIE,
Region II, Inspector F. S. Cantrell on August 2, 1979. The first,
second, third, fourth, and fifth interim reports were submitted on
August 29, December 12, 1979, February 25, April 25, and June 27,
1980, respectively. In compliance with paragraph 50.55(e) of 10 CFR
Part 50, we are enclosing the final report on the subject
deficiency. We consider 10 CFR Part 21 applicable to this
reportable deficiency. If you have any questions regarding this
subject, please call Jim Domer at FTS 857-2014.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L M Mills
L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosure

cc: Mr. Victor Stello, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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ENCLOSURE
PHIPPS BEND NUCLEAR PLANT
HIGH PRESSURE CORE SPRAY DIESEL GENERATOR SWITCHGEAR
WIRING DISCREPANCIES
10CFR50.55(e) REPORT NO. 6 (FINAL)
NCR PBNP-033

On August 2, 1979, TVA notified NRC-OIE Region II, Inspector F. S. Cantrell, of a reportable condition under 10CFR50.55(e) regarding wiring discrepancies discovered in high pressure core spray (HPCS) diesel generator (DG) control switchgear for both units of the Phipps Bend Nuclear Plant.

TVA previously reported similar problems in HPCS DG switchgear for the Hartsville Nuclear Plant (NCR HNP-A-021) and our final report to you on that deficiency was dated March 7, 1979, from J. E. Gilleland to James P. O'Reilly. This condition was also reported to your office by Power Systems Division of Morrison-Knudson Company, Incorporated, by letter dated April 7, 1980, under 10CFR21. This is the final report on the subject reportable deficiency.

Description of Deficiency

TVA site personnel at Phipps Bend Nuclear Plant performed a wiring check on the two sets of HPCS DG switchgear as a result of their followup on corrective actions taken as a result of the previously mentioned Hartsville Nuclear Plant deficiency. As a result of this wiring check, TVA found similar discrepancies as reported for the Hartsville Nuclear Plant HPCS DG switchgear and found the switchgear wiring contained evidence of poor workmanship such as a wire pulled out of a terminal, inadequate terminations, loose and broken soldering joints, cables with considerable wear or several strands of conductor cut, and other items which were in nonconformance with the equipment procurement specifications. Work which was done to correct the discrepancies also uncovered several instances where the wiring was functionally correct but the wiring drawings did not match the as-built wiring configuration.

The DG control switchgear was fabricated by International Controls and Switchgear (IC&S), Rocky Mt., North Carolina, for Morrison-Knudson Power Systems Division, Rocky Mt., North Carolina, under subcontract from GE who supplied these components to TVA as part of the NSSS package for the Hartsville and Phipps Bend Nuclear Plants.

The cause of this deficiency is a QA breakdown at Morrison-Knudson and their subvendor, IC&S. All wiring discrepancies on the subject components should have been corrected as part of the corrective actions described in our final report on NCR HNP-A-021. GE determined that the vendor, Morrison-Knudson, tested the Phipps Bend unit 2 switchgear as committed to in the final report on NCR HNP-A-021, but the test evidently addressed only those items specifically identified in the NCR and did not include a 100-percent "ring out" of all wiring as it should.

Safety Implications

The list of wiring discrepancies on the subject NCR contains items which could potentially prevent the components from functioning as intended. These conditions could have degraded the performance of the safety function of the HPCS system if the discrepancies had remained uncorrected and could have adversely affected the safety of operation of the facility.

Corrective Actions

TVA checked each of the Phipps Bend HPCS DG control switchgear panels against the latest revision of the wiring connection diagrams. TVA found discrepancies involving wiring which did not match the connection diagrams (discrepancies involving both hardware and software). GE-Engineering in San Jose evaluated the TVA listing of discrepancies and concurred with the TVA findings and, subsequently approved the documentation necessary for rework of these components.

Representatives from GE-San Jose, Morrison-Knudson, and IC&S met at Phipps Bend Nuclear Plant beginning February 25, 1980, to thoroughly investigate and resolve the discrepancies and to do a 100-percent "ring out" of all wiring on the two Phipps Bend units. Since then, over 90 percent of the discrepancies noted in the nonconformance report (PBNP-033, Revision 1) have been corrected. The 100-percent "ring out" of wiring also uncovered a few more minor discrepancies which have been or will be corrected. The only other corrections (due to conditions listed on the NCR) remaining to be made involved replacing some rpm indicating lights on the engine control cubicles for both units. Additionally, two drawings (which were found to be in error and revisions marked in the field) have not been received "officially" at Phipps Bend as revised.

Remaining hardware corrections will be completed by January 30, 1981. Software changes, including drawing corrections and corrections to the bills of material necessary to resolve these discrepancies, will be completed by June 30, 1981. Since all wiring discrepancies have been identified, no further testing of these components will be performed at this time other than that associated with the Receiving Inspection Storage and Preventive Maintenance program.

As a result of these deficiencies, Morrison-Knudson has removed IC&S from their authorized supplier list. In addition, they have revamped two comprehensive internal procedures involving switchgear manufacturing and inspection. These procedures stress workmanship and acceptance criteria and cover general electrical work.

The Phipps Bend Nuclear Plant electrical QC unit investigated wiring of HPCS motor control centers and DG air compressor skid units to determine if discrepancies exist similar to those found at Hartsville and reported to R. W. Wright as NCR's HNP-A-085 and HNP-A-086. These investigations included only those items listed on the Hartsville NCR's and no significant discrepancies were found. Any significant discrepancies encountered in the future on these other components will be reported separately.