

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

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November 29, 1985

BLRD-50-438/85-20

U.S. Nuclear Regulatory Commission
Region II
Attn: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Dr. Grace:

BELLEFONTE NUCLEAR PLANT UNIT 1 - DIESEL GENERATOR EXHAUST SILENCERS
IMPROPERLY ANCHORED - BLRD-50-438/85-20 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector S. Weise on July 2, 1985 in accordance with 10 CFR 50.55(e) as NCR 4353. This was followed by our first interim report dated August 1, 1985. Enclosed is our final report.

If you have any questions, please get in touch with R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. W. Hufham
J. W. Hufham, Manager
Licensing and Risk Protection

Enclosure

cc: Mr. James Taylor, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center (Enclosure)
Institute of Nuclear Power Operations
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ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNIT 1
DIESEL GENERATOR EXHAUST SILENCERS IMPROPERLY ANCHORED
BLRD-50-438/85-20
NCR 4353
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

In reference to NRC Information Notice 85-25, "Consideration of Thermal Conditions in the Design and Installation of Supports for Diesel Generator Exhaust Silencers," and to 10 CFR 50.55(e) nonconformance report (NCR) BLN 3615 (CDR/BLRD-50-438/84-55, BLRD-50-439/84-51), "Deficient Category I Components and Miscellaneous Steel," a reinspection of the Unit 1 Diesel Generator Exhaust Silencers Foundations was conducted by TVA personnel. The following conditions and drawing discrepancies were identified:

1. Hairline shrinkage cracks were noted along the concrete surface of the support foundation.
2. Some of the 1" diameter MK5 anchor bolts did not have the designated 4-1/2" projection above the concrete surface of the support foundation. Therefore, the anchor bolt nuts do not have full thread engagement and/or a jam nut installed, as called for by design drawings. (The cause of this deficiency was a failure of construction personnel to install the items as referenced in design drawings.)
3. The anchor bolt nuts should be loose to allow movement to accommodate thermal expansion but were found to be tightened. (The cause of this deficiency was due to construction personnel not using the required mechanical drawing to set the equipment and to the lack of clear requirements on design drawings delineating the tightness of nuts.)
4. Due to dirt, grout, and insulation, the physical conditions of the slotted connections appear to prevent the required sliding movement to accommodate thermal expansion. (This deficiency was caused by a high level of construction activity in the area of the diesel generator exhaust silencers.)

Safety Implications

The identified deficiencies could cause shearing of the anchor bolts or cracking of the concrete support pedestal. This exhaust silencer support failure could happen because of a lack of support sliding movement to accommodate thermal expansion.

Exhaust silencer support failure could lead to detrimental movement of the exhaust silencer during emergency operation of the diesel generator. This movement could crimp the exhaust system to such an extent that the unwarranted shutdown or power reduction of the diesel generator could potentially occur. In the event of a loss of offsite power, the plant would be without an adequate source or capacity of ac electrical power due to this potential common-mode failure such that the plant could not be safely shut down. Station blackout is beyond the design basis of the plant. Therefore, if this condition had remained uncorrected, the safe operation of the plant could have been adversely affected.

Corrective Action

All dirt, grout, and insulation were removed, and the nuts were loosened on the anchor bolts by TVA during preparation for an operational test of the diesel generators. When these "housekeeping" modifications were made, the sliding connections functioned properly. The only other modifications performed were the tack welding of the nuts to the anchor bolts in the loosened position and an anchor bolt splice for extending the anchor bolts which did not have enough projection to provide full-thread engagement. The use of a jam nut will no longer be required--but is optional. TVA has revised drawing 4DW0783-X1-2 to provide a splice detail for the short bolts and to include tightness requirements for the nuts.

To prevent recurrence of this deficiency, the following actions were taken by TVA, corresponding to the conditions noted in the Description of Deficiency:

1. The hairline shrinkage cracks on the surface of the support foundation were evaluated and considered not detrimental to the integrity of the foundation; therefore, action to prevent recurrence is not required.
2. Quality Control and Engineering functions were separated in 1983, enabling more emphasis being given to quality installations through training programs and enhancement of Quality Control Procedures (QCPs). Additionally, QC units routinely perform self-audits of finished inspections to determine areas where more training emphasis is required. Also, in August 1984, craft personnel began formalized training in QCPs. This training uses a modular-package concept for presentation and should improve the quality of craft installations.

3. The investigation conducted concluded that this was an isolated instance; however, to prevent recurrence, Bellefonte Civil Design Group has been instructed to adhere to the following guideline in the future detailing of equipment anchorages: "If the anchorage details for electrical and mechanical equipment are not shown completely on the civil/structural drawings, the applicable electrical or mechanical drawings, showing the details, must be referenced on the civil drawings."
4. Action to prevent recurrence is not required in relation to dirt, grout, and insulation on the silencer slotted connections, since this was due solely to a high level of construction activity in the area of the diesel generator exhaust silencers. Bellefonte's normal housekeeping and preventive maintenance procedures will preclude recurrence of this condition.

TVA is now in full compliance.