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Docket No. 50-346

MEMORANDUM FOR: Thomas A. Ippolito, Chief, Electrical, Instrumentation and Control Systems Branch, DSS

FROM: Andrew J. Szukiewicz, Electrical, Instrumentation and Control Systems Branch, DSS

THRU: Charles F. Miller, Section Leader, Electrical, Instrumentation and Control Systems Branch, DSS

SUBJECT: SUMMARY OF SITE VISIT HELD ON OCTOBER 6, 7, AND 8, 1976, AT DAVIS BESSE UNIT NUMBER 1

The NRC Staff conducted a Site Visit at the Davis Besse Unit 1 plant to assure that the installation of safety related electrical systems and equipment were implemented in accordance with the design described and the criteria specified in the FSAR. Attached as Enclosure 1 is a list of attendees. Enclosure 2 summarizes the major points of observation and identifies the concerns expressed by the NRC Staff and their resolutions. The first day (October 6, 1976) we concentrated on the control room safety related equipment which included review of the plant protection systems and associated cable routings in vertical control panels and the main control console.

The second day (October 7, 1976) we concentrated on review of systems and equipment in the general plant areas, i.e., equipment inside containment, diesel generator rooms, and auxiliary building.

The third day (October 8, 1976) we concentrated on review of the service water system and the intake structure. At the conclusion of our visit we met with the applicant to summarize and discuss our findings.

This Site Visit supplemented our initial Site Visit of October 15, and 16, 1975, (refer to Trip Report Summary dated November 5, 1975) and completes this phase of the review process.

Contact:
A. J. Szukiewicz
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Thomas A. Ippolito

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It is recommended that the LPM transmit the concerns expressed in Enclosure 2 to the applicant for resolution in order to expedite our review.

JS

Andrew J. Szukiewicz
Electrical, Instrumentation
and Control Systems Branch
Division of Systems Safety

Enclosures:
As Stated

DISTRIBUTION: See Attached

DISTRIBUTION

DOCKET FILE
EIC READING FILE
NRR READING FILE
A. J. SZUKIEWICZ

OFFICE →	PS:EICSB <i>JS</i>	PS:EICSB <i>JS</i>	PS:EICSB <i>JS</i>			
SURNAME →	AJSzukiewicz	CFMiller	TAIppolito			
DATE →	11/2/76	11/2/76	11/4/76			

ENCLOSURE 1

List of Attendees During Site Review

Davis Besse Unit 1

M. Calcamuggio	TEC
E. Novak	TEC
L. Engle	NRC
C. Miller	NRC
A. Szukiewicz	NRC
O. Chopra	NRC
F. Miller	TEC
L. Lesniak	B&W
G. Hurrell	TEC
R. Bins	TEC
D. Douds	Bechtel
G. Schoenbaum	Consolidated Controls Corp.
D. Roosevelt	Consolidated Control Corp.
B. Novich	Bechtel
L. Wise	Bechtel
F. Jablonski	NRC
V. Howard	Bechtel
R. Yamrus	Bechtel
V. Marathe	Bechtel
F. DiVito	Bechtel
S. Saba	Bechtel
S. Cantor	Bechtel

ENCLOSURE 2

DAVIS BESSE UNIT 1 SITE VISIT

October 6, 7, and 8, 1976

1. The Plant Protection Logic System cabinet installations were reviewed in detail. Representatives from Consolidated Controls Corporation and Babcock and Wilcox were available to discuss the details of their respective systems [i.e., the Engineered Safety Features Actuation System (ESFAS), the Steam and Feedwater Line Rupture Control Systems, and the Reactor Protection System (RPS)]
2. Selected inter-cabinet cable routing (Cable 13 RPS MD1E, 23 RPS MO1C, and 23 RPS MO3E) was checked to verify that they were routed within their designated wireways. Non-safety cable ALNNI235D was checked to verify that it was routed in accordance with the separation criteria stated in the FSAR. No apparent violations to the separation criteria were detected.
3. It was observed that there was no "half-trip" status indication at the main control panel to alert the operator of the status of the SFRCS. The applicant verified that provisions for "half-trip" status will be provided in the control room and that this condition will be alarmed.
4. It was observed that means for manual initiation of system level inoperable status or bypass indication did not fully meet the objective of Regulatory Guide 1.47, Section C.4. Specifically, manual initiation of systems level inoperable status or bypass indication of the Containment Isolation System was not provided.

The applicant agreed to provide manual initiation of inoperable status indication for this subsystem. In addition, he was requested and agreed to review his design to assure that manual initiation of inoperable status or bypass indication is provided for safety related systems. The licensee will amend the FSAR to include (1) a detailed description of their system and (2) identify the safety systems accounted for in their design. The present design provides indication for the following systems:

- A. Auxiliary Feedwater System,
 - B. Component Cooling System,
 - C. Service Water System,
 - D. High Pressure Injection System,
 - E. Low Pressure Injection System,
 - F. Containment Spray System,
 - G. Core Flooding System,
 - H. Emergency Ventilation System,
 - I. Borated Water Storage System,
 - J. Containment Air System,
 - K. Containment Radiation System, and
 - L. Control Room System.
5. The staff's concern regarding faults (i.e., grounding, shorting, application of high voltage, or electro-magnetic and radio frequency interference [noise]) on non-Class 1E circuits being propagated through to the safety grade equipment was readdressed.

(Refer to memorandum for T. A. Ippolito from A. J. Szukiewicz, dated July 29, 1976.) The applicant agreed to submit test procedures and results which would demonstrate that such faults would not degrade the safety systems below an acceptable level. In lieu of actual test conducted on the as-installed design, the applicant agreed to provide test procedures and test results that were previously conducted by the protection system suppliers (i.e., Consolidated Control Corporation and Babcock and Wilcox). We stated that this could be a viable approach, provided that the tests enveloped the actual as-installed design conditions. The applicant concurred that such a response will be provided.

6. Separation between redundant Class 1E and non-Class 1E circuits within enclosures (i.e., vertical panels, main control console) was reviewed and found unacceptable. The applicant agreed that where redundant safety channel cables exist inside these enclosures, and bridging between safety channels via non-safety cables (i.e., train A and/or B, and/or C) also exist. These safety channels will be fully covered with suitable fire barrier material (i.e., flamastic, silica gel or equivalent). The applicant stated that these types of installations only exist in the control room. However, in the event that these conditions exist in enclosures outside the control room the above requirement is applicable. The applicant agreed to document this required criteria in the FSAR.
7. Diesel generator installation was reviewed and found acceptable. The applicant agreed to provide the following:

- A. The hand control valves on the oil supply lines to the motor and the engine on each diesel generator will be padlocked open. The padlock key will be controlled via specified administrative procedures.
 - B. Covers on the hydraulic governors will be provided to assure that the control settings would not be inadvertently actuated.
 - C. Submit drawing E64B, sheet 8, revision 0 as part of the FSAR to show that the design as implemented does not utilize thermal overload relays in the control circuit of the soak back pump.
8. The following valves which are required to conform with EICSB Branch Technical Position 18 were reviewed (i.e., DH1A, DH1B, DH14A, DH14B, MOV 599, and MOV 608). The detailed schematics describing their circuit design have been submitted in a recent amendment to the FSAR (i.e., drawings E52B, sheet 60, revision 0, E52B, sheet 25A, revision 4, E44B, sheet 4C, revision 5, and E44B, sheet 4D, revision 8). We conclude that the design satisfies the Commission's requirements and is acceptable. Redundant position indication was verified to be run in separate raceways. The applicant was requested and agreed to revise their previous response to our position P7.1.1-1 (stated in the FSAR) and include all these valves in the listing.
9. The Borated Water Storage Tank level channels were reviewed. The design as described provides independent heat tracing for each of the four level transmitters. The heat traced circuits are

routed in separate and independent raceways from the level control signals. No heat tracing on the outlet lines have been provided since there is continuous recirculation of the liquid in these lines. We conclude that the design is acceptable.

10. Auxiliary Shutdown Panel System design was reviewed. Separate and independent, fully enclosed subsections provide terminations for the required redundant equipment systems. Fire stop seal (not yet installed) will be provided at the interconnection of the two subsections where a common grounding bar is routed. The applicant stated that the manual auxiliary feedwater isolation valve switches and the switches controlling the valves on the steam inlet to the auxiliary feed pumps will be removed because they will be controlled automatically by the SFRCS system. This information has apparently been documented in the FSAR. We concluded that the design for this system is acceptable. The applicant agreed that the adequacy of the isolation devices used in the shutdown panel will be addressed in the applicant's response to Item 5.

11. Cable routing of redundant circuits in manhole 3001 was reviewed. Barriers between redundant circuits have not been provided. The applicant verified that barriers in these locations will be provided in accordance with the approved separation criteria.

Water was observed to be standing in these manholes. The applicant verified that adequate drains are provided and although

not visually apparent, a sump pump was located in these manholes. In response to the staff's concern regarding the effects on the cable insulation due to the wetting and drying cycles resulting from water collecting in these manholes, the applicant stated that these types of installation are common in large utility installations and that such effects are negligible. The applicant is requested to submit data to substantiate these assumptions.

12. All control rod drive power supply breakers have not been completely installed. However, each of the four a-c breakers are located in separate and independent rooms. All cables terminating at the breakers are routed in solid metal conduits. Although the applicant has committed (verbally and apparently in a recent amendment to the FSAR) to provide unique identification of the conduits at intervals along their entire length. This design feature has not yet been adequately implemented. The applicant was requested to implement these requirements quickly in order to aid our inspection and enforcement personnel in their review efforts.

13. Intertie scheme between redundant 480VAC buses (i.e., F11A and E11B) was reviewed. The applicant agreed to submit a description of this design in the FSAR to include their criteria for the cable routing and identification of this system. The cable routing interconnecting the redundant buses will be designated Channel 1 and 2. The applicant also verified that the breakers associated with this intertie (i.e., breakers BF1135 and BE1153)

will be removed from their motor control center cubicles during normal power operation and that these cubicles will be padlocked closed. Access to these cubicles will be under strict administrative control. We conclude that this design is acceptable.

14. The applicant was requested and agreed to provide a physical drawing of the Main Steam Isolation Valve solenoid control valve arrangement, describing channel separation and barriers. The cable routing of selected sensors used in the Main Steam Line Isolation System was reviewed. Separation criteria between redundant trains was verified.
15. It was observed that all four redundant reactor coolant flow transmitters (in each loop) shared a common process sensing line. The staff expressed concern that such an installation was in violation with the design criteria (i.e., a single failure should not cause loss of a protection feature) and therefore unacceptable. The staff requires that the applicant modify this design to conform with the design requirements and submit the modified design for our review.
16. Separation criteria for wireways and metal conduits (recently submitted in Amendment 36 of the FSAR) was reviewed with the applicant. It appeared that the criteria presented in this amendment was significantly different from the criteria presented previously to us and to the NRC staff in the field. Satisfactory resolution of the concerns expressed by the staff could not be reached. A forthcoming meeting on October 28, 1976, will be held

in Bethesda, Maryland, with the applicant to resolve these concerns. The applicant was requested to submit their basis of acceptability for this design.

17. The staff expressed concern regarding the adequacy of the level indication system for the service water intake canal. Subsequent to the meeting, the staff concluded that redundant level instrument channels of high quality are required. Each redundant level instrument channel should be routed independently and powered off independent power supplies with level indication provided in the main control room. The applicant is therefore requested to modify their design and conform with the above requirements and submit the modified design for our review.

18. It was agreed that F. Jablonski of I&E will follow-up the system design identified in Items 3, 5, 6, 11, 12, 14, 15, 16, and 17 to assure that the final as-built design was implemented in accordance with the staff's requirements.