

Docket No. 50-346

License No. NPF-3

Serial No. 1039

April 3, 1984



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Director of Nuclear Reactor Regulation
Attention: Mr. John F. Stolz
Operating Reactor Branch No. 4
Division of Operating Reactors
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Stolz:

On December 13, 1983 a meeting was held between Toledo Edison and the NRC Staff to discuss the resolutions of the deficiencies identified in the Technical Evaluation Report (TER) for Environmental Qualifications for Safety-Related Electrical Equipment (February 8, 1983 Log No. 1211). The enclosures contain the generic issues, resolution of the open items and identified Justifications for Continued Operations (JCO) for the Davis-Besse Nuclear Power Station Unit No. 1.

Enclosure 1 contains the agenda of Generic Issues discussed at the December 13, 1983 meeting. Enclosure 2 (Category I.B), 3 (Category II.A), 4 (Category II.C) and 5 (Category IV) contain the identified TER components with their deficiencies. The enclosures describe each of the components/manufacturers with the detailed method of resolution as discussed in our December 13, 1983 meeting.

During the meeting, two items (Amphenol penetrations and ASCO Solenoid Valves) were identified for which the Staff requested JCOs. An Amphenol penetration test report was located and provided resolution to the question of qualification. The ASCO Solenoid Valves JCO is contained in Enclosure 6 and was reviewed by the Staff on December 22, 1983. The JCO for the ASCO Solenoid Valve was found to be acceptable as was our response concerning the Amphenol penetration qualification.

Revision 2 to the Davis-Besse Environmental Qualification Manual was submitted on November 29, 1983 (Serial No. 1009). This includes data and analysis performed to resolve the TER concern and additional data on the continuing qualification of certain specific items. We believe that the environmental qualification documents maintained in our central file comply with the requirements of 10CFR50.49.

Very truly yours,

RPCrouse/jm

RPC:GAB:lah

cc: DB-1 NRC Resident Inspector

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ENCLOSURE 1

Generic Issues

Introduction

In the Franklin Research Center, "Davis-Besse-1 TER"; Section 4.3 provided the review of the "Methodology Used by the Licensee." This review concluded that satisfactory response to the NRC concern has been provided for the following items:

- 4.3.1 Completeness of Safety-Related Equipment List
- 4.3.2 Containment Spray System (not subject to a disabling single - component failure)
- 4.3.3 Environmental Service Conditions
- 4.3.4 Chemical Spray
- 4.3.5 Submergence (including flooding outside containment)
- 4.3.6 Aging and Qualified Life

Concerns have been raised with respect to certain generic issues which have been discussed below.

Individual Generic Issues

G-1 Inadequate Aging and Radiation Analysis

In some cases there were comments in the TER concerning the aging and radiation materials analysis. The concern was that radiation values presented were not properly evaluated for the property of interest. Regarding aging, the concern was that the qualified life was not properly evaluated.

To address these issues TED has performed a comprehensive aging and radiation review of the DB-1 EQ Manual. All materials analysis and the test reports were reviewed for radiation qualification. Similarly, materials analysis and test reports have been reviewed for thermal aging qualification. The detailed methodology used in the performance of this effort has been included in the revised EQ Methodology report. The results are included in Revision 2 to the TED EQ Manual submitted on November 29, 1983 (Serial No. 1009).

The TER comment, "the Licensee referenced two generic documents as a basis of radiation and thermal aging qualification for many items. These are Modern Plastics Encyclopedia and "The Use of Plastics and Elastomers in Nuclear Radiation," by Parkinson and Sissman. While these documents are useful for screening qualifiable materials, they are not adequate as a basis of environmental qualification."

For thermal aging, the temperature index data from the Modern Plastics Encyclopedia is not being used as the basis for environmental qualification. Such information is used as an input to the Arrhenius aging calculation only in a few cases where aging test data is not otherwise available.

For radiation aging, the Parkinson & Sissman paper was used with a number of other sources to evaluate the degradation effects taking into account the specific engineering properties of interest.

G-2 Qualification by Analysis

The TER comment stated that the Static-O-Ring pressure switches were required to function in the harsh environment and only a materials analysis was provided.

Qualification by analysis is allowed per IEEE standard 323-1974, DOR Guidelines, and the final rule 10CFR 50.49(f). In accordance with these provisions certain components have been qualified by analysis which is based on test information.

The switches are located in Rooms 500 & 501 which have peak temperature and pressure conditions of 249°F and 0.9 psig and 267°F and 0.9 psig respectively during a High Energy Line Break (HELB). Conditions return to ambient in 18 minutes. There is no accident radiation dose contribution in this room.

A materials analysis was performed on the list of materials provided by the manufacturer (Static-O-Ring). The materials analysis showed that the polyvinyl chloride (PVC) wire insulation was the material most sensitive to thermal degradation.

Considering that the ambient room temperature during the HELB exceeds the continuous service temperature of the most limiting material of the switch (150°F), it is still felt that the switch can tolerate this momentary excursion (300 seconds). The decomposition temperature of the PVC is 298°F below which the electrical properties of the switch are retained and the switch function will not be impaired. Furthermore the PVC is located within the airspace of the switch which will afford some thermal insulation for the switch internals. These pressure switches are pressure sensing inputs to the Steam and Feedwater Rupture control system sensing main steam line 1&2 pressure. The steam lines are located in Rooms 601 and 602 (Auxiliary building elevation 643' while the switches are located in rooms 500 and 501 directly below on elevation 623'. The harsh environment postulated to occur in rooms 601 and 602 is due to a HELB in the 36 inch main steam lines while the harsh environment in rooms 500 and 501 is due to a HELB in a 6 inch main steam line.

The pressure switches are housed in aluminum gasketed enclosures rated as NEMA-4. The wiring to the switches is via qualified conax electric seal assemblies to ensure the integrity of the switch housings. The enclosure which is rated NEMA-4 is capable of satisfactorily excluding water when subjected to a water stream of 65 gpm from a one inch nozzle from a distance of 10 feet for 7.5 minutes. The impingement pressure on the seal during this test would be 1.2 psig. Therefore the sealing capability of the enclosure by virtue of its NEMA-4 rating exceeds the postulated peak room pressure of 0.9 psig which could occur as a result of the postulated HELB.

Maintenance instructions will be revised such that the gasket seal on these pressure switches is inspected at each switch calibration. If the gasket is found to be degraded then the switch would be refurbished. The qualified life of the gasket seal is 36.5 years at 104°F based on Arrhenius calculation. These switches are included in the surveillance and maintenance program which will ensure that sufficient inspections and maintenance are performed to prevent age related or environmental failure.

Based on this we conclude that by analysis, the Static-O-Ring Pressure Switches (SFRCS inputs) are qualified.

G-3 Change of Qualification Status

The qualification status of certain components have changed since the issuance of the EQ Annual Rev. 0. These are as follows:

- A. Exemption of certain solenoid valves due to the argument that the failure of the solenoid valves would cause the solenoid valves to go to their fail-safe position. Main steam isolation solenoid valves and main steam line warm-up drain solenoid valves should not be exempted. The MSIV and main steam warm-up line solenoid valves have been scheduled for replacement by 11-30-84 (schedule was provided in May 20, 1983 submittal).

As previously submitted with regard to the ASCO Solenoid Valves, we have additional analysis to justify continued operation. The solenoid valves in question are those which when dennergized close the Main Steam Isolation Valves (MSIV) to prevent the blowdown of two steam generators and thus maintain heat removal capability.

A test has been conducted on ASCO solenoid valves HTX8320A20V by General Electric, which are identical to those installed at Davis-Besse. The results of this test (Rockwell Test Report #2792-03-02, Rev 1) show that the valves survive in an harsh steam environment at 340°F for 2 hrs. Room 601 temperature peaks at 280°F for 1sec and stabilizes at 200°F for 50sec then decreases to ambient temperature in 7000sec. Room 602 temperature peaks at 344°F for 1sec and drops to 210°F at 2sec and stabilizes for 50sec then decreasing to ambient temperature in 3400sec. This time period and temperature profile will allow the valves to perform their intended safety function.

The design is such that if any solenoid valve should fail due to a steam line break (by moving to its fail safe position, or by not moving at all) it will not prevent the MSIV from closing. Therefore we can sustain a failure of the single solenoid valve.

In addition, further analysis was performed to show that should multiple failures of solenoid valves occur due to a main steam line break; and prevent the MSIV from closing, we would still be able to isolate the unaffected steam generator from the worst case main steam line break (a break between the containment and an MSIV.)

This analysis utilizes a previous study performed on the Non Return Valve which shows that it will close and not fail should such an event occur. This provides two valve isolation (Main turbine Stop Valves and the Non Return Valve) to mitigate this event.

NUREG 0136 "Davis Besse Nuclear Power Station Unit 1 Safety Evaluation Report" December 1976 Section 10.3 "Main Steam Supply System" pg 10-2 contains statements on the Non-Return Valves. "Pneumatically operated, non-return valves downstream of the isolation valves, prevent reverse flow. These valves close automatically upon closure of the main steam isolation valves. They can also be remote manually operated from the main control room. We have reviewed the main steam system design and conclude the system is acceptable." Therefore, we believe that the non-return valves will perform their function.

There are two other ways to detect smaller steam line break in the main steam line Rooms 601 and 602. The first would be by the fire detection system located within each room. Room 601 has 34 detectors and 602 has 8 detectors. All detectors are ionization type. Any steam reaching these detectors would actuate the fire alarm for the associated room. These detectors are maintained in accordance with our Fire Protection Program. This has been verified every time the steam safety valves or atmospheric vent valves actuate which causes a steam environment in Rooms 601 and 602. The second method is provided by the sound from the steam leak.

When the operator determines there is a steam leak, the following actions will be taken:

1. If personnel safety is in question the operator will trip SFRCS manually which trip the reactor and closes MSIV's.
2. If the steam leak is small and no personnel safety is involved the operator will shutdown the plant in a controlled manner.

This provides justification for continued operation until the affected solenoid valves can be replaced with qualified solenoid valves during our 1984 refueling outage.

The main steam line 1 and 2 warm-up drain isolation valves SV375 and SV394 (208H-025 and 208H-026) are 3 way solenoid valves which control the air to air operated valves HV394 and HV375. These Air Operated Valves (AOVs) control the flow of steam and condensate through 1 1/2 inch lines to a common 2 inch line and then to the condenser. The three way solenoid valves are normally energized and must deenergize to spring to the vent position to vent the air from the warm-up drain air operated valve diaphragms closing the AOVs.

Two Emergency Ventilation System components have been added to the EQ Manual in Revision 2 and are scheduled to be relocated. These are:

1)	PDY5000A	222H-028
2)	PDY5000B	222H-029

JCO has been provided for these two components. This JCO is similar to that for the Bailey controller and the Foxboro current repeater which was judged to be acceptable by the FRC TER evaluation.

- B. The items listed below are no longer scheduled for modification or replacement because additional data has been collected to demonstrate qualification by a combination of testing and analysis. Rev. 2 of the E.Q. manual reflects this.

Items which are no longer scheduled for replacement

1)	Rees Pushbutton Switch	221H-159 221H-246 221H-258
2)	Rosemount Transmitter	220H-007 220H-011
3)	Limitorque Operators	210H-014 210H-015
4)	Barksdale Temperature Switch	205H-019 through 205H-023
5)	Comsip Delphi H ₂ Analyzer	223H-024 223H-023

- C. Items deleted from the EQ Master List (harsh environment) because they provide no safety function. Rev. 2 of the EQ Manual reflects this.

General Electric Solenoid Valve	224H-013
Prestolite Leland HPI Lube Oil Pump DC Motor	211H-012 211H-013
United Electric Pressure Differential Switch	211H-014 211H-015

G-4 Regulatory Guide 1.97 Components (Post Accident Monitoring)

Those RG 1.97 items already installed have been included in the EQ Manual.

TED is presently undergoing a RG 1.97 review in conjunction with the B&W Owners Group. This effort is part of our overall Emergency Response Capability Program (Generic Letter 82-33).

The schedule for implementing any RG 1.97 modifications will be addressed in our response to Generic Letter 82-33.

Any changes resulting from our RG 1.97 review, and the associated qualification data will be incorporated in the EQ Manual as part of the normal facility changes request closeout process following installation.

C-5 Methodology to Identify Equipment Within the Scope of 10CFR 50.49(b)(2)

Paragraph (b)(2) of 10CFR 50.49 requires that licensees identify "non safety-related electric equipment whose failure under postulated environmental condition could prevent satisfactory accomplishment of safety functions. . . ." The methodology that was used to create the DB-1 master list is summarized below:

1. A list of safety related systems required to achieve safe shutdown or accident mitigation was developed. Any systems or equipment which were support systems (i.e. mechanically connected or auxiliary systems) which are necessary for the required operation of the safety related equipment was included. This was determined by review of the FSAR and the Davis-Besse Unit 1 Piping and Instrumentation diagrams (P&IDs).
2. From these systems determined in Step 1, a list was generated of safety-related electric equipment as defined in paragraph (b)(1) of 10CFR 50.49 required to remain functional during or following design-basis Loss of Coolant Accident (LOCA) or High Energy Line Break (HELB) Accidents. The LOCA/HELB accidents are the only design-basis accidents which result in significantly adverse environments to electrical equipment which is required for safe shutdown or accident mitigation. The list of safety related electrical equipment was based on reviews of the Davis-Besse Final Safety Analysis Report, Technical Specifications, Emergency Operating Procedures, Piping and Instrumentation Diagrams (P&IDs), and electrical distribution diagrams.
3. The elementary wiring diagrams of the safety-related electrical equipment previously identified in Step 1 were reviewed to identify any auxiliary devices electrically connected directly into the control or power circuitry of the safety-related equipment whose failure due to postulated environmental conditions could prevent the required operation of the safety-related equipment.
4. Nonsafety-related electrical circuits indirectly associated with the electrical equipment identified in Step 2 by common power supply or physical proximity were considered in the original DB-1 electrical design including the use of applicable industry standards (e.g., IEEE, NEMA, ANSI, UL, and NEC) and the use of properly coordinated protective relays, circuit breakers, and fuses for electrical circuit fault protection (Ref. FSAR Chap. 8).

The methodology utilized to create the Master List for the DB-1 E.Q. manual ensures that all equipment required for initiating protective actions, mitigating the consequences of the event, and monitoring of the event is included. Therefore the DB-1 E.Q. Manual Master List is judged to address all electrical equipment within the scope of the rule (10CFR50.49).

The flooding and environmental effects resulting from all postulated design-basis accidents including the loss-of-coolant accident (LOCA) and steam-line break accident (HELB) inside containment and the flooding and environmental effects resulting from HELBs outside containment were considered when identifying safety-related electrical equipment at Davis-Besse Unit 1 which was to be environmentally qualified. FSAR section 15.4 discusses the design basis accident considered and FSAR section 3.11 provides a discussion of the Environmental Design of Electrical Equipment.

Concerning submergence inside containment, deficiencies are addressed on the individual system component evaluation worksheets. Sufficient documentation has been obtained for some components to prove qualification for submergence. Documentation is included in the Central File verifying qualification. For all other components, the following information is provided:

- o An assessment of the failure modes associated with the submergence of the applicable components.
- o Assurance that the subsequent failure of the component will not adversely affect any other safety functions or mislead an operator.
- o Discussions concerning operating time across the spectrum of events, in relation to the time of submergence.

Concerning submergence outside containment, the auxiliary building drainage system and accumulated water leakoff paths are of sufficient size to allow water removal to preclude safety-related component failure via submergence. Flooding resulting from postulated main steam line breaks is addressed within Davis-Besse Unit 1 FSAR Section 3.6.2.7.1.2 and 3.6.2.7.1.3. Flooding resulting from postulated main feed line breaks is addressed within FSAR Section 3.6.2.7.1.4. All break locations are above grade level which provides additional flow paths for run off.

G-6 TMI Action Items

Davis-Besse 1 Facility Change Request (FCR) Procedure (AD 1845) includes provisions for EQ review as part of the normal FCR closeout procedure.

TED has submitted an action plan which addresses all TMI related items. EQ requirements of safety-related items are being addressed as those items are completed. The EQ Manual Rev. 2 incorporates the EQ data for those items which are completed. This incorporation process will continue in accordance with the schedule for the items as given in the TED action plan.

G-7 Surveillance and Maintenance

Maintenance of Equipment Qualification

At Davis-Besse maintenance of equipment qualification is assured through a program consisting of the following ingredients:

- a) Control of spare parts procurement and usage
- b) Surveillance testing and equipment maintenance
- c) Training and indoctrination of personnel will be provided
- d) Systematic review and update of EQ manual and documentation files
- e) Evaluation of failures

Control of Spare Parts Procurement and Usage

A procedure is in place which controls the procurement of spare/replacement parts to assure that they are procured to the proper specifications, stored properly, and are in compliance with the Davis-Besse QA/QC program.

Equipment Surveillance and Maintenance

Davis-Besse S&M programs and procedures will be reviewed and updated as necessary to incorporate EQ related requirements (i.e., schedule for parts replacement/repair).

Training and Indoctrination

Engineering personnel who have the responsibility for equipment qualification have been and will continue to be provided training on the equipment qualification requirements and their responsibilities. Training is being developed for maintenance personnel who have the responsibility for equipment maintenance.

Systematic Review and Update of EQ Manual

Davis-Besse has in place a Procedure for Field Change Requests which requires a review for EQ impacts. This procedure requires update of the EQ manual and documentation files as Station modifications are completed.

Evaluation of Failures

Records of failures of maintenance history will be reviewed periodically to assess the potential for common mode failures resulting from:

- a) age related degradation, and
- b) environmentally induced degradation

Such review will also encompass a review of the data from NPRDS, equipment vendors and other industry sources.

G-8 Review of Justification for Continued Operation (JCO)

As part of the continuing EQ effort and in accordance with the governing documents TED has provided JCO statements wherever appropriate. JCOs are provided for outstanding items awaiting modification and for equipment which is undergoing qualification testing or analysis. JCOs are developed using the guidelines provided in 10CFR 50.49.

Enclosure 6 contains additional JCO which was requested by your staff at the December 13, 1983, Resolution of Safety Evaluation EQ meeting. With regard to ASCO Solenoid Valves and Amphenol Penetrations, this JCO was submitted December 22, 1983.

JCOs were reviewed prior to the initial TER response submittal and again prior to the May 20, 1983 response. JCOs have been reviewed again and are still valid and we believe that Davis-Besse Unit 1 can continue operation without undue risk to public health and safety.

G-9 Exemption Deficiencies

The TER contains comments relative to a component being exempt from the qualification for LOCA/HELB effects. These comments agreed with the basis for the exemption from the harsh steam environments and stated that components must be qualified for increased post LOCA radiation.

As stated in the EQ methodology report, exemption from qualification would only be considered for those parameters on the individual SCEWs containing EXEMPT in the qualification parameters column. TED recognizes that outside containment HELBs and increased radiation post LOCA are separate effects. The only exemption considered in these cases is from the effects of the HELB and not from the radiation/aging. All outside containment locations always contain the increased radiation due to post LOCA recirculated fluids in the radiation specification value for these locations.

ENCLOSURE 2

TED CATEGORY I.B.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
REES Push Button Switch	1 * 6 * 21 *	221H-259 221H-246 221H-258	No schedule provided for replacement.	Further analysis has been performed to document qualification and therefore replacement is no longer required.
TEC Amplifier (valve flow monitoring system - PORV and Pzr. safety-relief valves)	35	302H-012 through 302H-017	None	Modification has been performed to ensure a qualified system configuration.
Endevco Accelerometer (valve flow monitoring system - PORV and Pzr. safety-relief valves)	36	302H-006 through 302H-011	None	Modification has been performed to ensure a qualified system configuration.
Bailey Transmitter Models BY	48 49 50	218H-004 through 218H-011 204H-005 through 204H-008 224H-004	No JCO provided. No schedule for replacement.	Components to be replaced. Qualification data provided in lieu of a JCO. Schedule provided in May 20 submittal.

ENCLOSURE 2

TED CATEGORY I.B.
(continued)

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Rosemount Transmitter Model 1152	51 *	220H-007 220H-011	Shielding or replacement not completed. Qualified life deficiency.	<p>These level transmitters monitor SG levels and provide inputs to the SFRCS. This transmitter is only required for the mitigation of a feedline break requiring the initiation of auxiliary feedwater. Component failure will not impact safety related functions or mislead the operator as alternate instrumentation not affected by submergence and qualified for the accident radiation dose is available and required. For this reason the 40 year non-accident radiation dose is used here.</p> <ol style="list-style-type: none"> 1. Similarity analysis will be performed to attempt to show that adequate similarity exists between the Rosemount 1152 and 1153 model transmitters to allow the qualified life of the Model 1153 to be assigned to the Model 1152. Analysis to be done by 3/1/84. 2. If the similarity analysis proves to be unsuccessful, then an evaluation will be undertaken to determine if the qualified Rosemount 1153 electronic assemblies could be installed in a Rosemount 1152 transmitter. Physical and operational compatibility will have to be determined.

ENCLOSURE 2

TED CATEGORY I.B.
(continued)

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Victoreen Radiation Monitor (Model 8411) Station Vent	54 *	223H-017 223H-018	No schedule provided for replacement. Exemption deficiency.	The schedule provided in the May 20, 1983 submittal indicated that the equipment replacement had been completed. This equipment is only required for accident monitoring and not for accident mitigation. The replacement equipment has been installed and is currently undergoing testing to place it in service. Quali- fication test documents for the replace- ment components are being reviewed and this will be completed by 11/30/84. See generic discussion item G-9 for a discussion resolving the exemption deficiency.
Victoreen Radiation Monitors	55 * 56 * 204 *	223H-021 223H-022 223H-019 223H-020 223H-023	No schedule for replacement. Exemption deficiency.	Equipment replacement completed in accordance with the May 20, 1983, submittal. See generic item G-9 for a discussion resolving the exemption deficiency.

ENCLOSURE 2

TED CATEGORY I.B.
(continued)

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Prestolite Leland Motors HPI Lube Oil Motors (AC)	73 * 74 *	211H-006 211H-007	No schedule provided for replacement.	Schedule was provided in the May 20, 1983, submittal. AC lube oil pump motors to be replaced with qualified equipment by 11/30/84 in accordance with FCR 83-063.
Prestolite Leland Motors HPI Lube Oil Motors (DC)	75 * 76 *	211H-013 211H-012	No schedule provided for replacement.	Since these DC motors are backup equipment for the AC motors, upon replacement of the HPI AC lube oil pump motor these items will be deleted from the master list. Failure of this equipment will not adversely impact other safety related equipment or mislead the operator.
Bailey Model 701 Controller	77 *	222H-017	No schedule provided for modification. Exemption deficiency.	Equipment to be relocated in accordance with schedule provided in May 20, 1983, submittal. See generic item G-9 for a discussion resolving the exemption deficiency.
United Electric Pressure Differential Switch (Model 357)	82 * 83 *	211H-014 211H-015	No schedule provided for replacement.	Since these components activate the HPI DC lube oil pump motor, these switches will be deleted from the master list upon satisfactory replacement of the HPI AC lube oil pump motor. Failure of this equipment will not adversely impact other safety related equipment or mislead the operator.

ENCLOSURE 2

TED CATEGORY I.B.
(continued)

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Static-O-Ring Pressure Switch	87 *	210H-020	No schedule provided for replacement.	In accordance with the May 20, 1983 response, this component is scheduled for replacement when it is determined that the replacement component is fully qualified. If required, a schedule extension will be forwarded to the NRC with a target date for completion of this action as soon as qualified equipment becomes available.
Buchanan Terminal Block Model 0721 (Outside contain- ment)	96 * 97 * 98 *	221H-317 221H-315 221H-316 221H-319	No schedule provided for replacement.	Selective replacement required. The specific items requiring replacement will be completed by 11/30/84.
General Electric Solenoid Valve	168 *	224H-013	No schedule provided for replacement.	No schedule was provided. This item has been deleted in Revision 2 as it is not nuclear safety-related.

ENCLOSURE 2

TED CATEGORY I.B.
(continued)

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
ASCO Solenoid Valve	169 *	225H-005	No schedule provided for replacement.	Schedule for replacement (by 11-30-84) was provided in the May 20, 1983, submittal.
	177 *	210H-021 210H-022		
	183 *	210H-023 through 210H-026		
	187 *	216H-054		
	189 *	216H-039 216H-045		
	191 *	208H-029 208H-030		
	193 *	208H-031 208H-032		
Barksdale Temperature Switch	198 *	205H-022 205H-023	No schedule for replacement. Exemption deficiency.	Additional analysis has been performed to demonstrate qualification. Components are no longer scheduled for replacement. The Barksdale temperature switches are located in the ECCS rooms 105, 113, and 115. Peak temperature and pressures for these rooms are 130°F/1.36 psig, 155°F/1.36 psig, and 177°F/0.9 psig respectively. Components are qualified by analysis of test data and materials analysis for aging/radiation. The switches automatically control cooler fan
	199 *	205H-021		
	200 *	205H-019 205H-020		

ENCLOSURE 2

TED CATEGORY I.B.
(continued)

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Barksdale Temperature Switch (cont.)				<p>motors in the ECCS rooms.</p> <p>The switches are housed in gasketed NEMA-4 enclosures which exclude a water stream when sprayed from a 1 inch nozzle at 65 gpm. The HELBs are relatively mild only lasting for 24, 7, and 7 minutes respectively in rooms 105, 113, and 115. Maintenance instructions will be revised such that the gasket seal on these pressure switches is inspected at each switch calibration. See generic item G-9 for a discussion resolving the exemption deficiency.</p>
Foxboro Current Repeater	202 *	222H-022	No schedule provided for modification.	Equipment to be relocated in accordance with schedule provided in the May 20, 1983, submittal.

ENCLOSURE 2

TED CATEGORY I.B.
(continued)

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
COMSIP-DELPHI H ₂ Analyzer	203 *	223H-024	No schedule provided for modification/analysis.	<p>Analysis has been performed to demonstrate qualification. No modification is required.</p> <p>The H₂ analyzer is located outside containment in Room 304. Equipment is not needed to mitigate the HELB in this vicinity. Only harsh environment in which the equipment is required to operate is for post LOCA H₂ monitoring. Calculations show that when taking all radiation sources within the Analyzer cabinets (no external radiation sources affect this area) that the 40 year background plus 1 year accident dose to the electronic components within the cabinet is less than 1000 rads and doses to non-electronic electrical equipment experience total accident plus background doses of less than 10,000 rads. Therefore this equipment is located in a mild environment. Additionally, failures would not prevent sampling and analysis since grab samples can be taken for this purpose (reference procedure AD 1850.04).</p>

ENCLOSURE 2

TED CATEGORY I.B.
(continued)

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Westinghouse Motor Control Centers	205 *	221H-027	To be tested or analyzed by 1/1/83.	These MCC's have been qualified based on analysis, a certificate of compliance and a statement of qualified life for Equipment Qualification based on analysis is available. Additional report based on a performance test on used devices taken from DB-1 type W MCCs is scheduled to be available by 9-1-84. Qualification data will be incorporated by 11-30-84.
	206 *	221H-022 221H-025 221H-028		
	207 *	221H-023 221H-024 221H-035		
	208 *	221H-036 221H-026		

ENCLOSURE 3

TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
REES Pushbutton Switch	2	221H-179	Exemption deficiency.	See generic item G-9 for discussion resolving exemption deficiency. See generic item G-1 for discussion resolving aging/radiation analysis deficiency.
	4	221H-180 221H-181	Aging/radiation analysis deficiency.	
	5	221H-241 221H-242		
	7	221H-244 221H-245 221H-246		
	8	221H-177 221H-178 221H-191		
	9	221H-216 221H-222 221H-224		
	10	221H-250 221H-261 221H-237 221H-236 221H-208 221H-211 221H-212		
	14	221H-214		
	16	221H-235		
				Items 221H-234 and 221H-235 have been deleted as they have been replaced by another monitoring system (Kaman Sciences).

ENCLOSURE 3

TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
REES Pushbutton Switch (continued)	17	221H-200 221H-227		
	20	221H-199 221H-226		
	24	221H-201 221H-202 221H-203		
	25	221H-183		
	26	221H-234 221H-182		
	27	221H-238 221H-251		
	30	221H-217 221H-232		
	32	221H-219		
	33	221H-217		

ENCLOSURE 3

TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
REES Pushbutton Switch (continued)	34	221H-219 221H-240 221H-239 221H-204 221H-205 221H-206 221H-207 221H-233 221H-231 221H-230 221H-229 221H-225		
Microswitch Pushbutton Switch	15 23	221H-188 221H-189	Exemption deficiency. Aging/ radiation analysis deficiency.	Equipment has been deleted. Equipment has been replaced with another monitoring system (Kaman Sciences).
Cutler Hammer Pushbutton Switch	18 19	221H-194 221H-195 221H-193 221H-192	Exemption deficiency.	TER states that equipment associated with the MSIV operation must be qualified for the environments to which it may become exposed. FMEA analysis on the switch and circuit has been performed which supports the exemption.

ENCLOSURE 3
TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Boston Insulated Wire Cabling	37	221H-171 through 221H-175	Aging-qualified life deficiency. Submergence deficiency. Failure would not adversely impact safety functions or mislead the operator.	Analysis has been performed to justify the 40-year qualified life. All cabling inside containment is housed in conduit. Submergence analysis has been performed. All components which are located below containment flood level have been identified as well as the cabling which serves these components. The effect of cable submergence failures on the equipment served has been analyzed and found to cause no additional safety-related failures or mislead the operator. Based on this analysis the cables can be exempt from submergence qualification as its associated components would have performed their function prior to submergence or their subsequent submergence would not impact safety functions or mislead an operator.
Okonite Cabling	38	221H-012 221H-013 221H-020	Documented evidence of qualification deficiency (test report applicability). Submergence deficiency.	Additional data reference has been pro- vided to SCEW sheets to demonstrate test report applicability. See item 37 for method of resolution for submergence deficiency.
Kerite Cabling	39	221H-037 through 221H-050 221H-065 through 221H-069	Documented evidence of qualification deficiency (test report applicability). Submergence deficiency.	Additional data reference has been pro- vided to SCEW sheets to demonstrate test report applicability. See item 37 for method of resolution for submergence deficiency.

ENCLOSURE 3
TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Kerite Cabling (continued)	40	221H-014 through 221H-018 221H-021 221H-029 through 221H-034		
Foxboro Transmitter Model E11GH Model E11AH	41 43 44 45	219H-007 through 219H-010 219H-006 219H-005 219H-004	Adequate similarity between component and units which underwent testing. Aging-qualified life deficiency.	Additional reference data has been added to the SCEWs to demonstrate test report/MCA series applicability. See generic item G-1 for a discussion resolving the aging methodology deficiency. Components have a short qualified life. This will be handled as follows: 1. Similarity analysis will be performed to demonstrate that sufficient similarity exists between Foxboro E-10 series and Foxboro N-E-10 series transmitters to allow the assignment of the qualified life of the N-E-10 series to the E-10 series transmitter. This will be completed by 3/1/84. 2. If similarity proves unsuccessful, then analysis will be undertaken to determine if it is possible to install a qualified N-E-10 series amplifier in an E-10 series transmitter.

ENCLOSURE 3

TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
General Electric Motor (ECCS Room Unit Cooler Fan Motor)	59	205H-005	Documented qualification evidence inadequate.	Additional analysis has been completed utilizing a detailed materials list supplied by the manufacturer to demon- strate qualification for these compon- ents. These motors are ECCS Room Cooler unit fan motors located in Rooms 105, 113, 115. Motors are subjected to a mild HELB and post LOCA recirculated fluids increased radiation. The motors are rated as NEMA design A with an ambient temperature rating of 70°C/158°F. The transient in the rooms peak at 130, 155 and 177°F respectively. The room's pressure peaks at 0.9, 1.36, and 1.36 psig respectively. The transients last for 6.7, 6.7 and 24 minutes respectively. The motor specification calls for a heat shock acceptance test of the polyesterimide stator winding of 200°C/392°F for 30 minutes. The mild steam HELB harsh environment should not adversely affect motor operation. See generic item G-1 for adiscussion resolving the aging/radiationanalysis deficiency. Motor lubricationand splices have been addressed generically in Chapter 2.21 of theE.Q. Manual Rev. 2.
	60	205H-006 205H-007	Similarity deficiency radiation/aging qualified life analysis deficiency.	
	61	205H-008 205H-009	Lubrication and splices not addressed.	

ENCLOSURE 3

TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
General Electric Motor (1E Switchgear Room Ventilation Fan Motor)	62	206H-004	Documented qualification evidence inadequate. Similarity deficiency radiation/aging qualified life analysis deficiency. Lubrication and splices not addressed. Plus exemption analysis questioned.	<p>Additional analysis has been performed to demonstrate qualification for this device despite the fact that the exemption argument provided is felt to be justified.</p> <p>This component is a vent fan supplying backup ventilation to Room 428 (1E Switchgear room). Materials analysis has been performed for qualification for thermal aging and radiation.</p> <p>This motor is a 2 horsepower, continuous duty, totally enclosed, air over cooled motor, rated NEMA design B with a Class F high temperature insulation system. This motor is not utilized during normal plant operation and is operated only during emergency conditions. Room 515 conditions peak at 203°F and 15.6 psia in 40 seconds and return to ambient in approximately 18 minutes. The low pressure of less than 1.0 psig and the 100% relative humidity will not affect this totally enclosed motor. Class F insulation systems are rated at 155°C (311°F) continuous duty. An 18-minute transient peaking at 203°F will not be approaching the thermal limit of the insulation system. The motor leads are attached with qualified heat shrink connections. Bearing lubrication is addressed is addressed through normal plant maintenance procedures.</p>

ENCLOSURE 3

TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
General Electric Motor (1E Switchgear Room Ventilation Fan Motor) (cont.)				Although we feel this motor is qualified, it is exempt because the harsh environment seen by this component is due to a main steam to auxiliary fed pump turbine line break. This ventilation fan, MC0712, is a backup ventilation system for Room 428 located in Room 515. Cooling of the 1E Switchgear Room 428 is normally supplied by equipment located in Room 516. Both of these rooms are non-harsh and would not be affected by this high energy line break. The component is exempted from qualification since its failure would not affect normal ventilation. It does not perform essential safety functions and its failure in the harsh environment would not mislead the operator. See generic item G-1 for a discussion resolving the aging/radiation analysis deficiency. Motor lubrication and splices have been addressed generically in Chapter 2.21 of the E.Q. Manual Rev. 2.
General Dynamics Motor (Containment Spray Motor)	63 64	214H-005 214H-004	Radiation/aging analysis deficiency. Lubricant and splices not addressed.	See generic item G-1 for a discussion resolving the aging/radiation analysis deficiency. Lubricant and splices have been addressed generically in Chapter 2.21 of the E.Q. Manual Rev. 2..

ENCLOSURE 3
TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Westinghouse Motor (Decay Heat/Low Pressure Injection)	65	210H-007	Similarity deficiency. Aging-qualified life deficiency. Lubrication- bearings and splices not addressed.	Additional references have been added to the SCEWs to demonstrate similarity of motor. Aging-qualified life developed using referenced test data and plant operating time. Lubrication- bearings and splices have been addressed generically in Chapter 2.21 of the E.Q. Manual Rev. 2.
	66	210H-006		
Westinghouse Motor (High Pressure Injection)	67 *	211H-005	No schedule for completion of additional analysis. Docu- mented evidence of qualifica- tion, similarity, aging- qualified life, and harsh steam environment deficiencies. Lubrication-bearings and splices not addressed.	Additional references have been added to demonstrate similarity of motors. Additional analysis has been completed to demonstrate qualification for this device. Aging-qualified life deter- mined using referenced test data and plant operating data. Lubrication- bearings and splices have been addressed generically in Chapter 2.21 of the E.Q. Manual Rev. 2.
	68 *	211H-004		
Westinghouse Motors (H ₂ Dilution)	69	215H-008	Aging-qualified life deficiency. Lubricant-bearing and splices not addressed.	Additional aging and qualified life analysis using test data performed to demonstrate qualification. Lubrication-bearing and splices have been addressed generically in Chapter 2.21 of the E.Q. Manual Rev. 2.
	70	215H-007		

ENCLOSURE 3
TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Joy/Reliance Fan Motor (Containment Air Cooler and Contain- ment Recirculation Fans)	71	217H-004 217H-005 217H-006	Similarity deficiency. Inadequate basis for limiting component thermal aging analysis. Surveillance and maintenance program data for motor-splice-lead cable and bearing system not provided. No insulation life character- istic plot provided. Test report radiation valves could not be checked because they were not identified by material (only Reliance specification number provided).	Additional references have been added to the SCEWs to demonstrate test report applicability. Thermal aging-qualifi- cation has been reviewed. Surveillance and maintenance program for maintenance of equipment qualification is being developed. Test report materials analysis has been reviewed and the insulation system is the limiting component. Radiation data has been checked using Appendix A and F which identified the materials by name and reliance part number and the analysis was found to be satisfactory. Based on this materials analysis the motor is felt to be full qualified.
	72	215H-005 215H-006		
Mercoild Pressure Switch	85	218H-013	TER states that because the switch measures containment atmospheric pressure that it must be qualified for LOCA. Qualified life calculation not available.	Additional clarification has been added to the SCEW to demonstrate qualification for this component. Components aging and radiation analysis has been revised. See generic item G-1 for discussion.
Static-O-Ring Pressure Switch (SFRCS Inputs)	88	220H-023 220H-030	HELB qualification analysis inadequate. Aging-qualified life analysis deficiency.	See generic item G-1 for a discussion resolving the aging-qualified life deficiency. See generic item G-2 for a discussion resolving the HELB quali- fication by analysis deficiency. Surveillance and maintenance program is in development. Maintenance instruc- tions will be revised such that the gasket seal on these pressure switches is inspected at each switch calibration.
	91	220H-019 through 220H-022	No schedule provided for surveillance and maintenance.	

ENCLOSURE 3
TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Static-O-Ring Pressure Switch (SFRCS Inputs) (continued)	92	220H-024 through 220H-029 220H-031 through 220H-040		
Static-O-Ring Pressure Switch	89 90	223H-016 223H-015	Exemption deficiency. TER states that since these switches measure containment pressure, they must be qualified for LOCA exposure. Calculation of qualified life not available.	See generic item G-9 for a discussion resolving the exemption deficiency. Additional clarification has been added to the SCEWs to demonstrate qualification. Aging and radiation analysis has been revised. See generic item G-1 for discussion resolving the qualified life deficiency. Maintenance instructions will be revised such that the gasket seal on these pressure switches is inspected at each switch calibration.
States Terminal Block (Outside containment)	101 102 103 104 105	See 5/20/ 83 TER response for listing.	Test report data provided. Test report was not available for review.	The test report has been obtained and is available in the qualification file.
Stanwick Terminal Block (Outside containment)	106 through 114 116 through 119	See 5/20/ 83 TER response for listing.	Test report not available for review.	Pertinent qualification information have been obtained from the owner of the test report and compared against the Davis-Besse parameters to establish qualification. Efforts are underway to obtain the test report.

ENCLOSURE 3
TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Raychem Splice (WCSF Heat Shrink)	115	221H-152	Aging/qualified life deficiency. Submergence deficiency.	See generic item G-1 for a discussion resolving the aging/qualified life defi- ciency. Additional analysis has been performed to address the submergence deficiency.
Limitorque Valve Motor Operator	124 * 128 * 134 * 136 * 138 * 151 * 165 *	204H-010 204H-012 210H-015 210H-014 210H-011 210H-010 204H-011 204H-009	No schedule provided. Aging/ radiation analysis deficiency.	Schedule has been provided in the May 20, 1983 submittal. Operators are scheduled for brake coil or motor/brake replacement as required. Additional analysis has been performed to resolve the aging/radiation deficiency. See generic discussion item G-1 for details resolving the aging/qualified life deficiency.
ASCO Solenoid Valve	181 182 184 185	208H-026 208H-025 208H-020 through 208H-024 208H-014 through 208H-018	Exemption failure mode analysis questioned.	Component to be replaced in accordance with schedules provided in May 20, 1983, submittal. FMEA to justify continued operation included in the E.Q. Manual. See Generic discussion item G-3 for JCO discussion.

ENCLOSURE 3

TED CATEGORY II.A.

Component/ Manufacturer	TER Number	SCEW Number	Designated Deficiency	Method of Resolution
Amphenol Electric Penetration Assembly	210	221H-267 through 221H-284	Aging-qualified life deficiency. Chemical spray deficiency. Functional testing deficiency.	Additional analysis has been performed to resolve the aging-qualified life deficiency. See generic item G-1. Additional analysis has been added to the SCEWs to resolve the chemical spray deficiency. Additional Amphenol test data has been submitted as well as analysis which substantiates the qualification of the penetration while energized. The analysis shows the most limiting case (i.e., highest heat up) and this value of heating when added to the postulated LOCA temperature is less than the test report temperature. A response has been transmitted to the NRC for this equipment. Based on the additional test data and analysis we feel this equipment is qualified.
REES Pushbutton Switch	212 213 214	221H-243 221H-190 221H-257	Exemption deficiency. Aging/ radiation analysis deficiency. (213 and 214 only) Failure mode exemption analysis questioned.	See generic item G-1 for a discussion resolving the aging/radiation deficiency. See generic item G-9 for a discussion resolving the exemption deficiency. (213 and 214 only) Failure modes and effects analysis has been reviewed and found to be valid.

ENCLOSURE 4

TED CATEGORY II.C

In the revision of the TED E.Q. Manual a comprehensive review of all components was performed. This review utilized Arrhenius methodology to determine the qualified lives of all the components either by utilization of test report heat aging data or by analysis of vendor supplied data. The results of this analysis has been incorporated into E.Q. Manual Revision 2 so that all components have had their qualified lives re-established and replacement periods are redefined.

TED CATEGORY IV

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ENCLOSURE 6

RESPONSE TO EQUIPMENT QUALIFICATIONS CONCERNS JUSTIFICATION FOR CONTINUED OPERATION

During our meeting, on December 13, 1983, we were requested to respond within 10 days on two specific items regarding their qualification status, and justification for Continued Operation. The items are Amphenol Penetrations (TER item 210) and ASCO Solenoid Valves (TER items 181, 182, 184, and 185).

With regard to the Amphenol Penetrations, we had indicated that "additional efforts were underway to resolve the functional testing deficiency" where the penetration was not energized and conducting current during the LOCA profile testing.

We have located and reviewed additional Amphenol test reports which resolve this test deficiency.

Thermal load tests were performed by Amphenol with 37.67 Watts/ft generated by current flow. At Davis-Besse heat generated by current flow is between 1.99 and 29.96 Watts/ft. The temperature rise due to the test current was 27°F. The temperature rise at Davis-Besse will be less than the 27°F.

Thermal cycle tests were performed to which show that the penetrations can survive temperatures to 350°F and still perform their intended function. The 27°F conservative temperature rise due to current loading combined with our LOCA profile maximum temperature of 283°F is 40°F less than the 350°F thermal loading test. On this basis, we deem the penetration to be fully qualified.

With regard to the ASCO Solenoid Valves, we have additional analysis to justify continued operation. The solenoid valves in question are those which when dennergized close the Main Steam Isolation Valves (MSIV) to prevent the blowdown of two steam generators and thus maintain heat removal capability.

A test has been conducted on ASCO Solenoid Valves HTX8320A20V by General Electric, which are identical to those installed at Davis-Besse. The results of this test (Rockwell Test Report #2792-03-02, Rev 1) show that the valves survive in an harsh steam environment at 340°F for 2 hrs. Room 601 temperature peaks at 280°F for < 1sec and stabilizes at 200°F for 50sec then decreases to ambient temperature in 7000sec. Room 602 temperature peaks at 344°F for < 1sec and drops to 210°F at 2sec and stabilizes for 50sec then decreasing to ambient temperature in 3400sec. This time period and temperature profile will allow the valves to perform their intended safety function.

The design is such that if any solenoid valve should fail due to a steam line break (by moving to its fail safe position, or by not moving at all) it will not prevent the MSIV from closing. Therefore we can sustain a failure of the single solenoid valve.

In addition, further analysis was performed to show that should multiple failures of solenoids valves occur due to a main steam line break; and prevent the MSIV from closing, we would still be able to isolate the unaffected steam generator from the worst case main steam line break (a break between the containment and an MSIV.)

This analysis utilizes a previous study performed on the Non-Return Valve which shows that it will close and not fail should such an event occur. This provides two valve isolation (Main Turbine Stop Valves and the Non-Return Valve) to mitigate this event.

NUREG 0136 "Davis-Besse Nuclear Power Station Unit 1 Safety Evaluation Report" December 1976 Section 10.3 "Main Steam Supply System" pg 10-2 contains statements on the Non-Return Valves.

There are two other ways to detect smaller steam line break in the main steam line Rooms 601 and 602. The first would be by the fire detection system located within each room. Room 601 has 34 detectors and 602 has 8 detectors. All detectors are ionization type. Any steam reaching these detectors would actuate the fire alarm for the associated room. These detectors are maintained in accordance with our Fire Protection Program. This has been verified every time the steam safety valves or atmospheric vent valves actuate which causes a steam environment to Rooms 601 and 602. The second method is provided by the sound from the steam leak.

When the operator determines there is a steam leak, the following actions will be taken:

1. If personnel safety is in question the operator will trip SFRCS manually which trip the reactor and closes MSIV's.
2. If the steam leak is small and no personnel safety is involved the operator will shutdown the plant in a controlled manner.

This provides justification for continued operation until the affected solenoid valves can be replaced with qualified solenoid valves during our 1984 refueling outage.