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February 27, 1982

REVIEWED BY *Ru* COMMITMENT YES NO
NA 28205

ØCANØ28211

Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: Arkansas Nuclear One - Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6
Environmental Qualification of
Safety-Related Electrical Equipment
(File: 1510.6, 2-1510.6)

Gentlemen:

By letter dated February 18, 1982, (ØCANØ28208) from Mr. J. R. Marshall to Mr. D. G. Eisenhut, AP&L committed to provide more detailed justification for interim operation pending final resolution of open items relative to environmental qualification of safety-related electrical equipment. The requested documentation is provided as Attachments I and II to this letter for ANO-1 and ANO-2, respectively. Significant effort has been expended in order to comply with the submittal date requested by your staff. I trust the attached material will meet your needs.

Very truly yours,

John R. Marshall

J. R. Marshall
Manager, Licensing

A048

JRM/dh/jm

Attachments

DESIGNATED ORIGINAL

Certified By *Janice A. Stevens*

8211100065 820227
PDR ADOCK 05000313
P PDR

Regulatory Report Review

Plant: Arkansas Nuclear One Unit: 1
Justification for Interim Operation for
Report Title: Environmental Qualification Deficiencies(Ref: ØCANØ28211)
Report Number: NA
Report Type: Routine: () Non-Routine: ()
Special: (x) Reportable Occurrence: 14 day () 30 day ()

Prepared By: EDS Nuclear Date: February 26, 1982

Reviewed By: NA Date: _____
General Manager or Cognizant
Manager/Supervisor (Signature, reference or NA)

Reviewed By: *Don Howard* Date: 2/27/82
Cognizant Licensing Reviewer

Reviewed and Approved By: *John R. Marshall* Date: 2/27/82
Manager, Licensing

Review Required: PSC YES () NO (x)
SRC YES () NO (x)

Reviewed By: NA Date: _____
Plant Safety Committee
(Signature or reference)

Reviewed By: NA Date: _____
Safety Review Committee

Attachment I

ARKANSAS NUCLEAR ONE

UNIT 1

JUSTIFICATIONS FOR INTERIM
OPERATION FOR ENVIRONMENTAL
QUALIFICATION DEFICIENCIES

March 1, 1982

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EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Analyzer

TAG NO(S).: C-178

SER RESPONSE PAGE NO(S).: B125

MANUFACTURER AND MODEL NO.: Delphi B1A-1A1B9D

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 46

• SAFETY FUNCTION:

The safety function of the hydrogen analyzer is to determine the hydrogen concentration in the Reactor Building after a LOCA.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	173°F
Pressure	.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for the hydrogen analyzer result from a HELB outside containment. Since this system needs to operate only after a LOCA, the required safety function of the hydrogen analyzer is not jeopardized.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Analyzer

TAG NO(S).: C-179

SER RESPONSE PAGE NO(S).: B126

MANUFACTURER AND MODEL NO.: Delphi BIA-1A1B9D

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

The safety function of the hydrogen analyzer is to determine the hydrogen concentration in the Reactor Building after a LOCA.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	211°F
Pressure	1.1 psig
Relative Humid	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The discrepancy due to radiation results from the one year integrated dose that the hydrogen analyzer was determined to receive. The two sources of this radiation dose are the reactor coolant letdown line (3.6E7 rads) and other lines (1.5E5 rads). The reactor coolant letdown line is isolated at the initiation of a LOCA so that it is no longer a source, and can be eliminated from the specified dose. Therefore based on engineering judgement, the safety function of the hydrogen analyzer is not significantly jeopardized due to radiation.

The remaining qualification discrepancies occur during a HELB outside Reactor Building. Since this system has no safety related operation during a HELB event, failure during this event does not jeopardize plant safety.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Analyzer Gas Sample Blower

TAG NO(S): CM-19A

SER RESPONSE PAGE NO(S): B119

MANUFACTURER AND MODEL NO.: Reliance 708933-DY

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 46

• SAFETY FUNCTION:

CM-19A is the lead hydrogen analyzer gas sample blower. This blower provides the suction required to obtain a sample of the Reactor Building atmosphere for the hydrogen analyzing system. CM-19A is manually controlled.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	173°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for CM-19A result from a HELB outside the Reactor Building. Since the hydrogen gas sampling system needs to operate only after a LOCA, the required safety function of CM-19A is not jeopardized.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Analyzer Gas Sample Blower

TAG NO(S): CM-19B

SER RESPONSE PAGE NO(S): B120

MANUFACTURER AND MODEL NO.: Reliance 708933-DY

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

CM-19B is the stand-by hydrogen analyzer gas sample blower. This blower provides the suction required to obtain a sample of the Reactor Building atmosphere for the hydrogen analyzing system. CM-19B is manually controlled.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

All the qualification discrepancies for CM-19B, except for the one resulting from radiation, result from a HELB outside of the Reactor Building. Since the hydrogen gas sampling system needs to operate only after a LOCA, the required safety operation of CM-19B is not jeopardized due to a HELB.

The discrepancy due to radiation results from the assumption that the 30 day integrated dose to CM-19B is equivalent to the sum of the 1 year integrated doses it receives, outside the Reactor Building, from the reactor coolant letdown line (3.6E7 rads) and other sources (1.5E5 rads), after a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

CM-19B is required to be operational for only 30 days after a LOCA and is qualified for an integrated dose of $1.0E5$ rads during this period. Since the letdown line is isolated by an Emergency Safeguards Actuation System High Pressure Injection actuation signal after a LOCA, it cannot be a source of $3.6E7$ rads, as noted above.

Based on engineering judgement, the safety function of CM-19B is not significantly jeopardized due to radiation during its required operating time.

Furthermore, LOCA conditions do not jeopardize the operation of CM-19A, which is a redundant component for CM-19B.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Coolant Letdown Line Isolation Valve Motor Operation

TAG NO(S): CV-1221

SER RESPONSE PAGE NO(S): B071

MANUFACTURER AND MODEL NO.: Limitorque SMB-00-25

SYSTEM - P&ID NO.: Make-up and Purification M-231

LOCATION: Room 79

• SAFETY FUNCTION:

CV-1221 is located on the Reactor Coolant letdown line, outside the Reactor Building, after the letdown coolers. Upon Engineered Safeguards Actuation System (ESAS) High Pressure Injection (HPI) actuation, CV-1221 closes, resulting in Reactor Building isolation.

• QUALIFICATION DISCREPANCY:

Documentation was determined not to exist which would qualify CV-1221 for the $3.6E7$ rad environment that it is subjected to.

• JUSTIFICATION FOR INTERIM OPERATION:

Documentation supplied by the vendor, qualifies valves of the same type as CV-1221 for an integrated dose of $2.0E7$ rad. Since the $3.6E7$ rad dose was determined over a 1 year time period and the valve is only required to be operational for 1 minute after accident initiation, radiation should not inhibit the required safety operation of CV-1221 based on engineering judgment.

CV-1214 and CV-1216 close on an ESAS HPI actuation signal, resulting in isolation of the letdown line in the Reactor Building, upstream of its penetration through the Reactor Building. This redundancy assures Reactor Building isolation upon failure of CV-1221.

No failure mode has been identified which will cause CV-1221 to open after it has been closed by the ESAS actuation signal since power is supplied from a remotely operated motor control center.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Makeup Pumps Recirculation Valve Motor Operator

TAG NO(S).: CV-1300

SER RESPONSE PAGE NO(S).: B078

MANUFACTURER AND MODEL NO.: Limitorque SMB-00

SYSTEM - P&ID NO.: Make-Up and Purification M-231

LOCATION: Room 69

• SAFETY FUNCTION:

CV-1300 closes upon an Engineered Safeguards Actuation System (ESAS) High Pressure Injection (HPI) actuation signal. This valve terminates the diversion of primary make-up water through the Reactor Coolant pump seal return coolers during a LOCA.

• QUALIFICATION DISCREPANCY:

CV-1300 is qualified for an integrated dose of 2.04E8 rads and the calculated integrated dose received is 5.9E8 rads.

• JUSTIFICATION FOR INTERIM OPERATION:

CV-1300 was conservatively assumed to be located in Room 68 for the integrated dose calculation. The dominant source in Room 68 is the 8' diameter Reactor Coolant Make-Up tank. Since CV-1300 is actually in Room 69 it is shielded from this tank, and based on engineering judgment, the integrated dose in this room will be significantly lower than the valve is qualified for.

Further, since CV-1300 closes on HPI initiation and remains closed for accident duration, its safety function would be performed prior to the reception of the high accident doses. No failure mode has been identified which would cause CV-1300 to open after it has been closed by the ESAS actuation Signal since power is supplied from a remotely located motor control center.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Makeup Pumps Receive Valve Motor Operator

TAG NO(S).: CV-1301

SER RESPONSE PAGE NO(S).: B079

MANUFACTURER AND MODEL NO.: Limitorque SMB-000

SYSTEM - P&ID NO.: Make-Up and Purification M-231

LOCATION: Room 70

• SAFETY FUNCTION:

CV-1301 closes upon an Engineered Safeguards Actuation System (ESAS) High Pressure Injection (HPI) actuation signal. This valve terminates the diversion of primary make-up water through the Reactor Coolant pump seal return coolers during a LOCA.

• QUALIFICATION DISCREPANCY:

CV-1301 is qualified for an integrated dose of 2.04×10^8 rads and the calculated integrated dose received is 5.9×10^8 rads.

• JUSTIFICATION FOR INTERIM OPERATION:

CV-1301 was conservatively assumed to be in Room 69 for the integrated dose calculation. Further, Room 69 was assumed to have the reactor coolant make-up tank as the primary source of radiation. Since CV-1301 is actually located in Room 70, it is shielded from the tank by two concrete walls.

CV-1301 closes on HPI initiation and remains closed for accident duration. Therefore, its safety function would be performed prior to the reception of high accident doses. No failure mode has been identified which would cause CV-1301 to open after it has been closed by the ESAS actuation signal since power is supplied from a remotely operated motor control center.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Decay Heat Removal System Cooler E35B Isolation Motor
Operated Valve and Internal Position Switch

TAG NO(S).: CV-1400

SER RESPONSE PAGE NO(S).: B082

MANUFACTURER AND MODEL NO.: Limitorque SMB-3-100

SYSTEM - P&ID NO.: Decay Heat Removal System M-232

LOCATION: Room 79

• SAFETY FUNCTION:

CV-1400 is required to open on an Engineered Safeguards Actuation System (ESAS) Low Pressure Injection signal thus permitting Low Pressure Injection Pump P34B to inject borated water into the reactor vessel. Per an emergency procedure for LOCA CV-1400 is later throttled to keep P34B from operating at run out for long periods of time.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Radiation	3.6E7 rads
Operation Time	30 days

• JUSTIFICATION FOR INTERIM OPERATION:

The major portion of the radiation dose specified for the valve results from recirculating fluid from the Reactor Building sump back to the reactor vessel. This fluid is the Reactor Coolant postulated to be released as a result of a LOCA. CV-1400 is normally closed and opens after receiving an ESAS signal. The initial fluid going through the valve is uncontaminated borated water from the Borated Water Storage Tank (BWST). Fluid flow through the valve increases as reactor coolant pressure decreases until the operator is required to throttle CV-1400 to avoid Low Pressure Injection pump cavitation. This throttling operation is completed prior to switching Low Pressure Injection pump suction to the contaminated fluid in the reactor building sump. Therefore all required valve operation is

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

completed before the valve experiences a dose in excess of its qualified dose, and before the specified time of 30 days. No failure mode has been identified which would cause this valve to close since power is supplied from a remotely located motor control center.

Based on the above, justification for continued operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Decay Heat Removal System Cooler E35A Isolation Motor
Operated Valve and Internal Position Switch

TAG NO(S).: CV-1401

SER RESPONSE PAGE NO(S).: B083

MANUFACTURER AND MODEL NO.: Limitorque SMB-3-100

SYSTEM - P&ID NO.: Decay Heat Removal System M-232

LOCATION: Room 79

• SAFETY FUNCTION:

CV-1401 is required to open on an Engineered Safeguards Actuation System Low Pressure Injection signal thus permitting P34A to inject borated water into the reactor vessel. Per emergency procedure for LOCA, CV-1401 is later throttled to keep P34A from operating at run out for long periods of time.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Radiation	3.6E7 rads
Operating Time	30 days

• JUSTIFICATION FOR INTERIM OPERATION:

The major portion of the radiation dose specified for the valve results from recirculating fluid from the reactor building sump back to the reactor vessel. This fluid is the Reactor Coolant postulated to be released as a result of a LOCA. CV-1401 is normally closed and opens after receiving an ESAS signal. The initial fluid going through the valve is uncontaminated borated water from the Borated Water Storage Tank. Fluid flow through the valve increases as reactor coolant pressure decreases until the operator is required to throttle CV-1401 to avoid Low Pressure Injection pump cavitation. This throttling operation is completed prior to switching LPI pump suction to the contaminated fluid in the reactor building sump. Therefore all required valve operation is completed before the valve experiences a dose in excess of its qualified dose and before the specified time of 30 days. No failure mode has been identified which would cause this valve to close. Since power is supplied from a remotely located motor control center.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Based on the above, justification for interim operations is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Borated Water Storage Tank Supply to Decay Heat Removal Pump
Motor Operated Valve and Internal Position Switches

TAG NO(S).: CV-1407

SER RESPONSE PAGE NO(S).: B089

MANUFACTURER AND MODEL NO.: Limitorque SMB-2-40

SYSTEM - P&ID NO.: Decay Heat Removal M232

LOCATION: Room 56

• SAFETY FUNCTION:

This valve is located on the outlet line from the Borated Water Storage Tank, and is opened upon Low Pressure Injection actuation allowing flow to the suction of pump P34A. The valve is closed when BWST level is low in which case the pump suction draws from the Reactor Building sump.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Radiation	1.9E6 Rads
Operating Time	30 Days

• JUSTIFICATION FOR INTERIM OPERATION:

The primary source of radiation to this valve is circulating water from the reactor building sump. Since circulation of Reactor Building sump water does not occur until the BWST level is low, the valve function is complete at the time of initial exposure to radiation, and prior to the 30 day specified operating time. No failure mode has been identified which would close this valve.

Based on the above, justification for continued operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Borated Water Storage Tank to Decay Heat Removal Pump Motor
Operated Valve and Internal Position Switches

TAG NO(S).: CV-1408

SER RESPONSE PAGE NO(S).: B090

MANUFACTURER AND MODEL NO.: Limitorque SMB-2-40

SYSTEM - P&ID NO.: Decay Heat Removal M-232

LOCATION: Room 56

• SAFETY FUNCTION:

This valve is located on the outlet line from the Borated Water Storage Tank (BWST), and is opened upon Low Pressure Injection (LPI) actuation allowing flow to the suction of pump P-34B. The valve is closed when BWST level is low in which case the pump suction draws from the Reactor Building sump.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Radiation	1.9E6 rads
Operating Time	30 days

• JUSTIFICATION FOR INTERIM OPERATION:

The primary source of radiation to this valve is circulating water from the Reactor Building sump. Since circulation of Reactor Building sump water does not occur until the BWST level is low, the valve function is complete at the time of initial exposure to radiation, and prior to the specified 30 day operating time. No failure mode has been identified which would close this valve since power is supplied from a remotely located motor control center.

Based on the above analysis and engineering judgement, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Intermediate Cooling Water Isolation Valve Actuator and
Internal Position Switch

TAG NO(S).: CV-2220

SER RESPONSE PAGE NO(S).: B101

MANUFACTURER AND MODEL NO.: Rotork 16A

SYSTEM - P&ID NO.: Intermediate Cooling System M-234

LOCATION: Room 77

• SAFETY FUNCTION:

The valve actuator operates CV-2220, the Control Rod Drive and Reactor Coolant Pump coolant isolation valve. The actuator closes the isolation valve on receipt of a Reactor Building isolation signal from the Engineered Safeguards Actuation System (ESAS). The position switch indicates valve position on an ESAS panel.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Temperature 196°F

• JUSTIFICATION FOR INTERIM OPERATION:

CV-2220 is located outside of the Reactor Building. The postulated harsh environment for CV-2220 results from a High Energy Line Break (HELB) outside of the Reactor Building, for which CV-2220 has no safety function. Reactor Building integrity is further assured by qualified isolation valve CV-2221 inside the Reactor Building. Position switch ZS-2220 is qualified by Rotork test reports TR-116 and TR-222 for 340°F for a minimum of 3 days post LOCA, assuring that the operator would not be misled regarding the valve position in the event of valve actuator failure. Test report TR-222 qualifies the actuator for continuous duty at 163°F. The duration of the valve's safety function is less than 1 minute at only 33° above its continuous duty design rating.

Based on engineering judgement and the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Penetration Room Filter Suction Valve Actuator

TAG NO(S).: CV-2123, CV-2133

SER RESPONSE PAGE NO(S).: B169, B175

MANUFACTURER AND MODEL NO.: ITT General 9210

SYSTEM - P&ID NO.: Reactor Building Penetration Room Ventilation M-264

LOCATION: Room 47

• SAFETY FUNCTION:

On receipt of an Engineered Safeguards Actuation System (ESAS) Reactor Building isolation signal, the lead fan VEF-38A is energized and CV-2123 is opened. If after 20 seconds there is not proper flow through the lead system, VEF-38A is stopped and CV-2123 closed due to another ESAS Reactor Building isolation signal. This signal also energizes VEF-38B and opens CV-2133 to allow operation of the standby system.

• QUALIFICATION DISCREPANCY:

Documentation does not envelope the environmental parameters for the following:

Operating Time	30 days
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancy for these valves results from a High Energy Line Break (HELB) outside the Reactor Building. Since the safety function of these valves requires operability for 30 days after a LOCA, which occurs inside the Reactor Building, the required safety operation of the valve is not jeopardized.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Reactor Building Penetration Room Filter Minimum Flow Valve Actuator

TAG NO(S).: CV-2126

SER RESPONSE PAGE NO(S).: B171

MANUFACTURER AND MODEL NO.: ITT General 9210

SYSTEM - P&ID NO.: Reactor Building Penetration Room Ventilation System
Airflow M-264

LOCATION: Room 47

• SAFETY FUNCTION:

Airflow must be circulated, at a minimum of 40 scfm, through an iodine-exposed charcoal filter to prevent the filter from reaching a combustion temperature of 650°F and igniting. After the lead filtration system has operated for a long time, resulting in high radiation levels at the filter discharge, the stand-by system can be initiated. By opening CV-2126, minimum flow is maintained through the lead system filter by the operating stand-by system.

• QUALIFICATION DISCREPANCY:

Documentation does not envelope the environmental parameters for the following:

Operating Time	30 Days
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancy for CV-2126 results from a HELB outside the Reactor Building. Since the safety function of the valve requires operability within 30 days after a LOCA, which occurs inside of the Reactor building, the required safety operation of the valve is not jeopardized.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Penetration Room Filter Minimum Flow Valve Actuator

TAG NO(S).: CV-2136

SER RESPONSE PAGE NO(S).: B177

MANUFACTURER AND MODEL NO.: ITT General 9210

SYSTEM - P&ID NO.: Reactor Building Penetration Room Ventilation System
Airflow M-264

LOCATION: Room 47

• SAFETY FUNCTION:

Airflow must be circulated, at a minimum of 40 scfm, through an iodine-exposed charcoal filter to prevent the filter from reaching a combustion temperature of 650°F and igniting. If the standby filtration system has operated for a long time, resulting in high radiation levels at the filter discharge, the lead system can be initiated. By opening CV-2136, minimum flow is maintained through the stand-by system filter by the operating lead system.

• QUALIFICATION DISCREPANCY:

Documentation does not envelope the environmental parameters for the following:

Operating Time	30 days
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancy for CV-2136 results from a HELB outside the Reactor Building. Since the safety function of the valve requires operability within 30 days after a LOCA, which occurs inside of the Reactor Building, the required safety operation of the valve is not jeopardized.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Intermediate Cooling System Isolation Valve Actuator and
Internal Position Switch

TAG NO(S).: CV-2235

SER RESPONSE PAGE NO(S).: B106

MANUFACTURER AND MODEL NO.: Rotork 14A

SYSTEM - P&ID NO.: Intermediate Cooling System M-234

LOCATION: Room 77

• SAFETY FUNCTION:

The valve actuator operates CV-2235, the coolant inlet isolation valve. The actuator is required to close CV-2235 on receipt of a Reactor Building isolation signal from the Engineered Safeguards Actuation System (ESAS). The position switch indicates valve position on an ESAS panel in the Control Room.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Temperature 196°F

• JUSTIFICATION FOR INTERIM OPERATION:

CV-2235 is located outside of the Reactor Building. The postulated harsh environment for CV-2235 results from a High Energy Line Break (HELB) outside of the Reactor Building, for which CV-2235 has no safety function. Reactor Building integrity is assured by an isolation check valve ICW-30 inside the Reactor Building. Position switch ZS-2235 is qualified by Rotork test reports TR-116 and TR-222 for 340°F for a minimum of 3 days post-LOCA, assuring that the operator would not be misled regarding the valve position in the event of valve actuator failure. Test TR-222 qualifies the actuator for continuous duty at 163°F. The duration of the valve's safety function is less than 1 minute at only 33°F above its continuous duty design rating.

Based on engineering judgement and the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Emergency Feedwater Pump Steam Admission Bypass Valve,
Including Position Switch

TAG NO(S).: CV-2626

SER RESPONSE PAGE NO(S).: B004

MANUFACTURER AND MODEL NO.: Rotork 14A

SYSTEM - P&ID NO.: Emergency Feedwater M-204

LOCATION: Room 46

• SAFETY FUNCTION:

This valve is a backup (bypass) to block valve CV-2620 and allows flow from the Emergency Feedwater pump discharge to steam generator E24B.

• QUALIFICATION DISCREPANCY:

Specified temperature is 173°F and the component is qualified for 163°F.

• JUSTIFICATION FOR INTERIM OPERATION:

Upon Emergency Feedwater (EFW) actuation, environmentally qualified block valve CV-2620 opens. If the block valve should fail to open, bypass valve CV-2626 can be opened manually, if necessary, to provide EFW to the Once Through Steam Generator. Once the bypass valve is open, no known failure mode exists that would cause it to close. Furthermore, since one steam generator is sufficient to remove core heat under accident conditions, only one of the two block valves or one of the two bypass valves needs to function to achieve safe emergency shutdown of the plant. The bypass valve has been shown by testing to function properly at a temperature just 10°F below the conservatively high estimate of the compartmental analysis. The valve would serve its safety function after a HELB, based on engineering judgement.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Emergency Feedwater Pump Discharge Valve to Steam Generator
E24A (Includes Internal Position Switch)

TAG NO(S).: CV-2627

SER RESPONSE PAGE NO(S).: B005

MANUFACTURER AND MODEL NO.: Rotork 14A

SYSTEM - P&ID NO.: Emergency Feedwater M-204

LOCATION: Room 53

• SAFETY FUNCTION:

This valve is a backup (bypass) to block valve CV-2670 and allows flow from the Emergency Feedwater pump discharge to steam generator E24A.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Temperature 213°F

• JUSTIFICATION FOR INTERIM OPERATION:

Upon Emergency Feedwater (EFW) actuation, environmentally qualified block valve CV-2670 opens. If the block valve should fail to open, bypass valve CV-2627 can be opened manually, if necessary, to provide EFW to the Once Through Steam Generator. Once the bypass valve is open, no known failure mode exists that would cause it to close since power is supplied from a remotely located motor control center. Furthermore, since one steam generator is sufficient to remove core heat under accident conditions, only one of the two block valves or one of the two bypass valves needs to function to achieve safe emergency shutdown of the plant. The bypass valve has been shown by testing to function properly at a temperature just 10°F below the conservatively high estimate of the compartmental analysis. The valve would serve its safety function after a HELB, based on engineering judgement.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Emergency Feedwater Pump Turbine Steam Admission Valve,
including Internal Position Switch

TAG NO(S).: CV-2667

SER RESPONSE PAGE NO(S).: B011

MANUFACTURER AND MODEL NO.: Limitorque SMB-000-5

SYSTEM - P&ID NO.: Steam Generator Secondary M-206

LOCATION: Room 170

• SAFETY FUNCTION:

Normally closed valve CV-2667 is required to open in order to supply main steam to the Emergency Feedwater Pump Turbine on receipt of a Steam Line Break Isolation Channel (SLBIC) "A" signal. CV-2667 must be manually reclosed if the break is upstream of the "A" Once Through Steam Generator (OTSG) main steam isolation valve.

• QUALIFICATION DISCREPANCY:

The specified temperature is 390°F, and the valve is qualified to 340°F.

• JUSTIFICATION FOR INTERIM OPERATION:

The high temperature environment leading to failure of CV-2667 is the result of a postulated mainsteam line break immediately downstream from a Reactor Building penetration. CV-2667 is further downstream in the same line. The normal safety function for CV-2667 is to open, which would not be required following the break upstream of CV-2667. CV-2667 is also required to be manually closed following an upstream break in order to isolate the break. CV-2667 is qualified for duty at 250°F, and its environment will peak at 390°F. If the operator is able to identify the break location and close the valve within a few seconds after the break, thermal lag of the valve and actuator housings should allow the valve to complete its function, based on engineering judgement. Additionally, the turbine driven EFW pump is backed up by a motor driven pump, and the reactor decay heat can be successfully removed using primary bleed and feed.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Service Water Supply to Decay Heat Unit Cooler Control Valve

TAG NO(S).: CV-3800

SER RESPONSE PAGE NO(S).: B024

MANUFACTURER AND MODEL NO.: Rotork 6A

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 53

• SAFETY FUNCTION:

CV-3800 is required to open to supply service water to auxiliary building decay heat removal unit cooler VUC1D, on either manual actuation or automatic actuation upon failure of primary cooler VUC1D.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Temperature 213°F

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment to which CV-3800 is exposed ramps from ambient to 213°F and back down to ambient within less than 8 minutes. CV-3800 is qualified for continuous duty operation at 163°F. The time during which the environment is above the rated 163°F is less than 90 seconds. Although the surface temperature of the valve might reach equilibrium with the environment within 90 seconds, the internal components of the valve and actuator would be expected to remain at a substantially lower temperature due to the thermal inertia of the valve and actuator housings, based on engineering judgement. Additionally, the actuation of CV-3800 would not be required until "a considerable period of time"¹ after the [harsh environment producing] reactor coolant letdown line break, assuring that the valve and operator would be fully cooled to ambient before actuation.

Therefore, based on engineering judgement, justification for interim operation is demonstrated.

¹FSAR Appendix A pg. A-29

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Service Water Supply Valve to Decay Heat Unit Cooler

TAG NO(S).: CV-3801

SER RESPONSE PAGE NO(S).: B025

MANUFACTURER AND MODEL NO.: Rotork 6A

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 53

• SAFETY FUNCTION:

CV-3801 is required to open to supply service water to auxiliary building decay heat removal unit cooler VUC1B, on either manual actuation or automatic actuation occurring upon failure of primary cooler VUC1A.

• QUALIFICATION DISCREPANCY:

The specified temperature is 213°F, and the component is qualified to 163°F.

• JUSTIFICATION FOR INTERIM OPERATION:

During post-LOCA recirculation, when the valve performs a safety function, CV-3801 is not exposed to a high temperature.

The harsh environment to which CV-3801 is exposed ramps from ambient to 213°F and back down to ambient within less than 8 minutes. CV-3801 is qualified for continuous duty at 163°F. The time during which the environment is above the rated 163°F is less than 90 seconds. Although the surface temperature of the valve might reach equilibrium with the environment within 90 seconds, the internal components of the valve and actuator would be expected to remain at a substantially lower temperature due to the thermal inertia of the valve and actuator housings, based on engineering judgment. Additionally, the actuation of CV-3801 would not be required until "a considerable period of time¹ after the reactor coolant letdown line break", assuring that the valve and operator would be fully cooled to ambient before actuation.

¹ FSAR Appendix A Pg. A-29

Based on the above, justification for interim operations is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Service Water Supply to Decay Heat Cooler Control Valve

TAG NO(S).: CV-3802

SER RESPONSE PAGE NO(S).: B026

MANUFACTURER AND MODEL NO.: Rotork 6A

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 53

• SAFETY FUNCTION:

CV-3802 is required to open to supply service water to auxiliary building decay heat removal unit cooler VUC1C, on either manual actuation or automatic actuation when decay heat removal pump 34A or 34B is started.

• QUALIFICATION DISCREPANCY:

The specified temperature is 213°F, and the component is qualified to 163°F.

• JUSTIFICATION FOR INTERIM OPERATION:

During post-LOCA recirculation, when this valve performs a safety function, CV-3802 is not exposed to a harsh environment.

The harsh environment to which CV-3802 is exposed during a HELB, ramps from ambient to 213°F and back down to ambient within less than 8 minutes. CV-3802 is qualified for continuous duty operation at 163°F. The time during which the environment is above the rated 163°F is less than 90 seconds. Although the surface temperature of the valve might reach equilibrium with the environment within 90 seconds, the internal components of the valve and actuator would be expected to remain at a substantially lower temperature due to the thermal inertia of the valve and actuator housings based on engineering judgment. Additionally, the actuation of CV-3802 would not be required until "a considerable period of time"¹ after the reactor coolant letdown line break", assuring that the valve and operator would be fully cooled to ambient before actuation.

Based on the above, justification for interim operations is demonstrated.

¹ FSAR Appendix A Pg. A-29

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Service Water Supply to Decay Heat Unit Cooler Control Valve

TAG NO(S).: CV-3803

SER RESPONSE PAGE NO(S).: B027

MANUFACTURER AND MODEL NO.: Rotork 6A

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 57

• SAFETY FUNCTION:

CV-3803 is required to open to supply service water to auxiliary building decay heat removal unit cooler VUC1A, on either manual actuation or automatic actuation when decay heat removal pump 34A or 34B is started.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Temperature 178°F

• JUSTIFICATION FOR INTERIM OPERATION:

During post-LOCA recirculation, when the valve performs a safety function, CV-3803 is not exposed to a high temperature.

The harsh environment to which CV-3803 is exposed, during a HELB, ramps from ambient to 178°F and back down to ambient within than 8 minutes. CV-3803 is qualified for continuous duty operation at 163°F. The time during which the environment is above the rated 163°F is less than 90 seconds. Although the surface temperature of the valve might reach equilibrium with the environment within 90 seconds, the internal components of the valve and actuator would be expected to remain at a substantially lower temperature due to the thermal inertia of the valve and actuator housings, based on engineering judgment. Additionally, the actuation of CV-3803 would not be required until "a considerable period of time"¹ after the [harsh environment producing] reactor coolant letdown line break", assuring that the valve and operator would be fully cooled to ambient before actuation.

Based on the above, justification for interim operations is demonstrated.

¹ FSAR Appendix A Pg. A-29

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Service Water Supply Control Valve, Including Position Switch, To Make Up Pump Lube Oil and Room Coolers

TAG NO(S).: CV-3808

SER RESPONSE PAGE NO(S).: B032

MANUFACTURER AND MODEL NO.: Rotork 6A

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 56

• SAFETY FUNCTION:

CV-3808 is required to open to provide service water to the makeup pump lube oil and room coolers. The valve opens automatically when Makeup Pump P36A starts, or can be opened manually.

• QUALIFICATION DISCREPANCY:

The specified temperature is 178°F, and the valve is qualified for 163°F.

• JUSTIFICATION FOR INTERIM OPERATION:

CV-3808 is exposed to a harsh environment due to a reactor coolant letdown line break. The temperature and pressure profiles for this break reveal that the duration of the temperature spike above the qualified temperature for CV-3808 is approximately 90 seconds. The valve's safety function will be accomplished within 25 seconds (FSAR Sec. 6.1.3.1). CV-3808 is qualified for continuous operation at 163°F. Although the surface temperature of the valve and actuator might reach thermal equilibrium with the environment within 25 seconds, the internal components of the valve and actuator would be expected to remain at a substantially lower temperature due to the thermal inertia of the valve and actuator housings, based on engineering judgement. No failure mode has been identified which would cause this valve to close once it has opened since electrical power is supplied from a remotely located motor control center.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Service Water Supply to Makeup Pump Lube Oil and Room Coolers
Control Valve and Internal Position Switch

TAG NO(S).: CV-3809

SER RESPONSE PAGE NO(S).: B033

MANUFACTURER AND MODEL NO.: Rotork 6A

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 55

• SAFETY FUNCTION:

CV-3809 is required to open to provide service water to the makeup (M.U.) pump lube oil and room coolers. The valve opens automatically when M.U. pump P-36B starts, or manually upon HS-3809 open signal.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Temperature: 178°F

• JUSTIFICATION FOR INTERIM OPERATION:

CV-3809 is exposed to a harsh environment due to a reactor coolant letdown line break. The temperature and pressure profiles for this break reveal that the duration of the temperature spike above the qualified temperature for CV-3809 is approximately 90 seconds. The valve's safety function will be accomplished within 25 seconds (FSAR Sec. 6.1.3.1). CV-3809 is qualified to operate continuously at 163°F. Although the surface temperature of the valve and actuator might reach thermal equilibrium with the environment within 25 seconds, engineering judgement indicates that the internal components of the valve and actuator would remain at a substantially lower temperature due to the thermal inertia of the valve and actuator housings. Successfully achieving safe shutdown will be assured by two additional trains, only one of which is required to mitigate the initiating event (FSAR Page 14-48).

Based on engineering judgement and the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Service Water Supply Control Valve, Including Position Switch, To Makeup Pump Lube Oil And Room Coolers

TAG NO(S).: CV-3810

SER RESPONSE PAGE NO(S).: B034

MANUFACTURER AND MODEL NO.: Rotork 64

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 54

• SAFETY FUNCTION:

CV-3810 is required to open to provide service water to the makeup pump lube oil and room coolers. The valve opens automatically when Makeup Pump P-36B starts, or can be manually opened.

• QUALIFICATION DISCREPANCY:

The specified temperature is 178°F, and the valve is qualified for 163°F.

Temperature: 178°F

• JUSTIFICATION FOR INTERIM OPERATION:

CV-3810 is exposed to a harsh environment due to a reactor coolant letdown line break. The temperature and pressure profiles for this break reveal that the duration of the temperature spike above the qualified temperature for CV-3810 is approximately 90 seconds. The valve's safety function will be accomplished within 25 seconds (FSAR Sec. 6.1.3.1). CV-3810 is qualified for continuous operation at 163°F. Although the surface temperature of the valve and actuator might reach thermal equilibrium with the environment within 25 seconds, the internal components of the valve and actuator would be expected to remain at a substantially lower temperature due to the thermal inertia of the valve and actuator housings, based on engineering judgement. No failure mode has been identified which would cause this valve to close once it has opened since power is supplied from a remotely located motor control center.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Decay Heat Removal Cooler Outlet Valve Operator

TAG NO(S).: E/H-1428

SER RESPONSE PAGE NO(S).: B091

MANUFACTURER AND MODEL NO.: Bailey RP1211

SYSTEM - P&ID NO.: Decay Heat Removal System M-232

LOCATION: Room 14

• SAFETY FUNCTION:

The function of E/H 1428 is to operate valve CV-1428. The operation of CV-1428 controls heat exchanger discharge flow thereby regulating Reactor Coolant temperature.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1 psig
Relative Humidity	100%
Radiation	1.6E7 Rads

• JUSTIFICATION FOR INTERIM OPERATION:

Since valve CV-1428 remains open during plant normal operation, and the valve is required to be open in the accident condition, heat removal is assured. The presence of the harsh environment will not close the valve since electrical power is supplied from a remotely located motor control center and the valve fails in the open position. Therefore, safe shutdown of the plant will not be inhibited.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Decay Heat Removal Cooler Outlet Valve Operator

TAG NO(S).: E/H-1429

SER RESPONSE PAGE NO(S).: B092

MANUFACTURER AND MODEL NO.: Bailey RP1211

SYSTEM - P&ID NO.: Decay Heat Removal System M-232

LOCATION: Between Rooms 10 and 11

• SAFETY FUNCTION:

The function of E/H-1429 is to operate valve CV-1429. The operation of CV-1429 controls heat exchanger discharge flow thereby regulating Reactor Coolant temperature.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1 psig
Relative Humidity	100%
Radiation	3E7 Rads

• JUSTIFICATION FOR INTERIM OPERATION:

Since valve CV-1429 remains open during plant normal operation, and the valve is required to be open in the accident condition, heat removal is assured. The presence of the harsh environment will not close the valve, since electrical power is supplied from a remotely borated motor control center and the valve fails in the open position. Therefore, safe shutdown of the plant will not be inhibited.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Triaxial Instrumentation Cable

TAG NO(S).: GEN-1001

SER RESPONSE PAGE NO(S).: A098

MANUFACTURER AND TYPE NO.: Boston Insulated Wire & Cable RG11/U

SYSTEM - P&ID NO.: Nuclear Instrumentation (None)

LOCATION: Reactor Building

• SAFETY FUNCTION:

These cables are used as signal and high voltage cables on all channels of the Nuclear Instrumentation System.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	280°F
Pressure	53.82 psig
Relative Humidity	100%
Radiation	5.0E7 rads
Chemical Spray	15,000 PPM Boric Acid PH 10.5 @ 77°F

• JUSTIFICATION FOR INTERIM OPERATION:

Further investigation since the SER response was submitted, revealed that the triaxial cables are signal and high voltage cables to the Nuclear Instrumentation System detectors. The detectors are excluded from the scope of IEB 79-01B; Therefore qualification to be specified environmental parameters is not required.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Signal Cable

TAG NO(S).: Gen-1002

SER RESPONSE PAGE NO(S).: A099

MANUFACTURER AND TYPE NO.: Boston Insulated Wire & Cable PN 8374-H-002

SYSTEM - P&ID NO.: Various

LOCATION: Reactor Building

• SAFETY FUNCTION:

Class 1E instrumentation cable for class 1E equipment.

• QUALIFICATION DISCREPANCY:

At the time of the original SER response, documentation was not available to qualify the cables to the following parameters:

Operating Time	30 days
Temperature	280°F
Pressure	53.82 psig
Relative Humidity	100%
Radiation	5.0E7 rads
Chemical Spray	15,000 ppm Boric Acid PH 10.5 @ 77°F

• JUSTIFICATION FOR INTERIM OPERATION:

The Class 1E instrumentation cables installed at ANO-1 were manufactured by Boston Insulated Wire and Cable Company (BIW). The cable construction consists of a Bostrad 7 [Chlorosulfonated Polyethylene (CSPE)] insulation with an overall Bostrad 7 Jacket. BIW Test Report No. B901, September 1969, flame and radiation resistant cables for nuclear power plants, tested Bostrad 7 for environmental parameters present during a LOCA. Test results are indicative of the qualification of Bostrad 7 to satisfactorily perform in a LOCA environment. Additionally, the cable is designed to maintain its physical and electrical properties after exposure to 1.6 E8 Rads. The test demonstrated the satisfactory performance of Bostrad 7 during a LOCA test following irradiation of the test samples to 5.5×10^7 Rads. The test temperature and pressure profiles ramp from ambient to 318°F, 100% relative humidity and 60 psig within 10 seconds, and maintain these conditions for more than 150 minutes, then slowly ramp down. The test also included a chemical spray of dilute sodium hydroxide and boric acid solution.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

The test envelopes the containment LOCA environment specified for ANO-1.

Based on the above justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Electrical Cable

TAG NO(S).: GEN-1010

SER RESPONSE PAGE NO(S).: A105

MANUFACTURER AND MODEL NO.: Okonite 600V

SYSTEM - P&ID NO.: Various Safety Systems

LOCATION: Reactor Building

• SAFETY FUNCTION:

Class IE Power and Control Cable for Class IE equipment.

• QUALIFICATION DISCREPANCY:

The qualification documentation referenced in this SER response does not support qualification of the cable for the required 30-day operative time.

• JUSTIFICATION FOR INTERIM OPERATION:

The IE Power and control cables installed at ANO-1 were manufactured by the Okonite Company. The IE cable construction consists of Okonite (Ethylene-Propylene Rubber) insulation with an overall Okoprene (Neoprene) jacket. The Okonite Company test report ER-110E, referenced in the SER, contained test results for Okonite insulated/Okoprene jacketed test samples. These test results are indicative of the qualification of these IE cables for simulated LOCA conditions, except for operating time. The Franklin Institute Research Laboratory tested representative samples of Okonite Company cables, including Okonite insulated (unjacketed) and Okonite insulated/Okoprene jacketed combinations (FIRL Technical Report F-C3694, January 1974). This test subjected the samples to a 31-day LOCA simulation, followed by a 100-day test at rated voltage in a 212°F steam environment. The test report concluded that the ethylene-propylene base product line demonstrated satisfactory electrical performance under simulated LOCA conditions. The total radiation dose to which the cables were exposed was 2×10^8 RADS, and the temperature/pressure profile included two transients to 346°F/113 psig, well above the maximum parameters specified for ANO-1. Chemical spray consisting of 2,000 ppm boric acid buffered to a pH of 9 to 11 was applied during the test.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

Based on the above, justification for interim operations is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Sump Level Sensor

TAG NO(S).: LE-1405B

SER RESPONSE PAGE NO(S).: A052

MANUFACTURER AND MODEL NO.: Gems XM-54854-56-2000

SYSTEM - P&ID NO.: Decay Heat Removal System M-232

LOCATION: Reactor Building

• SAFETY FUNCTION:

This component is installed in the Reactor Building sump and provides the operator with a sump level reading to be used as a diagnostic parameter, as specified in the emergency procedures.

• QUALIFICATION DISCREPANCY:

Testing is in progress to determine whether LE-1405B is qualified for the following parameters:

Operating Time	30 Days
Temperature	280°F
Pressure	53.82 psig
Relative Humidity	100%
Chemical Spray	15000 ppm Boric Acid ph 10.5 @77°F
Radiation	1.44×10^7 rad

• JUSTIFICATION FOR INTERIM OPERATION:

AP&L files contain a test report that qualified this device for a 300°F/59 psig/100% relative humidity/boric acid environment (15,000 ppm, pH10.5 @ 77°F) for 4 hours. In addition, another test report qualifies this instrument for a 150°F boric acid environment for 14 days and 2.0×10^8 rads. Testing to be completed at Wyle Laboratories in June 1982 is expected to show that the specified conditions will not cause malfunctioning of this sensor in the specified time period of 30 days. Also, there is a redundant sensor, LE-1405, that is used as a backup. Both of these sensors indicate Reactor Building sump levels only, and cannot be used for containment flood level indication. A Borated Water Storage Tank low level indication can also verify a Reactor Building sump level upon failure of LE-1405 and LE-1405B.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

LE-1405B was added as part of the Three Mile Island Action Plan requirement in NUREG-0737, and is being tested to insure qualification to the IEEE 323 1974 Standards.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Pressurizer Level Transmitters
TAG NO(S).: LT-1000, LT-1001, LT-1002
SER RESPONSE PAGE NO(S).: A014, A016, A018
MANUFACTURER AND MODEL NO.: Bailey BY-3X40X-A,
SYSTEM - P&ID NO.: Reactor Coolant System M-230
LOCATION: Reactor Building

• SAFETY FUNCTION:

These level transmitters are responsible for generating the signals required for the pressurizer level indicators located in the control room.

• QUALIFICATION DISCREPANCY:

These transmitters are subjected to a chemical spray of 15,000 ppm Boric Acid (pH 10.5) at 77°F. No documentation exists to qualify the operation of these transmitters for 24 hours in this environment.

• JUSTIFICATION FOR INTERIM OPERATION:

The casings for these transmitters are constructed of #316 stainless steel, and are classified as NEMA 7D Hazardous Locations enclosures. Operation of the transmitters is required for 24 hrs. after the initiation of a LOCA. Based upon this information and engineering judgement, the harsh boric acid environment would not be expected to jeopardize the proper functioning of the transmitters during this time period.

Since each of these transmitters is independent from the others, failure of up to two of the transmitters can occur without causing loss of pressurizer level indication in the control room.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Steam Generator Secondary Level Transmitter

TAG NO(S).: LT-2609, LT-2614, LT-2659, LT-2664

SER RESPONSE PAGE NO(S).: A001, A002, A005, A006

MANUFACTURER AND MODEL NO.: Bailey BY-8B41X-A

SYSTEM - P&ID NO.: Steam Generator Secondary M-206

LOCATION: Reactor Building

• SAFETY FUNCTION:

These components transmit the Once Through Steam Generator (OTSG) secondary level signal to the control room to indicate feedwater delivery to the OTSG and thereby assure proper core heat removal. LT-2064 and LT-2659 indicate level in the low range and the high range, respectively, for OTSG E24A. LT-2614 and LT-2609 are the corresponding components for OTSG E24B.

• QUALIFICATION DISCREPANCY:

These transmitters are subjected to a chemical spray of 15,000 ppm Boric Acid (pH 10.5) at 77°F. No documentation exists to qualify the operation of these transmitters for 8 hours in this environment.

• JUSTIFICATION FOR INTERIM OPERATION:

The casings for these transmitters are constructed of stainless steel number 316, and are classified as NEMA 7D Hazardous Location enclosures. The specified operation time for these components is the first eight hours after accident initiation. Based upon this information and engineering judgement, the harsh chemical spray environment would not be expected to damage the instruments and jeopardize proper functioning during this time period. Each OTSG is supplied with identical corresponding level transmitters that perform a redundant function on an independent Instrumentation Control System channel.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hot Leg Pressure Differential Transmitters

TAG NO(S).: PDT-1028, PDT-1029, PDT-1030, PDT-1031, PDT-1034, PDT-1035,
PDT-1036, PDT-1037

SER RESPONSE PAGE NO(S).: A027 thru and including A034

MANUFACTURER AND MODEL NO.: Bailey BY-3X41-A

SYSTEM - P&ID NO.: Reactor Coolant System M-230

LOCATION: Reactor Building

• SAFETY FUNCTION:

There are four Pressure Differential Transmitters (PDT's) on the hot leg of each of the two Reactor Coolant System (RCS) loops. Each PDT of Loop A will have a single corresponding PDT on Loop B, and the pair form an input to one of the four Reactor Protection System channels. The flow information derived by these PDT's is monitored by the plant computer and used in conjunction with neutron flux signals to generate the set point for Reactor Power Trip Based on Imbalance and Flow Functions. A two out of four logic is used to generate the trip signal.

• QUALIFICATION DISCREPANCY:

These transmitters are subjected to a chemical spray of 15,000 ppm Boric Acid (pH 10.5) at 77°F. No documentation exists to qualify the operation of these transmitters for 24 hours in this environment.

• JUSTIFICATION FOR INTERIM OPERATION:

The casings for these transmitters are constructed of #316 stainless steel, and are classified as NEMA 7D Hazardous Location enclosures. The specified operation time for these components is the first eight hours after accident initiation. Based upon this information and engineering judgement, the harsh boric acid environment would not be expected to jeopardize the proper functioning of the transmitters during this time period.

If the transmitters should fail, the protection channel trip relay is de-energized insuring safe operation upon failure.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Emergency Feedwater Flow Indicating Pressure Differential Transmitters

TAG NO(S).: PDT-2670A, PDT-2670B

SER RESPONSE PAGE NO(S).: B007, B008

MANUFACTURER AND MODEL NO.: Rosemount 1152DP

SYSTEM - P&ID NO.: Emergency Feedwater M-204

LOCATION: Room 79

• SAFETY FUNCTION:

These transmitters indicate Emergency Feedwater (EFW) flow through flow measuring orifice FO-2670 to Once Through Steam Generator (OTSG) E24A.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Radiation 3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

Upon accident initiation, the main feedwater system is tripped, and EFW is required. The function of PDT-2670A and PDT-2670B is to transmit the measurement of flow to OTSG E24A by flow element FO-2670. The transmitters are identical in every way except that they are powered by independent supplies. Since the transmitters are required soon after the initial event, and the operating time is 8 hours, the radiation dose received during the EFW operation period will be significantly less than the one year integrated dose of 3.6E7 rads. When the components absorbed dose exceeds the qualification limit of 5.0E6 rads, the EFW, and therefore the transmitters, have completed their function.

The emergency operating procedure for a loss of feedwater event states that the EFW flow should be reverified by checking the steam generator level indicator. Since the function of EFW system is to provide cooling water to the OTSG, the level is the pertinent parameter.

Based on the above, justification for interim operation is determined.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air Exhaust System Pressure Differential Transmitter

TAG NO(S).: PDT-7442

SER RESPONSE PAGE NO(S).: B130

MANUFACTURER AND MODEL NO.: Fischer and Porter 10B2491JC

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

PDT-7442 and flow switch, FS-7442, function together to assure a minimum flow through the stand-by Hydrogen Purge Air Exhaust System before the dehumidifying heater is energized. They also provide a controlling signal to de-energize the heater if the flow terminates, or backflow exists.

• QUALIFICATION DISCREPANCY:

Available qualification documentation does not envelope the following parameters:

Operating Time	30 days
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

There are two main contributors to the 3.6E7 rad dose that PDT-7442 is determined to receive in Room 79. The major contributor is the reactor coolant letdown line (3.6E7 rads). The secondary contribution is from other lines (1.5E5 rads). The reactor coolant letdown line is isolated on an Emergency Safeguards Actuation System (ESAS) Reactor Building isolation signal at the initiation of the LOCA. This isolation excludes the letdown line as a source of radiation to PDT-7442. Documentation exists which qualifies PDT-7442 for a dose of 1.1E7 rads. Based upon this information and engineering judgement, PDT-7442 is not expected to receive a dose in excess of its qualified dose during its required operating period after a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Test results have qualified the operating time of PDT-7442 up to 24 days. Based upon engineering judgement, PDT-7442 can be expected to function properly for an operating period of 30 days.

The redundant lead Hydrogen Purge Air system is available if the stand-by system malfunctions.

Based on the above information and engineering judgements, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Decay Heat Removal Pump Motor
TAG NO(S).: PM-34A
SER RESPONSE PAGE NO(S).: B080
MANUFACTURER AND MODEL NO.: Westinghouse ABDP
SYSTEM - P&ID NO.: Decay Heat Removal System M-232
LOCATION: Room 14

• SAFETY FUNCTION:

Motor PM-34A is required to drive the Decay Heat Removal pump in its Low Pressure Injection mode on receipt of a Low Pressure Injection (LPI) initiation signal from the Engineered Safeguards Actuation Signal (ESAS).

• QUALIFICATION DISCREPANCY:

No qualification information was available, at the time the SER Response was made, to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1 psig
Relative Humidity	100%
Radiation	1.6E7

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, the harsh environment to which PM-34A is exposed, is the result of a Reactor Coolant letdown line HELB outside of the Reactor Building. The pump is not required to operate in the Low Pressure Injection mode for this event. The FSAR states that for this HELB, the letdown line will be isolated automatically within 40 seconds, and that one High Pressure Injection pump alone will successfully mitigate the consequences of this event.

The radiation dose which PM-34A receives (1.6E7 rads) is the result of recirculating LOCA fluids in the pump room. A generic report on environmental qualification of class 1E motors for nuclear out-of-containment use indicates that motors similar to the Decay Heat Removal pump motors installed at ANO-1, would be qualified for 2.0E8 rads. The lubricating oil to these pump motors is Gulf

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Harmony 46, similar to Gulf Harmony 44, which has been demonstrated to be qualified to at least $1.0E7$ rads. The $1.6E7$ rads to which PM-34A is exposed is a one year integrated dose. During the specified 30 day operating time, this dose would be expected to be significantly less, based on engineering judgments. The room in which PM-34A is located is cooled by redundant, dedicated unit coolers for which no credit was taken in the environmental thermal hydraulic analysis.

Based on the above, justification for interim operations is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Decay Heat Removal Pump Motor

TAG NO(S): PM-34B

SER RESPONSE PAGE NO(S): B081

MANUFACTURER AND MODEL NO.: Westinghouse ABDP

SYSTEM - P&ID NO.: Decay Heat Removal System M-232

LOCATION: Room 10

• SAFETY FUNCTION:

Motor PM 34B is required to drive the Decay Heat Removal pump in its Low Pressure Injection mode on receipt of a Low Pressure Injection (LPI) initiation signal from the Engineered Safeguards Actuation System.

• QUALIFICATION DISCREPANCY:

No qualification information was available, at the time the SER response was made, to support qualification to the following parameters.

Operating Time	30 days
Temperature	111°F
Pressure	1 psig
Relative Humidity	100%
Radiation	6.0E6 rads

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, the harsh environment to which PM-34B is exposed, is the result of a Reactor Coolant letdown line HELB outside of the Reactor Building. The pump is not required to operate in the Low Pressure Injection mode for this event. The FSAR states that for this HELB, the letdown line will be isolated automatically within 40 seconds, and that one High Pressure Injection pump alone will successfully mitigate the consequences of this event.

The radiation dose which PM-34B receives (6.0E6 rads) is the result of recirculating LOCA fluids in the pump room. A generic report on environmental qualification of class 1E motors for nuclear out-of-containment use indicates that motors similar to the Decay Heat Removal pump motors installed at ANO-1, would be qualified for 2.0E8 rads. The lubricating oil to these pump motors is Gulf

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Harmony 46, similar to Gulf Harmony 44, which has been demonstrated to be qualified to at least $1.0E7$ rads. The $6.0E6$ rads to which PM-34B is exposed is a one year integrated dose. During the specified 30 day operating time, this dose would be expected to be significantly less. The room in which PM-34B is located is cooled by redundant, dedicated unit coolers for which no credit was taken in the environmental thermal hydraulic analysis.

Based on the above engineering judgement, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Spray Pump Motor

TAG NO(S).: PM-35A

SER RESPONSE PAGE NO(S).: B109

MANUFACTURER AND MODEL NO.: Westinghouse ABDP

SYSTEM - P&ID NO.: Reactor Building Spray and Core Flooding M-236

LOCATION: Room 13

• SAFETY FUNCTION:

Reactor Building spray pump motor PM-35A is required to operate, driving the Reactor Building spray pump on receipt of a Reactor Building spray initiation signal from the Engineered Safeguards Actuation System (ESAS).

• QUALIFICATION DISCREPANCY:

No qualification information was available at the time of the original SER submittal to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1 psig
Relative Humidity	100%
Radiation	1.2E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, the harsh environment to which PM-35A is exposed is the result of a reactor coolant letdown line High Energy Line Break (HELB) outside of the Reactor Building. The reactor building spray pumps are not required to operate for this event. The FSAR states that for this HELB, the letdown line will be automatically isolated within 40 seconds, but the environmental thermal/hydraulic analysis for the room in which PM-35A is located did not take credit for the isolation. Based on engineering judgement, the environment to which PM-35A is exposed would be expected to be significantly less harsh when isolation occurs.

The radiation dose which PM-34B receives (1.2E7 rads) is the result of recirculating LOCA fluids in the pump room. A generic report on environmental qualification of class 1E motors for nuclear out-of-containment use indicates that motors similar to the Reactor

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

Building spray pump motors installed at ANO-1, would be qualified for $2.0E8$ rads. The lubricating oil to the pump motors is Gulf Harmony 46 similar to Gulf Harmony 44, which has been demonstrated to be qualified to at least $1.0E7$ rads. The $1.2E7$ rads to which PM-35A is exposed is a one year integrated dose. During the specified 30 day operating time, engineering judgement indicates that this dose would be significantly reduced.

Based on engineering judgement and the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Spray Pump Motor

TAG NO(S).: PM-35B

SER RESPONSE PAGE NO(S).: B110

MANUFACTURER AND MODEL NO.: Westinghouse ABDP

SYSTEM - P&ID NO.: Reactor Building Spray and Core Flooding M-236

LOCATION: Room 10

• SAFETY FUNCTION:

Reactor Building spray pump motor PM-35B is required to operate, driving the Reactor Building spray pump on receipt of a Reactor Building spray initiation signal from the Engineered Safeguards Actuation System (ESAS).

• QUALIFICATION DISCREPANCY:

No documentation information was available at the time of the original SER submittal to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1 psig
Relative Humidity	100%
Radiation	6.0E6 rads

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, the harsh environment to which PM-35B is exposed is the result of a reactor coolant letdown line High Energy Line Break (HELB) outside of the Reactor Building. The reactor building spray pumps are not required to operate for this event. The FSAR states that for this HELB, the letdown line will be automatically isolated within 40 seconds, but the environmental thermal/hydraulic analysis for the room in which PM-35B is located did not take credit for the isolation. Based on engineering judgement, the environment to which PM-35B is exposed would be expected to be significantly less harsh when isolation occurs.

The radiation dose which PM-35B receives (6.0E6 rads) is the result of recirculating LOCA fluids in the pump room. A generic report on environmental qualification of class 1E motors for nuclear out-of-containment use indicates that motors similar to the Reactor

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Building spray pump motors installed at ANO-1, would be qualified for $2.0E8$ rads. The lubricating oil to the pump motors is Gulf Harmony 46 similar to Gulf Harmony 44, which has been demonstrated to be qualified to at least $1.0E7$ rads. The $6.0E6$ rads to which PM-35B is exposed is a one year integrated dose. During the specified 30 day operating time, engineering judgement indicates that this dose would be significantly reduced.

Based on engineering judgement and the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Makeup and Motor Purification System Pump

TAG NO(S).: PM-36A

SER RESPONSE PAGE NO(S).: B063

MANUFACTURER AND MODEL NO.: Westinghouse ABDP

SYSTEM - P&ID NO.: Makeup and Purification System M-231

LOCATION: Room 56

• SAFETY FUNCTION:

When the Reactor Coolant pressure drops below 1500 psig, these motors are required to drive the High Pressure Injection (HPI) pump 36A.

• QUALIFICATION DISCREPANCY:

Documentation does not exist to support qualification to the following parameters:

Operating Time	30 days
Temperature	178°F
Pressure	1.0 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, the harsh environment specified for this motor is the result of a Reactor Coolant letdown line (RCLB) HELB outside containment. The FSAR states that for this HELB, the letdown line is isolated within 40 seconds, and that one of the three redundant HPI pumps is sufficient to successfully mitigate the consequences of this event. A generic report on environmental qualification of class 1E motors for nuclear out-of-containment use indicates that motors similar to the HPI pump motors installed at ANO-1 would be qualified for continuous operation in a moist 105°C (221°F) atmosphere for a projected life of 40 years. The compartmental analysis for the room in which this component is situated shows that the temperature decreases rapidly after letdown line isolation and reaches 100°F in approximately 7 minutes. In addition, the motor enclosure is of a drip-proof, hazardous conditions design and would not be expected to incur any damage as a result of exposure to a 1.0 psig and 100% relative

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

humidity environment. Furthermore, the qualification report presents test results that shows that motors similar to the ANO-1 HPI pump motors can withstand $2.0E8$ rads without malfunctioning. The lubricating oil to the motor is Gulf Harmony 46, similar to Gulf Harmony 44, which has been demonstrated to be qualified to at least $1.0E7$ rads.

Based on the above, justification for interim operations is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Makeup and Purification System Pump Motor

TAG NO(S).: PM-36B

SER RESPONSE PAGE NO(S).: B064

MANUFACTURER AND MODEL NO.: Westinghouse ABDP

SYSTEM - P&ID NO.: Makeup & Purification M-231

LOCATION: Room 55

• SAFETY FUNCTION:

When the Reactor Coolant pressure drops below 1500 psig, these motors are required to drive the High Pressure Injection pump P-36B.

• QUALIFICATION DISCREPANCY:

No qualification documentation existed when the SER response was submitted for the following parameters:

Operating Time	30 days
Temperature	178°F
Pressure	1.0 psig
Relative Humidity	100%

In addition, the specified radiation dose is 2.4E6 and the component is qualified for 1.0E5.

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, the harsh environment specified for this motor is the result of a Reactor Coolant letdown line HELB outside containment. The FSAR states that for this HELB, the letdown line is isolated within 40 seconds, and that one of the two remaining High Pressure Injection (HPI) pumps is sufficient to successfully mitigate the consequences of this event. A generic report on environment qualification of class 1E motors for nuclear out-of-containment use indicates that motors similar to the HPI Pump motors installed on ANO-1 would be qualified for continuous operation in a moist 105°C (221°F) atmosphere for a projected life of 40 years. The compartmental analysis for the room in which this component is situated shows that the temperature decreases rapidly after letdown line isolation and reaches 100°F in approximately 7 minutes. In addition, the motor enclosure is of a drip-proof, hazardous conditions design and would not be expected to incur any damage as a result of exposure to 1.0 psig and 100% relative

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

humidity environment. Furthermore, the qualification report presents test results that shows that motors similar to the ANO-1 HPI pump motors can withstand $2.0E8$ rads without malfunctioning. The lubricating oil to the motor is Gulf Harmony 46, similar to Gulf Harmony 44, which has been demonstrated to be qualified to at least $1.0E7$ rads.

Based on the above engineering judgement, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Make-Up and Purification Pump Motor

TAG NO(S).: PM-36C

SER RESPONSE PAGE NO(S).: B065

MANUFACTURER AND MODEL NO.: Westinghouse, ABDP

SYSTEM - P&ID NO.: Makeup & Purification M-231

LOCATION: Room 54

• SAFETY FUNCTION:

When the RC pressure drops below 1500 psig, these motors are required to drive the HPI pump 36C.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	178°F
Pressure	1.0 psig
Relative Humidity	100%
Radiation	1.9E6 rads

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, the harsh environment specified for this motor is the result of a RC letdown line HELB outside containment. The FSAR states that for this HELB, the letdown line is isolated within 40 seconds, and that one of the three redundant High Pressure Injection (HPI) pumps is sufficient to successfully mitigate the consequences of this event. A generic report on environmental qualification of class 1E motors for nuclear out-of-containment use indicates that motors similar to the HPI. Pump motors installed at ANO-1 would be qualified for continuous operation in a moist 105°C (221°F) atmosphere for a projected life of 40 years. The compartmental analysis for the room in which this component is situated shows that the temperature decreases rapidly after letdown line isolation and reaches 100°F in approximately 7 minutes. In addition, the motor enclosure is of a drip-proof, hazardous conditions design and would not be expected to incur any damage as a result of exposure to 1.0 psig and 100% relative humidity environment. Furthermore, the qualification report presents test results that shows that motors similar to the ANO-1 HPI

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

pump motors can withstand $2.0E8$ rads without malfunctioning. The lubricating oil to the motor is Gulf Harmony 46, similar to Gulf Harmony 44, which has been demonstrated to be qualified to at least $1.0E7$ rads.

Based on engineering judgement and the above information, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Pressure Switch
TAG NO(S).: PS-2400, PS-2401, PS-2402, PS-2403
SER RESPONSE PAGE NO(S).: A-058, A-059, A-060, A-061
MANUFACTURER AND MODEL NO.: ITT Barton 288A
SYSTEM - P&ID NO.: Reactor Building Spray and Core Flood M-236
LOCATION: Reactor Building

• SAFETY FUNCTION:

Each of these switches is connected to a separate Reactor Protection System channel and generates a reactor trip signal on high Reactor Building pressure.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	280°F
Pressure	53.82 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Based on the FSAR the environmental parameters specified for these switches are the calculated results for the design basis LOCA. In such an event, the set point of 4 psig for these switches will be reached in less than one second after break initiation. This time will be well before the peak pressure and temperature conditions are reached in the containment. In addition, the design of these components is such that if they should become damaged, they would be expected to fail in the "trip" (open circuit) position and thereby serve their safety function. A signal from two of the four switches is sufficient to provide reactor trip.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air System Exhaust Fan Seal Water Pressure Switch

TAG NO(S).: PS-7500

SER RESPONSE PAGE NO(S).: B143

MANUFACTURER AND MODEL NO.: Barksdale D2T-M150SS

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 46

• SAFETY FUNCTION:

This switch allows operation of the Hydrogen Purge air system lead exhaust fan only if the seal water pressure for this fan is greater than the set point of 35 psig.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	173°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for PS-7500 result from a HELB outside the Reactor Building. Since the Hydrogen Purge Air system needs to operate only after a LOCA, the required safety function of PS-7500 is not jeopardized. Furthermore, the stand-by Hydrogen Purge air system is available if the lead system cannot be initiated due to low seal water pressure.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air System Exhaust Fan Seal Water Pressure Switch

TAG NO(S).: PS-7501

SER RESPONSE PAGE NO(S).: B145

MANUFACTURER AND MODEL NO.: Barksdale D2T-M150SS

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

This switch allows operation of the Hydrogen Purge Air system stand-by exhaust fan only if the seal water for the fan is greater than the set point of 35 psig.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

All the qualification discrepancies for PS-7501 except for the one due to radiation, result from a HELB outside of the Reactor Building. Since the Hydrogen Purge Air system needs to operate only after a LOCA, the required safety operation of PS-7501 is not jeopardized due to a HELB.

The discrepancy due to radiation results from the assumption that the 30 day integrated dose to PS-7501 is equivalent to the sum of the 1 year integrated doses it receives, outside containment, from the reactor coolant letdown line (3.6E7 rads) and other sources (1.5E5 rads), after a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

PS-7501 is required to be operational for only 30 days after a LOCA, and is qualified for an integrated dose of $1.0E7$ rads during this period. Since the letdown line is isolated by an Emergency Safeguards Actuation System High Pressure Injection actuation signal after a LOCA, it cannot be a source of $3.6E7$ rads, as noted above. Based on engineering judgement, the safety function of PS-7501 is not significantly jeopardized due to radiation during its required operating time.

Furthermore, LOCA conditions do not jeopardize the operation of the lead Hydrogen Pruge Air system, which is redundant to the standby system.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air System Supply Fan Seal Water Pressure Switch

TAG NO(S).: PS-7502

SER RESPONSE PAGE NO(S).: B147

MANUFACTURER AND MODEL NO.: Barksdale D2T-M150SS

SYSTEM - P&ID NO.: HVAC - Reactor Building

LOCATION: Room 46

• SAFETY FUNCTION:

This switch allows operation of the hydrogen purge air system lead supply fan only if the seal water pressure for this fan is greater than the set point of 35 psig.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	173°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for PS-7502 result from a HELB outside the Reactor Building. Since the Hydrogen Purge Air system needs to operate only after a LOCA, the required safety function of PS-7502 is not jeopardized. Furthermore, the stand-by Hydrogen Purge Air system is available if the lead system cannot be initiated due to low seal water pressure.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air System Supply Fan Seal Water Pressure Switch

TAG NO(S).: PS-7503

SER RESPONSE PAGE NO(S).: B149

MANUFACTURER AND MODEL NO.: Barksdale D2T-M150SS

SYSTEM - P&ID NO.: HVAC-Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

This switch allows operation of the Hydrogen Purge Air system stand-by supply fan only if the seal water pressure for the fan is greater than the set point of 35 psig.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	211 °F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

All the qualification discrepancies for PS-7503 except for the one due to radiation, result from a HELB outside of the Reactor Building. Since the Hydrogen Purge Air system needs to operate only after a LOCA, the required safety operation of PS-7503 is not jeopardized due to a HELB.

The discrepancy due to radiation results from the assumption that the 30 day integrated dose to PS-7503 is equivalent to the sum of the 1 year integrated doses it receives, outside the Reactor Building from the Reactor Coolant letdown line (3.6E7 rads) and other sources (1.5E5 rads), after a LOCA.

PS-7503 is required to be operational for only 30 days after a LOCA, and is qualified for an integrated dose of 1.0E5 rads during this period. Since the letdown line is isolated by an Emergency

• JUSTIFICATION FOR INTERIM OPERATION: (Continued)

Safeguard Actuation System High Pressure Injection actuation signal after a LOCA, it cannot be a source of $3.6E7$ rads, as noted above.

Based on engineering judgement, the safety function of PS-7503 is not significantly jeopardized due to radiation during its required operating time.

Furthermore, LOCA conditions do not jeopardize the operation of the lead Hydrogen Purge Air system, which is redundant to the standby system.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Coolant System Pressure Transmitter

TAG NO(S).: PT-1041

SER RESPONSE PAGE NO(S).: A039

MANUFACTURER AND MODEL NO.: Westinghouse 56PH1224-000

SYSTEM - P&ID NO.: Reactor Coolant System M-230

LOCATION: Reactor Building

• SAFETY FUNCTION:

This instrument is one of four transmitters that initiate an Emergency Safeguards Actuation System (ESAS) signal to actuate High Pressure Injection (HPI) and Low Pressure Injection (LPI) on low Reactor Coolant System (RCS) pressure.

• QUALIFICATION DISCREPANCY:

The specified operating time is 24 hours, but the component is qualified in the specified environment (280°F) for a shorter duration. Qualified operating time is: 8 min. @ 286°F
24 hrs. @ 150°F

This transmitter is also subjected to a chemical spray of 15,000 ppm Boric Acid (pH 10.5) at 77°F. No documentation exists to qualify operation of this transmitter for 24 hours in this environment.

• JUSTIFICATION FOR INTERIM OPERATION:

Plant staff has verified that the function of PT-1041 has been changed such that it no longer has a safety function. PT-1041 is now used to isolate the Decay Heat System upon high RCS pressure. There are three qualified pressure transmitters, one for each of the Engineering Safeguards Actuation System (ESAS) channels, which measure Reactor Coolant System pressure.

Based on the above, the use of PT-1041 for a non-safety related function does not affect the ESAS, and allows PT-1041 to be unqualified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air System Exhaust Radiation Monitor

TAG NO(S).: RE-7442

SER RESPONSE PAGE NO(S).: B131

MANUFACTURER AND MODEL NO.: Eberline Sping 4

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

The safety function of RE-7442 is to monitor the radiation level of the air leaving the reactor building via the hydrogen purge exhaust line.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters.

Radiation - $3.6E7$ rads.

• JUSTIFICATION FOR INTERIM OPERATION:

The only outstanding qualification discrepancy for RE-7442 is the specified one year integrated dose. Two main contributors, in room 79, were identified for this dose. The major contributor is the reactor coolant letdown line ($3.6E7$ rads). The secondary contribution is from other lines ($1.5E5$ rads). The reactor coolant letdown line is isolated on an Emergency Safeguards Actuation System Reactor Building isolation signal, at the initiation of a LOCA. This isolation eliminates the primary source of radiation to RE-7442. Furthermore, plant operating procedures state that both RE-7441 and RE-7442 are only backup radiation elements for the normal range gaseous effluent radiation monitor RX-9835. RE-7441 is on the lead line and RE-7442 is on the backup line.

Based on the above information and engineering judgement, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Coolant Quench Tank Transfer Line Isolation Solenoid Valve

TAG NO(S).: SV-1052

SER RESPONSE PAGE NO(S).: B058

MANUFACTURER AND MODEL NO.: ASCO No Model Number

SYSTEM - P&ID NO.: Reactor Coolant M-230

LOCATION: Room 13

• SAFETY FUNCTION:

This component is actuated on a high Reactor Building pressure Engineered Safeguards Actuation System signal to close the Reactor Building isolation valve (CV-1052) on the Reactor Coolant quench tank transfer line.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment calculated for this valve exists as a result of a HELB outside containment, but this valve is needed only for accidents resulting in a high Reactor Building pressure. If the component should be damaged, it would fail in the closed position and no known mechanism exists that would cause it to reopen. The transfer line is equipped with a redundant environmentally qualified valve inside containment.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Quench Tank Condensate Inlet Line Isolation Valve Solenoid

TAG NO(S).: SV-1065A, SV-1065B

SER RESPONSE PAGE NO(S).: B061, B062

MANUFACTURER AND MODEL NO.: ASCO No Model Number

SYSTEM - P&ID NO.: Reactor Coolant M-230

LOCATION: Room 77

• SAFETY FUNCTION:

These components actuate on a high Reactor Building pressure Engineered Safeguards Actuation System signal to close the Reactor Building isolation valve on the condensate inlet line to the Reactor Coolant quench tank.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment calculated for these components exists as a result of a HELB outside containment, but the isolation valve is only required for breaks resulting in high Reactor Building pressure. Either solenoid can close the valve even without actuation of the other solenoid. In addition, the condensate inlet line to the quench tank is equipped with an isolation check valve inside containment.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Nitrogen Supply Isolation Solenoid Valve

TAG NO(S).: SV-1667

SER RESPONSE PAGE NO(S).: B095

MANUFACTURER AND MODEL NO.: ASCO HTX8347A1

SYSTEM - P&ID NO.: Chemical Addition M-233

LOCATION: Room 77

• SAFETY FUNCTION:

SV 1667, located outside of the Reactor Building, is required to isolate the one inch low pressure N₂ supply line which enters the Reactor Building through a penetration. Isolation occurs on receipt of a Reactor Building isolation signal from the Engineered Safeguards Actuation System, (ESAS), or a manual signal.

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing these discrepancies would exist during a high energy line break outside of the Reactor Building. SV-1667 is not required to isolate the low pressure N₂ supply for events occurring outside of the Reactor Building. Failure of SV-1667 does not degrade any safety-related functions for the stated environmental parameters. SV-1667 is normally closed, and would close on solenoid failure. Reactor Building integrity is further assured by an isolation check valve N₂32 located inside of the Reactor Building.

Based on the above, justification for continued operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Solenoid Valve

TAG NO(S).: SV-1668

SER RESPONSE PAGE NO(S).: B097

MANUFACTURER AND MODEL NO.: ASCO HTX 8347A1

SYSTEM - P&ID NO.: Chemical Addition System M-233

LOCATION: Room 77

• SAFETY FUNCTION:

SV-1668, located outside the Reactor Building, is required to close isolation valve CV-1667, located outside the Reactor Building in the 1" low pressure N₂ supply line through a penetration. Isolation occurs on receipt of a Reactor Building isolation signal from the Engineered Safeguards Actuation System (ESAS), or a manual signal.

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

SV-1668 isolation is initiated by Reactor Building pressure > 4psig (ESAS). The harsh environment leading to failure of SV-1668 would exist following a high energy line break outside of the Reactor Building, for which SV-1668 has no safety function. Failure of SV-1668 does not degrade any safety-related functions for the stated environmental parameters. SV-1668 is normally closed, and would close on solenoid failure. Reactor Building integrity is further assured by a redundant solenoid valve, SV-1667, and by an isolation check valve N₂32 located inside of the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Primary Coolant Quench Tank Sampling Isolation Solenoid Valve

TAG NO(S).: SV-1845

SER RESPONSE PAGE NO(S).: B115

MANUFACTURER AND MODEL NO.: ASCO LB 8320 A8

SYSTEM - P&ID NO.: Sampling System M-237

LOCATION: Room 79

• SAFETY FUNCTION:

SV-1845 is the actuator solenoid for CV-1845, the primary coolant quench tank sampling isolation valve. Its safety function is to de-energize on receipt of Reactor Building isolation signal from the Engineered Safeguards Actuation System (ESAS), which closes CV-1845.

• QUALIFICATION DISCREPANCY:

No documentation exists which would support qualification to the following parameters:

Operating Time	30 days
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

SV-1845 is required to close CV-1845 on pressure inside the Reactor Building of > 4 psig. The harsh environment leading to its failure is the result of a reactor coolant letdown line break outside of the Reactor Building, for which CV-1845 has no safety function.

Additionally:

- 1) Radiation dose to SV-1845 has been reduced by additional calculations to 1.1E6 rads.
- 2) The pressure spike for the initiating event has a duration of < 1 min.
- 3) The temperature spike for the initiating event has a duration of < 10 min.
- 4) The solenoid's safety function is to de-energize to close CV-1845. Solenoid failure results in proper performance of the safety function.

• JUSTIFICATION FOR INTERIM OPERATION (continued):

- 5) No safety function for CV-1845 can be identified in the ANO-1 FSAR past the initial isolation closure, which would occur within seconds of ESAS initiation.
- 6) No failure mode can be identified which would cause re-opening of CV-1845 after solenoid failure.
- 7) Reactor Building integrity is assured by redundant, qualified, isolation valve, CV-1054, inside the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Penetration Room Isolation Solenoid Valves

TAG NO(S).: SV-2100, SV-2101, SV-2102, SV-2103, SV-2104, SV-2105,
SV-2106

SER RESPONSE PAGE NO(S).: B153, B157, B161, B165, B155, B159, B163

MANUFACTURER AND MODEL NO.: ASCO 8321A5

SYSTEM - P&ID NO.: Reactor Building Penetration Room Ventilation M-264

LOCATION: Room 79

• SAFETY FUNCTION:

The safety function for these solenoid valves is to isolate the penetration rooms from their normal ventilation system.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The discrepancy due to radiation results from the one year integrated dose that these valves were determined to receive. The two sources of this radiation dose are the reactor coolant letdown line (3.6E7 rads) and other lines (1.5E5 rads). The reactor coolant letdown line is isolated at the initiation of a LOCA, eliminating the primary source of radiation. Documentation exists which qualifies these valves for doses of 1.0E5 rads. Based on engineering judgement, the safety function of these valves is not significantly jeopardized due to radiation during its required operating time.

The remaining qualification discrepancies occur during a HELB outside the Reactor Building. Since these valves have no safety related operation during a HELB, failure during this event does not jeopardize plant safety.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Letdown Cooler Intermediate Cooling Water Isolation Solenoid Valve

TAG NO(S).: SV-2213, SV-2214

SER RESPONSE PAGE NO(S).: B098, B099

MANUFACTURER AND MODEL NO.: ASCO (Model No. Not Available)

SYSTEM - P&ID NO.: Intermediate Cooling System M-234

LOCATION: Room 77

• SAFETY FUNCTION:

SV-2213 and SV-2214 are located outside of the Reactor Building, and controls the letdown cooler isolation valve, CV-2214. Both SV-2213 and SV-2214 are required to energize to close valve CV-2214.

Isolation occurs following receipt of a Reactor Building isolation signal from the Engineered Safeguards Actuation System (ESAS), or a manual signal.

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

CV-2214 isolation is initiated by Reactor Building pressure > 4 psig. The harsh environment leading to failure of SV-2213/14 would exist only following a High Energy Line Break (HELB) outside of the Reactor Building, for which SV-2213/14 have no safety function. Reactor Building integrity is further assured by a redundant, qualified isolation valve CV-2215 inside of the Reactor Building.

Additionally, failure of SV-2213/14 would not mislead the operator since valve position indication is provided by a separate circuit.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Intermediate Cooling Isolation Solenoid Valve

TAG NO(S).: SV-2233

SER RESPONSE PAGE NO(S).: B102

MANUFACTURER AND MODEL NO.: ASCO

SYSTEM - P&ID NO.: Intermediate Cooling M-234

LOCATION: Room 77

• SAFETY FUNCTION:

SV-2233, located outside of the Reactor Building is required to close isolation valve CV-2233 which isolates the intermediate cooling system letdown coolers. Isolation is automatic upon receipt of a reactor building isolation signal from the Engineered Safeguards Actuation System (ESAS).

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing failure of SV-2233 would exist during a high energy line break outside of the Reactor Building. SV-2233 is not required to isolate the intermediate cooling system letdown coolers for events occurring outside of the Reactor Building. Failure of SV-2233 does not degrade any safety-related functions for the stated environmental parameters. Reactor building integrity is further assured by an isolation check valve, ICW-114, located inside of the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Intermediate Cooling System Isolation Solenoid Valve

TAG NO(S).: SV-2234

SER RESPONSE PAGE NO(S).: B104

MANUFACTURER AND MODEL NO.: ASCO

SYSTEM - P&ID NO.: Intermediate Cooling M-234

LOCATION: Room 77

• SAFETY FUNCTION:

SV-2234, located outside of the Reactor Building, is required to close isolation valve CV-2234 which isolates the intermediate cooling system inlet to the Reactor Coolant Pump (RCP) motor air and lube oil coolers. Isolation is automatic upon receipt of a reactor building isolation signal from the Engineered Safeguards Actuation System (ESAS).

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing failure of SV-2234 would exist during a high energy line break outside of the Reactor Building. SV-2234 is not required to isolate the inlet to the RCP motor air and lube oil coolers for events occurring outside of the Reactor Building. Failure of SV-2234 does not degrade any safety-related functions for the stated environmental parameters. Reactor Building integrity is further assured by an isolation check valve ICW-26 located inside of the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Intermediate Cooling System Letdown Coolers Isolation Solenoid Valve

TAG NO(S).: SV-2243

SER RESPONSE PAGE NO(S).: B107

MANUFACTURER AND MODEL NO.: ASCO

SYSTEM - P&ID NO.: Intermediate Cooling System M-234

LOCATION: Room 77

• SAFETY FUNCTION:

SV-2243, located outside of the Reactor Building, is required to close the intermediate cooling water isolation valve to the letdown coolers. Isolation is automatic upon receipt of a Reactor Building isolation signal from the Engineered Safeguards Actuation System (ESAS).

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing failure of SV-2243 would exist following a high energy line break (HELB) outside of the Reactor Building. SV-2243 is not required to isolate the intermediate cooling system letdown coolers for events occurring outside the Reactor Building. Failure of SV-2243 does not degrade any safety-related functions for the stated environmental parameters. Reactor Building integrity is further assured by an isolation check valve ICW-114 located inside the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Intermediate Cooling System Letdown Coolers Isolation Solenoid Valve

TAG NO(S).: SV-2244

SER RESPONSE PAGE NO(S).: B108

MANUFACTURER AND MODEL NO.: ASCO

SYSTEM - P&ID NO.: Intermediate Cooling System M234

LOCATION: Room 77

• SAFETY FUNCTION:

SV-2244, located outside of the Reactor Building, is required to close the intermediate cooling water isolation valve to the letdown coolers. Isolation is automatic upon receipt of a Reactor Building isolation signal from the Engineered Safeguards Actuation System (ESAS).

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing failure of SV-2244 would exist following a high energy line break (HELB) outside of the Reactor Building. SV-2244 is not required to isolate the intermediate cooling system letdown coolers for events occurring outside the Reactor Building. Failure of SV-2244 does not degrade any safety-related functions for the stated environmental parameters. Reactor Building integrity is further assured by an isolation check valve ICW-26 located inside the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Main Steam Isolation Valve Solenoid Valve

TAG NO(S).: SV-2691, SV-2692 (SV-6, SV-7)

SER RESPONSE PAGE NO(S).: B013, B015

MANUFACTURER AND MODEL NO.: NORGREN D0018 AVITON

SYSTEM - P&ID NO.: Steam Gen. Secondary M-206

LOCATION: Room 170

• SAFETY FUNCTION:

One SV-6 and one SV-7 solenoid valve are located on each of the two main steam isolation valves. A Steam Line Break Isolation Channel (SLBIC) "A" signal de-energizes the SV-6 solenoids, and a SLBIC "B" signal de-energizes the SV-7 solenoids. The solenoid's safety function is for either SV-6 or SV-7 to de-energize, causing closure of the isolation valves.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	8 hours
Temperature	390°F
Pressure	1.0 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Both solenoid valves are required to remain energized to open the Main Steam Isolation Valve (MSIV). De-energizing either solenoid due to a SLBIC signal or failure of the solenoid results in accomplishment of the required safety function. No failure mode can be identified which would result in opening of the MSIVs or failure of the MSIVs to close on demand.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Spray Pump Lube Oil Cooler Inlet Valve

TAG NO(S).: SV-3804

SER RESPONSE PAGE NO(S).: B028

MANUFACTURER AND MODEL NO.: ASCO 80173

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 13

• SAFETY FUNCTION:

SV-3804 energizes to open Reactor Building spray pump lube oil cooler E47A inlet valve CV-3804. SV-3804 energizes when pump P35A starts.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not exist to support qualification to the following parameters:

Operating time	30 days
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%
Radiation	1.2E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, environmental parameters causing discrepancies are due to a Reactor Coolant letdown line break outside of the Reactor Building. SV-3804, which opens the Reactor Building spray pump P35A lube oil cooler E47A inlet valve CV-3804, is not required to operate for the specified environmental parameters. SV-3804 is energized off an "A" contact (contact closed when breaker is closed) from the Reactor Building spray pump circuit breaker.

Postulated failure of SV-3804 would cause closure of the Reactor Building spray pumps lube oil cooler E47A inlet valve CV-3804. The postulated failure of CV-3804 due to excessive irradiation would result from a LOCA. The radiation source is several recirculating water lines containing recirculated spray and injection water.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Upon the occurrence of a LOCA, the Reactor Building pressure increases to 30 psig, a Reactor Building spray system Engineered Safeguards Actuation System signal initiates spray, and SV-3804 energizes to open CV-3804. After approximately 75 minutes the Reactor Building pressure will be reduced to 5 psig as shown in the FSAR. Also at this time the Borated Water Storage Tank will be depleted and recirculation will be initiated. Time to depletion is based on flow rates for a design basis LOCA. Postulated failure of SV-3804 due to excessive dosage would not be expected to occur for at least 30 to 60 minutes after recirculation is initiated. Therefore, based on engineering judgement, SV-3804 will have sufficient time to perform its safety function before postulated failure. Also, the Reactor Building spray pumps, which have bearing temperature inputs to the computer, could be intermittently and alternately operated within the limits of their operation temperature if further use of the spray system was required. The Reactor Building emergency cooling system serves as a safety related fully redundant system, for the Reactor Building spray system.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Spray Pump Lube Oil Cooler Inlet Control Valve Solenoid Valve

TAG NO(S).: SV-3805

SER RESPONSE PAGE NO(S).: B030

MANUFACTURER AND MODEL NO.: ASCO 80173

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 10

• SAFETY FUNCTION:

SV-3805 energizes to open Reactor Building spray pump P35B lube oil cooler E47B inlet valve CV-3805. SV-3805 energizes when pump P35B starts.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not exist to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%
Radiation	6.0E6 rads

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, environmental parameters causing discrepancies are due to a Reactor Coolant letdown line break outside of the Reactor Building. SV-3805, which opens the Reactor Building spray pump P35B Lube Oil cooler E47B inlet valve CV-3805, is not required to operate for the specified environmental parameters. SV-3805 is energized off an "A" contact (contact closed when breaker is closed) from the Reactor Building spray pump circuit breaker.

Postulated failure of SV-3805 would cause closure of the Reactor Building spray pumps lube oil cooler E47B inlet valve CV-3805. The postulated failure of CV-3805 due to excessive irradiation would result from a LOCA. The radiation source is several recirculating water lines containing recirculated spray and injection water.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Upon the occurrence of a LOCA, the Reactor Building pressure increases to 30 psig, a Reactor Building spray system Engineered Safeguards Actuation System signal initiates spray, and SV-3805 energizes to open CV-3805. After approximately 75 minutes the Reactor Building pressure will be reduced to 5 psig as shown in the FSAR. Also at this time the Borated Water Storage Tank will be depleted and recirculation will be initiated. Time to depletion is based on flow rates for a design basis LOCA. Postulated failure of SV-3805 due to excessive dosage would not be expected to occur for at least 30 to 60 minutes after recirculation is initiated.

Therefore, based on engineering judgement, SV-3805 will have sufficient time to perform its safety function before postulated failure.

Also, the Reactor Building spray pumps, which have bearing temperature inputs to the computer, could be intermittently and alternately operated within the limits of their operation temperature if further use of the spray system was required.

The Reactor Building Emergency Cooling System serves as a safety related fully redundant system, for the Reactor Building spray system.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Service Water Cooling Coils Isolation Valve

TAG NO(S).: SV-3814

SER RESPONSE PAGE NO(S).: B037

MANUFACTURER AND MODEL NO.: ASCO LB-80173

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 46

• SAFETY FUNCTION:

SV-3814 is required to energize to open CV-3814 upon receipt of a reactor building isolation signal from Engineered Safeguards Actuation System (ESAS). CV-3814 is the reactor building service water cooling coils (VCC-2A and VCC-2B) discharge isolation valve.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	173°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

SV-3814 is required to energize for an initiating event occurring inside of the Reactor Building. For this event, SV-3814 which is located outside of the Reactor Building, will not experience a harsh environment. SV-3814 will be subjected to a harsh environment only following a reactor coolant letdown line break or a HELB outside of the Reactor Building, for which SV-3814 has no safety function.

Based on the above, justification for interim operation is demonstrated

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Service Water Cooling Coils Isolation Valve

TAG NO(S).: SV-3815

SER RESPONSE PAGE NO(S).: B039

MANUFACTURER AND MODEL NO.: ASCO LB80173

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 79

• SAFETY FUNCTION:

SV-3815 is required to energize to open CV-3815 upon receipt of a reactor building isolation signal from Engineered Safeguards Actuation System (ESAS). CV-3815 is the reactor building service water cooling coils (VCC 2C and VCC 2D) discharge isolation valve.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists which supports qualification to the following parameters:

Operating Time	30 days
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

SV-3815 is required to provide its safety function for an initiating event occurring inside of the Reactor Building. For this event, SV-3815, which is located outside of the Reactor Building, will not experience a harsh environment. SV-3815 will be subjected to a harsh environment only following a Reactor Coolant letdown line break or a Main Feedwater line break, for which SV-3815 has no safety function. The other outstanding qualification discrepancy for SV-3815 is the specified one year integrated radiation dose. Two main contributors in Room 79 were identified for this dose. The first (and major contributor) is the Reactor Coolant letdown line (3.6E7 rads). The second contributor is from other lines (1.5E5 rads). The Reactor Coolant letdown line is isolated on a Engineered

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

Safeguards Actuation System (ESAS) Reactor Building isolation signal at the initiation of a LOCA, thereby excluding this line as a potential source. Therefore SV-3815 is not expected to receive a dose in excess of its qualified dose based on engineering judgement, and no loss of safety function can be identified.

Based on the above, justification for interim operation is acceptable.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Decay Heat Pump Bearing Cooler Inlet Valve Solenoid

TAG NO(S).: SV-3840

SER RESPONSE PAGE NO(S).: B044

MANUFACTURER AND MODEL NO.: ASCO 8210AZ

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 14

• SAFETY FUNCTION:

SV-3840 energizes to open decay heat removal pump P34A bearing cooler E50A inlet valve CV-3840. SV-3840 energizes when pump P34A starts.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists which supports qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing discrepancies are due to a Reactor Coolant letdown line break outside of containment. SV-3840 which opens decay heat removal pump P34A bearing cooler E50A inlet valve CV-3840, is not required to operate for the specified environmental parameters.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Decay Heat Pump Bearing Cooler Inlet Valve Solenoid Valve

TAG NO(S).: SV-3841

SER RESPONSE PAGE NO(S).: B046

MANUFACTURER AND MODEL NO.: ASCO 8210AZ

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 10

• SAFETY FUNCTION:

SV-3841 energizes to open Decay Heat pump P34B bearing cooler E50B inlet valve CV-3841. SV-3841 energizes when pump P34B starts.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing discrepancies are due to a Reactor Coolant letdown line break outside of the Reactor Building. SV-3841, which opens Decay Heat pump P34B bearing cooler E50B inlet valve CV-3841, is not required to operate for the specified environmental parameters.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building to Auxiliary Building Sump Drain Line
Isolation Solenoid Valve

TAG NO(S).: SV-4400

SER RESPONSE PAGE NO(S).: B048

MANUFACTURER AND MODEL NO.: ASCO No Model Number

SYSTEM - P&ID NO.: Dirty Liquid and Laundry Radioactive Waste M-213

LOCATION: Room 13/14

• SAFETY FUNCTION:

This valve isolates the drain line between the Reactor Building sump and the Auxiliary Building sump.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%
Spec. Radiation	1.6×10^7 rad
Qual. Radiation	1.0×10^5 rad

• JUSTIFICATION FOR INTERIM OPERATION:

Under normal operating conditions, valve CV-4400 is closed. In the unlikely event that the valve is open at the time of an accident initiation, a high Reactor Building pressure Engineered Safeguards Actuation System signal would de-energize the solenoid to close the valve. If the solenoid were damaged it would fail closed (de-energized) and no known mechanism exists that would reopen it. In addition, there is a redundant environmentally qualified valve inside the Reactor Building that isolates the Reactor Building sump drain line.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Gas Vent Line Isolation Solenoid Valve

TAG NO(S).: SV-4804

SER RESPONSE PAGE NO(S).: B050

MANUFACTURER AND MODEL NO.: ASCO WPHT 8300 BLIR

SYSTEM - P&ID NO.: Gas Radioactive Waste M-215

LOCATION: Room 79

• SAFETY FUNCTION:

This solenoid valve isolates the reactor building gas vent line on a high reactor building pressure Engineered Safeguards Actuation System signal.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the environmental parameters for the following:

Operating time	1 minute
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads (Qualified for 1.0E5 rads.)

• JUSTIFICATION FOR INTERIM OPERATION:

The specified harsh environment (other than radiation) for this valve exists as a result of a HELB outside containment, but this valve is needed only for breaks resulting in high pressure inside the Reactor Building. For a LOCA event, the valve would be de-energized to close well before a significant dose of radiation could be received. If the component should be damaged, it would fail in the closed (de-energized) position and no known mechanism exists that would cause it to reopen. The vent line is equipped with a redundant environmentally qualified valve inside containment.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Chilled Water Inlet Reactor Building Isolation
Solenoid Valves

TAG NO(S).: SV-6201, SV-6202

SER RESPONSE PAGE NO(S).: B-053, B-054

MANUFACTURER AND MODEL NO.: ASCO 8347A2

SYSTEM - P&ID NO.: Chilled Water M-222

LOCATION: Room 77

• SAFETY FUNCTION:

These components actuate on independent Engineered Safeguards Actuation System signals to close the chilled water inlet isolation valve, CV-6202.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment calculated for these components exists as a result of a HELB outside containment, but the isolation valve is only required for breaks resulting in high Reactor Building pressure. Either solenoid can close the valve without actuation of the other solenoid. The solenoids de-energize to close the chilled water isolation valve. In addition, the chilled water inlet line is equipped with an isolation check valve (AC-60) inside the Reactor Building.

Based on the above, justification for interim operation is acceptable.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Chilled Water Outlet Reactor Building Isolation Solenoid Valve

TAG NO(S): SV-6203

SER RESPONSE PAGE NO(S): B056

MANUFACTURER AND MODEL NO.: ASCO HT 8321 A7

SYSTEM - P&ID NO.: Chilled Water M-222

LOCATION: Room 77

• SAFETY FUNCTION:

This component actuates on an Engineered Safeguards Actuation System high Reactor Building pressure signal to close the chilled water outlet Reactor Building isolation valve.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment calculated for this valve exists as a result of a HELB outside containment, but this valve is needed only for accidents resulting in a high Reactor Building pressure. If the component should be damaged, it would fail in the closed position and no known mechanism exists that would cause it to reopen. The valve is de-energized to close. The outlet line is equipped with a redundant environmentally qualified valve inside containment.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Cooling Unit Damper Motors

TAG NO(S).: SV-7410, SV-7411, SV-7412, SV-7413

SER RESPONSE PAGE NO(S).: A077, A079, A081, A083

MANUFACTURER AND MODEL NO.: General Electric 707681-KX

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Reactor Building

• SAFETY FUNCTION:

The safety function of these motors is to open the reactor building cooling unit dampers on an Emergency Safeguards Actuation System (ESAS) signal for high Reactor Building pressure.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	280°F
Pressure	53.82 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The safety function of the damper is to open and allow the air intake to the coolers to bypass the intake filters. This results in a high flowrate through the coolers under accident conditions.

The intake filters have been removed from the cooling units since they were frequently becoming clogged during normal operation. The cooling coils of the unit are now periodically steam cleaned to insure adequate heat removal. The removal of the intake filters eliminates the need for the damper's safety function.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Exhaust Heater Temperature Switch

TAG NO(S).: TS-7442A

SER RESPONSE PAGE NO(S).: B132

MANUFACTURER AND MODEL NO.: Fenwal 18002-21

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

The safety function of TS-7442A is to energize the hydrogen purge heater, VEH-6B, at 145°F and de-energize it at 160°F. VEH-6B is required to operate only after a LOCA.

• QUALIFICATION DISCREPANCY:

Available qualification documentation does not envelope the following parameter:

Radiation - 3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The only outstanding qualification discrepancy for TS-7442A is the specified one year integrated dose. Two main contributors, in room 79, were identified for this dose. The major contributor is the reactor coolant letdown line (3.6E7 rads). The secondary contribution is from other lines (1.5E5 rads). The reactor coolant letdown line is isolated on an Emergency Safeguards Actuation System Reactor Building isolation signal, at the initiation of a LOCA. This isolation eliminates the primary source of radiation to TS-7442A. Documentation exists which qualifies TS-7442A for a dose of 1.7E5 rads. Therefore, TS-7442A will not be exposed to a radiation dose in excess of that for which it is qualified.

Furthermore, TS-7442B has a backup high temperature heater cut off switch available if TS-7442A fails (also in room 79).

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Exhaust Heater High Temperature Protection Switch

TAG NO(S).: TS-7442B

SER RESPONSE PAGE NO(S).: B133

MANUFACTURER AND MODEL NO.: Fenwal 18002-21

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

The safety function of this temperature switch is to insure that the hydrogen purge exhaust heater, VEH-6B, de-energizes at 170°F.

• QUALIFICATION DISCREPANCY:

Available qualification documentation does not envelope the following parameters:

Radiation - 3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The only outstanding qualification discrepancy for TS-7442B is the specified one year integrated dose. Two main contributors, in room 79, were identified for this dose. The major contributor is the reactor coolant letdown line (3.6E7 rads). The secondary contribution is from other lines (1.5E5 rads). The reactor coolant letdown line is isolated on an Emergency Safeguards Actuation System Reactor Building isolation signal, at the initiation of a LOCA. This isolation eliminates the primary source of radiation to TS-7442B. Documentation exists which qualifies TS-7442B for a dose of 1.7E5 rads. Therefore, TS-7442B will not be exposed to a radiation dose in excess of that for which it is qualified. Furthermore, TS-7442B is only a backup to TS-7442A (also located in room 79) and is only required upon failure of TS-7442A.

Based on the above information, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air System Exhaust Blower

TAG NO(S).: VEFM-37A

SER RESPONSE PAGE NO(S).: B123

MANUFACTURER AND MODEL NO.: General Electric 5K213AN1300

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 46

• SAFETY FUNCTION:

VEFM-37A powers the lead Hydrogen Purge Air system exhaust fan, which may be required to operate after a LOCA.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 Days
Temperature	173°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for VEFM-37A result from a HELB outside the Reactor Building. Since the Hydrogen Purge Air system needs to operate only after a LOCA, the required safety function of VEFM-37A is not jeopardized.

Furthermore, LOCA conditions do not jeopardize the operation of VEFM-37B, which is a redundant component for VEFM-37A.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air System Exhaust Blower Motor

TAG NO(S).: VEFM-37B

SER RESPONSE PAGE NO(S).: B124

MANUFACTURER AND MODEL NO.: General Electric 5K213AN1300

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

VEFM-37B drives the stand-by Hydrogen Purge Air system exhaust fan, which may be required to operate after a LOCA.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	211 °F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

All the qualification discrepancies for VEFM-37B, except for the one due to radiation, result from a HELB outside of the Reactor Building. Since the Hydrogen Purge Air system needs to operate only after a LOCA, the required safety operation of VEFM-37B is not jeopardized due to a HELB.

The discrepancy due to radiation results from the assumption that the 30 day integrated dose to VEFM-37B is equivalent to the sum of the 1 year integrated doses it receives, outside the Reactor Building, from the reactor coolant letdown line (3.6E7 rads) and other sources (1.5E5 rads) after a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

VEFM-37B is required to be operational for only 30 days after a LOCA, and is qualified for an integrated dose of $1.0E5$ rads during this period. Since the letdown line is isolated by an Emergency Safeguards Actuation System High Pressure Injection actuation signal after a LOCA, it cannot be a source of $3.6E7$ Rads, as noted above. Based on engineering judgement, the safety function of VEFM-37B is not significantly jeopardized due to radiation during its required operating time. Furthermore, LOCA conditions do not jeopardize the operation of VEFM-37A, which is a redundant component for VEFM-37B.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Penetration Room Ventilation Fan

TAG NO(S).: VEFM-38A

SER RESPONSE PAGE NO(S).: B151

MANUFACTURER AND MODEL NO.: Westinghouse 58DP

SYSTEM - P&ID NO.: Reactor Building Penetration Room Ventilation M-264

LOCATION: Room 47

• SAFETY FUNCTION:

The safety function of this fan is to assure that air leakage from the Reactor Building through the penetrations passes through high efficiency filters. Removal of radioactive materials before the air is released to the environment, is thereby insured.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	153°F
Pressure	0.4 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for this fan motor result from a HELB outside the Reactor Building. Since the safety function of the fan motor is to control reactor building leakage after a LOCA, the required safety operation of the fan motor is not jeopardized.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Penetration Room Ventilation Fan

TAG NO(S).: VEFM-38B

SER RESPONSE PAGE NO(S).: B152

MANUFACTURER AND MODEL NO.: Westinghouse 5BDP

SYSTEM - P&ID NO.: Reactor Building Penetration Room Ventilation M-264

LOCATION: Room 47

• SAFETY FUNCTION:

The safety function of this fan is to assure that air leakage from the Reactor Building through the penetrations passes through high efficiency filters. Removal of radioactive materials, before the air is released to the environment, is thereby insured.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	153°F
Pressure	.4 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for this fan motor result from a HELB outside the Reactor Building. Since the safety function of the fan motor is to control reactor building leakage after a LOCA, the required safety operation of the fan motor is not jeopardized.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Exhaust Dehumidifier

TAG NO(S).: VEH-6A

SER RESPONSE PAGE NO(S).: B117

MANUFACTURER AND MODEL NO.: CVI (Pennwalt) A90758D111

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 46

• SAFETY FUNCTION:

The safety function of VEH-6A is to dehumidify the Reactor Building gases prior to their passage through the exhaust filter of the lead Hydrogen Purge Air System.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating time	30 days
Temperature	173°F
Pressure	.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for VEH-6A result from a HELB outside the Reactor Building. Since this system needs to operate only after a LOCA, the required safety function of VEH-6A is not jeopardized.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO- 1

COMPONENT: Hydrogen Purge Exhaust Dehumidifier

TAG NO(S).: VEH-6B

SER RESPONSE PAGE NO(S).: B118

MANUFACTURER AND MODEL NO.: CVI (Pennwalt) A90752D111

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

The safety function of VEH-6B is to dehumidify the Reactor Building gases prior to their passage through the exhaust filter of the stand-by Hydrogen Purge Air system.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time:	30 days
Pressure:	1.1 psig
Temperature:	211°F
Relative Humidity:	100%
Radiation:	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The discrepancy due to radiation results from the one year integrated dose that VEH-6B was determined to receive. The two sources of this radiation dose are the reactor coolant letdown line (3.6E7 rads) and other lines (1.5E5 rads). The reactor coolant letdown line is isolated at the initiation of a LOCA so that it is no longer a source, and can be excluded from the specified dose. Documentation exists which qualified VEH-6B for a dose of 1.0E5 rads. Based on engineering judgement, the safety function of VEH-6B is not significantly jeopardized due to radiation during its required operating time.

The remaining qualification discrepancies occur during a HELB outside the Reactor Building. Since this system has no safety related operation during a HELB event, failing during this event does not jeopardize plant safety.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air System Supply Blower

TAG NO(S).: VSFM-30A

SER RESPONSE PAGE NO(S).: B121

MANUFACTURER AND MODEL NO.: General Electric 5K213AN1300

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 46

• SAFETY FUNCTION:

VSFM-30A drives the lead Hydrogen Purge Air system supply fan, which may be required to operate after a LOCA.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 Days
Temperature	173°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for VSFM-30A result from a HELB outside the Reactor Building. Since the Hydrogen Purge Air system needs to operate only after a LOCA, the required safety function of VSFM-30A is not jeopardized. Furthermore, VSFM-30B is a redundant component for VSFM-30A.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Hydrogen Purge Air System Supply Blower Motor

TAG NO(S).: VSFM-30B

SER RESPONSE PAGE NO(S).: B122

MANUFACTURER AND MODEL NO.: General Electric 5K213AN1300

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Room 79

• SAFETY FUNCTION:

VSFM-30B drives the stand-by Hydrogen Purge Air system supply fan, which may be required to operate after a LOCA.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 Days
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

All the qualification discrepancies for VSFM-30B, except for the one due to radiation, result from a HELB outside of the Reactor Building. Since the Hydrogen Purge Air system needs to operate only after a LOCA, the required safety operation of VSFM-30B is not jeopardized due to a HELB.

The discrepancy due to radiation results from the assumption that the 30 day integrated dose to VSFM-30B is equivalent to the sum of the 1 year integrated doses it receives, outside the Reactor Building from the reactor coolant letdown line (3.6E7 rads) and other sources (1.5E5 rads), after a LOCA.

VSFM-30B is required to be operational for only 30 days after a LOCA, and is qualified for an integrated dose of 1.0E5 rads during this period. Since the letdown line is isolated by an Emergency

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

Safeguards Actuation System High Pressure Injection actuation signal after a LOCA, it cannot be a source of $3.6E7$ Rads, as noted above. Based on engineering judgement, the safety function of VSFM-30B is not significantly jeopardized due to radiation during its required operating time. Furthermore, LOCA conditions do not jeopardize the operation of VSFM-30A, which is a redundant component for VSFM-30B.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Decay Heat Unit Coolers Fan Motors

TAG NO(S): VUCM-1A, VUCM-1B, VUCM-1C, VUCM-1D

SER RESPONSE PAGE NO(S): B017, B018, B019, B020

MANUFACTURER AND MODEL NO.: ALLIS-CHALMERS 012

SYSTEM - P&ID NO.: Service Water System

LOCATION: VUCM1A, VUCM1B - Room 14; VUCM1C, VUCM1D - Room 11

• SAFETY FUNCTION:

The decay heat unit cooler fan motors are required to start automatically when Decay Heat pumps 34A or 34B are started.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1 psig
Relative Humidity	100%
Radiation	1.6 E7

• JUSTIFICATION FOR INTERIM OPERATION:

During post-LOCA recirculation, when these motors perform a safety function, they are not exposed to the parameters listed with the exception of radiation.

The Allis-Chalmers Motors used in the decay heat removal unit coolers are designed with class F insulating systems, rated for continuous duty at 149°F, 35% over the temperature specified for the harsh environment. The motor housing is sealed, making failure due to the specified 1 psig and 100% relative humidity environment unlikely, based on engineering judgment. Additionally, failure due to humidity is unlikely due to the non-hygroscopic properties of the motor's insulating system. The motor components, including lubrication systems have been successfully tested to 2×10^8 rads in a Siemens-Allis report on irradiated motor components. If a fan

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

motor should fail, "No Flow" indication automatically starts the redundant cooler in the same room. "Fan on" and "No Flow" indications in the control room would prevent the operator from being misled regarding the cooler's function.

Based on the above, justification for interim operations is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Makeup Pump Room Unit Cooler Fan Motor

TAG NO(S).: VUCM-7A

SER RESPONSE PAGE NO(S).: B021

MANUFACTURER AND MODEL NO.: Litton/Louis-Allis 19225N2E371

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 56

• SAFETY FUNCTION:

VUCM-7A is required to provide air flow across the cooling coils of makeup pump room unit cooler VUC-7A.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following environmental parameters:

Operating Time	30 days
Temperature	178°F
Pressure	1.0 psig
Relative Humidity	100%
Radiation	1.9E6 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The unit cooler served by VUCM-7A is designed to prevent failure of makeup pump motor PM-36A due to overheating. With the exception of radiation, the harsh environment to which VUCM-7A is exposed is the result of a reactor coolant letdown line break (RCLB). The FSAR states that the RCLB will isolate within 40 seconds.

The thermal/hydraulic analysis, for the room in which VUCM-7A is located (Room 56), states that the room will return to ambient conditions within 90 seconds. The motor insulating system is NEMA Class B, which is rated for a 60°C temperature rise over a 40°C ambient or 212°F, which is 19% above the specified environment. Vendor data also states that the Class B insulating system is an excellent barrier against moisture and weak acids.

The 1.9E6 rads of radiation to which VUCM-7A is exposed is a one year integrated dose. Engineering judgment indicates that the 30 day dose would be significantly less.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

Furthermore, the FSAR states that for the RCLB, one makeup pump alone is sufficient to successfully mitigate the consequences of this break. In the event of a failure of VUCM-7A, leading to the eventual failure of PM-36A. Two redundant pumps are available.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Makeup Pump Room Unit Cooler Fan Motor

TAG NO(S).: VUCM-7B

SER RESPONSE PAGE NO(S).: B022

MANUFACTURER AND MODEL NO.: Litton/Louis-Allis 19225N2E371

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 55

• SAFETY FUNCTION:

VUCM-7B is required to provide air flow across the cooling coils of makeup pump room unit cooler VUC-7B.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following environmental parameters:

Operating Time	30 days
Temperature	178°F
Pressure	1.0 psig
Relative Humidity	100%
Radiation	1.9E6 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The unit cooler served by VUCM-7B is designed to prevent failure of makeup pump motor PM-36B due to overheating. With the exception of radiation, the harsh environment to which VUCM-7B is exposed is the result of a reactor coolant letdown line break (RCLB). The FSAR states that the RCLB will isolate within 40 seconds. The thermal/hydraulic analysis, for the room in which VUCM-7B is located (Room 54), states that the room will return to ambient conditions within 90 seconds. The motor insulating system is NEMA Class B, which is rated for a 60°C temperature rise over a 40°C ambient or 212°F, which is 19% above the specified environment. Vendor data also states that the Class B insulating system is an excellent barrier against moisture and weak acids.

The 2.4E6 rads of radiation to which VUCM-7B is exposed is a one year integrated dose. Engineering judgement indicates that the 30 day dose would be significantly less.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

Furthermore, the FSAR states that for the RCLB, one makeup pump alone is sufficient to successfully mitigate the consequences of this break. In the event of a failure of VUCM-7B, leading to the eventual failure of PM-36B two redundant pumps are available.

Therefore, based on engineering judgement, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Makeup Pump Room Unit Cooler Fan Motor

TAG NO(S).: VUCM-7C

SER RESPONSE PAGE NO(S).: B023

MANUFACTURER AND MODEL NO.: Litton/Louis-Allis 19225N-2E-371

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 54

• SAFETY FUNCTION:

VUCM-7C is required to provide air flow across the cooling coils of makeup pump room unit cooler VUC-7C.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following environmental parameters:

Operating Time	30 days
Temperature	178°F
Pressure	1.0 psig
Relative Humidity	100%
Radiation	1.9E6 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The unit cooler served by VUCM-7C is designed to prevent failure of makeup pump motor PM-36C due to overheating. With the exception of radiation, the harsh environment to which VUCM-7C is exposed is the result of a reactor coolant letdown line break (RCLB). The FSAR states that the RCLB will isolate within 40 seconds. The thermal/hydraulic analysis, for the room in which VUCM-7C is located (Room 54), states that the room will return to ambient conditions within 90 seconds. The motor insulating system is NEMA Class B, which is rated for a 60°C temperature rise over a 40°C ambient or 212°F, which is 19% above the specified environment. Vendor data also states that the Class B insulating system is an excellent barrier against moisture and weak acids.

The 1.9E6 rads of radiation to which VUCM-7C is exposed is a one year integrated dose. Engineering judgement indicates that the 30 day dose would be significantly less.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

Furthermore, the FSAR states that for the RCLB, one makeup pump alone is sufficient to successfully mitigate the consequences of this break. In the event of a failure of VUCM-7C, leading to the eventual failure of PM-36C two redundant pumps are available.

Therefore, based on engineering judgement, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Quench Tank Transfer Line Isolation Valve Position Switch

TAG NO(S).: ZS-1052

SER RESPONSE PAGE NO(S).: B059

MANUFACTURER AND MODEL NO.: Micro DTE62R062

SYSTEM - P&ID NO.: Reactor Coolant M-230

LOCATION: Room 13

• SAFETY FUNCTION:

This switch indicates the position of the Reactor Coolant isolation valve on the Reactor Coolant quench tank transfer line.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	111°F
Pressure	1 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment calculated for this valve exists as a result of a HELB outside containment, but this valve is needed only for breaks resulting in a high Reactor Building pressure. If the switch should malfunction and indicate that the valve is open when it is closed, the operator could attempt to reclose the valve by remote manual operation if necessary. This would have no adverse effect on the valve. Also, the operator could reverify that the redundant environmentally qualified valve on the transfer line inside containment is closed.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Quench Tank Condensate Inlet Line Isolation Valve Limit Switch

TAG NO(S).: ZS-1065

SER RESPONSE PAGE NO(S).: B060

MANUFACTURER AND MODEL NO.: Namco D2400X

SYSTEM - P&ID NO.: Reactor Coolant M-230

LOCATION: Room 77

• SAFETY FUNCTION:

This switch indicates the position of the Reactor Building isolation valve on the condensate inlet line to the Reactor Coolant quench tank.

• QUALIFICATION DISCREPANCY:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment calculated for this component exists as a result of a HELB outside containment but the isolation valve is only required for breaks resulting in high Reactor Building pressure. If the limit switch should malfunction and indicate that the valve is open when it should be closed, the operator could attempt to reclose the valve. This would have no adverse effect on the valve. If the switch continues to indicate an open valve position, valve closure can be assured by manual operation. In addition, the condensate inlet line is equipped with an isolation check valve inside containment.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Nitrogen Supply Isolation Valve Position Switch

TAG NO(S): ZS-1667

SER RESPONSE PAGE NO(S): B096

MANUFACTURER AND MODEL NO.: MICRO BZE6-2RN

SYSTEM - P&ID NO.: Chemical Addition System M-233

LOCATION: Room 77

• SAFETY FUNCTION:

To provide position indication of Nitrogen Supply isolation valve CV-1667. Isolation occurs on receipt of a Reactor Building isolation signal from the Engineered Safeguards Actuation System (ESAS).

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing these discrepancies would exist during a high energy line break (HELB) outside of the Reactor Building. ZS-1667 indicates position of low pressure N₂ supply isolation valve CV-1667 which has no safety function for a HELB outside of the Reactor Building. Therefore, failure of ZS-1667 due to the stated environmental parameters does not degrade any safety-related function. The Reactor Building integrity is further assured by an isolation check valve N₂32 located inside of the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Primary Coolant Quench Tank Sampling Isolation Valve Position Switch

TAG NO(S).: ZS-1845

SER RESPONSE PAGE NO(S).: B116

MANUFACTURER AND MODEL NO.: Micro BZE62RN

SYSTEM - P&ID NO.: Sampling System M-237

LOCATION: Room 79

• SAFETY FUNCTION:

ZS-1845 is the position indicator on valve CV-1845, the primary coolant quench tank sampling isolation valve. Its safety function is to give the operator verification of CV-1845 closure.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

ZS-1845 is required to verify CV-1845 position after isolation closure, which occurs on pressure inside the Reactor Building >4 psig. The harsh environment leading to its failure is the result of a reactor coolant letdown line break outside of the Reactor Building, for which CV-1845 has no safety function.

Additionally:

- 1) Radiation dose to ZS-1845 has been reduced by additional calculations to 1.1E6 Rads.
- 2) The pressure spike for the initiating event has a duration of <1 min.
- 3) The temperature spike for the initiating event has a duration of <10 min.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

- 4) Reactor Building integrity is assured by qualified isolation valve CV-1054 and qualified position switch ZS-1054, inside the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Penetration Room Isolation Valves Closure Verification
Switches

TAG NO(S).: ZS-2100, ZS-2101, ZS-2102, ZS-2103, ZS-2104, ZS-2105,
ZS-2106

SER RESPONSE PAGE NO(S).: B154, B156, B158, B160, B162, B164, B166

MANUFACTURER AND MODEL NO.: NAMCO D2400X

SYSTEM - P&ID NO.: Reactor Building Penetration Room Ventilation M-264

LOCATION: Room 79

• SAFETY FUNCTION:

The safety function of these limit switches is to permit the reactor operator to verify closure of the associated control valves, after the initiation of a Reactor Building isolation Emergency Safeguards Actuation System signal.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The discrepancy due to radiation results from the one year integrated dose that these switches were determined to receive. The two sources of this radiation dose are the reactor coolant letdown line (3.6E7 rads) and other lines (1.5E5 rads). The reactor coolant letdown line is isolated at the initiation of a LOCA, eliminating the primary source of radiation. Documentation exists which qualifies these switches for doses of 1.0E5 rads. Based on engineering judgement, the safety function of these switches is not significantly jeopardized due to radiation during its required operating time.

The remaining qualification discrepancies occur during a HELB outside the Reactor Building. Since these switches have no safety

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

related operation during a HELB, failure during this event does not jeopardize plant safety.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Penetration Room Ventilation Valve Position Switches

TAG NO(S).: ZS-2123, ZS-2126, ZS-2133, ZS-2136

SER RESPONSE PAGE NO(S).: B178, B176, B172, B170

MANUFACTURER AND MODEL NO.: NAMCO D2400X

SYSTEM - P&ID NO.: Reactor Building Penetration Room Ventilation M-264

LOCATION: Room 47

• SAFETY FUNCTION:

The safety function of these position switches is to permit the reactor operator to verify the associated valve position.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	153°F
Pressure	0.4 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The qualification discrepancies for these position switches results from a High Energy Line Break (HELB) outside the reactor building. Since the safety function of the switches requires operability within 30 days after a LOCA, which occurs inside the reactor building, the required safety operation of the switches is not jeopardized.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Letdown Cooler Intermediate Cooling Water Position Switch

TAG NO(S).: ZS-2214

SER RESPONSE PAGE NO(S).: B100

MANUFACTURER AND MODEL NO.: Micro OP-AR (2)

SYSTEM - P&ID NO.: Intermediate Cooling System M-234

LOCATION: Room 77

• SAFETY FUNCTION:

Position switch ZS-2214, located outside the Reactor Building indicates the position of valve CV-2214, the letdown cooler isolation valve. Its safety function is to assure the operator that CV-2214 has isolated following receipt of a Reactor Building isolation signal from the Engineered Safeguards Actuation System (ESAS).

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment leading to the failure of ZS-2214 results from a High Energy Line Break outside the Reactor Building. CV-2214 has no safety function following this event, therefore ZS-2214 has no safety function for an event which would produce a harsh environment in its location. Reactor Building integrity is assured by qualified valve CV-2215 located inside of the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Intermediate Cooling System Isolation Valve Position Switch

TAG NO(S).: ZS-2233

SER RESPONSE PAGE NO(S).: B103

MANUFACTURER AND MODEL NO.: MICRO OP-AR (2)

SYSTEM - P&ID NO.: Intermediate Cooling M-234

LOCATION: Room 77

• SAFETY FUNCTION:

To provide position indication of the intermediate cooling system letdown coolers isolation valve CV-2233 located outside of containment. Isolation is automatic upon receipt of a reactor building isolation signal from the Engineered Safeguards Actuation System.

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating Time	1 min.
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing these discrepancies would exist during a high energy line break (HELB) outside of the Reactor Building. ZS-2233 indicates position of intermediate cooling system letdown coolers isolation valve CV-2233. Position indication of CV-2233 is not a safety function for a high energy line break (HELB) outside of the Reactor Building. Therefore, failure of ZS-2233 due to the stated environmental parameters does not degrade any safety-related function. Reactor Building integrity is further assured by an isolation check valve ICW-114 located inside of the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Intermediate Cooling System Isolation Valve Position Switch

TAG NO(S).: ZS-2234

SER RESPONSE PAGE NO(S).: B105

MANUFACTURER AND MODEL NO.: Micro OP-AR(4)

SYSTEM - P&ID NO.: Intermediate Cooling M-234

LOCATION: Room 77

• SAFETY FUNCTION:

To provide position indication of the intermediate cooling system Reactor Coolant Pump (RCP) motor air and lube oil coolers inlet isolation valve CV-2234. Isolation is automatic upon receipt of a reactor building isolation signal from the Engineered Safeguards Actuation System (ESAS).

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating Time	1 min.
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing these discrepancies would exist during a high energy line break outside of the Reactor Building. ZS-2234 indicates position of intermediate cooling system RCP motor air and lube oil coolers isolation valve CV-2234. Position indication of CV-2234 is not a safety function for a High Energy Line Break (HELB) outside of the Reactor Building. Therefore, failure of ZS-2234 due to the stated environmental parameters does not degrade any safety-related function. Reactor Building integrity is further assured by an isolation check valve ICW-26 located inside of the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Main Steam Isolation Valve Position Switch

TAG NO(S).: ZS-2691

SER RESPONSE PAGE NO(S).: B014

MANUFACTURER AND MODEL NO.: NAMCO EA700-86010

SYSTEM - P&ID NO.: Steam Gen. Secondary M-206

LOCATION: Room 170

• SAFETY FUNCTION:

To provide position indication of main steam discharge isolation valve CV-2691.

• QUALIFICATION DISCREPANCY:

Documentation does not exist which would support qualification to the following parameters:

Operating Time	8 hr.
Temperature	390°F
Pressure	1.0 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing the discrepancies of ZS-2691 are due to a main steam line break located downstream of the containment penetration of steam line A. Isolation valve CV-2691, for which ZS-2691 provides position indication, is located further down stream from the postulated break. Therefore, ZS-2691 serves no safety function for a MSLB at this location since the line has ruptured upstream of the isolation valve.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Main Steam Isolation Valve Position Switch

TAG NO(S).: ZS-2692

SER RESPONSE PAGE NO(S).: B016

MANUFACTURER AND MODEL NO.: NAMCO EA700-86010

SYSTEM - P&ID NO.: Steam Gen. Secondary M-206

LOCATION: Room 170

• SAFETY FUNCTION:

Provides position indication of main steam discharge isolation valve CV-2692.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	8 hr.
Temperature	390°F
Pressure	1.0 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing discrepancies of ZS-2692 would result from a postulated main steam line break in the steam generator E24A discharge line outside of containment. ZS-2692 provides position indication of CV-2692. CV-2692 is the main steam isolation valve for steam generator E24B. A MSLB will initiate a Steam Line Break Isolation Channel signal, which will de-energize MSIV solenoids SV6 and SV7, causing closure of CV-2692. Failure of ZS-2692 will not degrade any safety-related function. Pressure transmitters PIT-6676 and PIT-6677, located at the main turbine, will verify closure of CV-2692 via pressure recorder PR-6677.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Spray Pump Lube Oil Cooler Inlet Valve
Position Switch

TAG NO(S).: ZS-3804

SER RESPONSE PAGE NO(S).: B029

MANUFACTURER AND MODEL NO.: Micro 51ML17

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 13

• SAFETY FUNCTION:

Provides position indication of Reactor Building spray pumps lube oil cooler E47A inlet valve CV-3804.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%
Radiation	1.2E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, environmental parameters causing discrepancies are due to a Reactor Coolant letdown line break outside of the Reactor Building. Position indication of the Reactor Building spray pumps lube oil cooler E47A inlet valve CV-3804 is not a safety function for a letdown line break.

Since actuation of the valve is automatic postulated failure of the position indication switch would not mislead the operator. Proper cooling water flow to the bearing lube oil coolers could be verified by monitoring the bearing temperature on the plant computer.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Position Switch

TAG NO(S).: ZS-3805

SER RESPONSE PAGE NO(S).: B031

MANUFACTURER AND MODEL NO.: MICRO 51ML17 SN7224

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 10

• SAFETY FUNCTION:

Provides position indication of Reactor Building spray pumps lube oil cooler E47B inlet valve CV-3805.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%
Radiation	6.0E6 rads

• JUSTIFICATION FOR INTERIM OPERATION:

With the exception of radiation, environmental parameters causing failure of ZS-3805 are due to a reactor coolant letdown line break outside of containment. Position indication of the Reactor Building spray pumps Lube Oil cooler E47B inlet valve CV-3805 is not a safety function for the specified conditions due to a letdown line break.

Since actuation of the valve is automatic, the position indication switch postulated failure would not mislead the operator. Proper cooling water flow to the bearing lube oil coolers could be verified by monitoring the bearing temperature on the plant computer.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Service Water Cooling Coils Isolation Valve
Position Switch

TAG NO(S).: ZS-3814

SER RESPONSE PAGE NO(S).: B038

MANUFACTURER AND MODEL NO.: NAMCO D2400X

SYSTEM - P&ID NO.: Service Water System M-210

LOCATION: Room 46

• SAFETY FUNCTION:

ZS-3814 indicates the position of valve CV-3814 to the operator.

• QUALIFICATION DISCREPANCY:

Operating Time	30 days
Temperature	173°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

ZS-3814 is required to provide its safety function for an initiating event occurring inside of containment. For this event, ZS-3814, which is located outside of containment, will not experience a harsh environment. ZS-3814 will be subjected to a harsh environment only following a reactor coolant letdown line break or a Main Feedwater line break for which ZS-3814 has no safety function.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Service Water Cooling Coils Isolation Valve
Position Switch

TAG NO(S).: ZS-3815

SER RESPONSE PAGE NO(S).: B040

MANUFACTURER AND MODEL NO.: NAMCO D2400X

SYSTEM - P&ID NO.: Service Water System M210

LOCATION: Room 79

• SAFETY FUNCTION:

ZS-3815 indicates the position of valve CV-3815 to the operator.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists which supports qualification to the following parameters:

Operating Time	30 days
Temperature	211° F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	3.6E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

ZS-3815 is required to provide its safety function for an initiating event occurring inside of the Reactor Building. For this event, ZS-3815, which is located outside of the Reactor Building will not experience a harsh environment. ZS-3815 will be subjected to a harsh environment only following a Reactor Coolant letdown line break or a Main Feedwater line break, for which ZS-3815 has no safety function. The other outstanding qualification discrepancy for ZS-3815 is the specified one year integrated radiation dose. Two main contributors in Room 79 were identified for this dose. The first (and major contributor) is the Reactor Coolant Letdown Line (3.6E7 rads). The second contributor is from other lines (1.5E5 rads). The Reactor Coolant letdown line is isolated on an Engineered Safeguards Actuation System (ESAS) Reactor Building Isolation signal at the initiation of a LOCA, thereby excluding this line as a potential source. Therefore, ZS-3815 is not expected to receive a dose in excess of its qualified dose, and no loss of safety function can be identified.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Decay Heat Pump Bearing Cooler Inlet Valve Position Switch

TAG NO(S).: ZS-3840

SER RESPONSE PAGE NO(S).: B045

MANUFACTURER AND MODEL NO.: MICRO 51 ML17

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 14

• SAFETY FUNCTION:

Provides position indication of Decay Heat pumps bearing cooler E50A inlet valve CV-3840.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists which support qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing discrepancies of ZS-3840 are due to a reactor coolant letdown line break outside of the Reactor Building. Position indication of the Decay Heat pumps bearing cooler E50A inlet valve CV-3840 is not a safety function for the specified conditions.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Decay Heat Pump Bearing Cooler Inlet Valve Position Switch

TAG NO(S).: ZS-3841

SER RESPONSE PAGE NO(S).: B047

MANUFACTURER AND MODEL NO.: MICRO Z000166A

SYSTEM - P&ID NO.: Service Water M-210

LOCATION: Room 10

• SAFETY FUNCTION:

Provides position indication of Decay Heat pumps bearing cooler E50B inlet valve CV-3841.

• QUALIFICATION DISCREPANCY:

No qualification documentation exists which supports qualification to the following parameters:

Operating Time	30 days
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

Environmental parameters causing discrepancies of ZS-3841 are due to a reactor coolant letdown line break outside of containment. Position indication of the Decay Heat pumps bearing cooler E50B inlet valve CV3841 is not a safety function for the specified conditions.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building to Auxiliary Building Sump Drain Line
Isolation Valve Position Switch

TAG NO(S).: ZS-4400

SER RESPONSE PAGE NO(S).. B-049

MANUFACTURER AND MODEL NO.: NAMCO D2400X

SYSTEM - P&ID NO.: Dirty Liquid and Laundry Radioactive waste M-213

LOCATION: Room 13/14

• SAFETY FUNCTION:

This component is used to verify isolation of the Reactor Building sump drain line.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope the following environmental parameters:

Operating Time	1 minute
Temperature	111°F
Pressure	1.0 psig
Relative Humidity	100%
Specified Radiation	1.6×10^7 rads
Qualified Radiation	1.0×10^5 rads

• JUSTIFICATION FOR INTERIM OPERATION:

Under normal operating conditions, valve CV-4400 is closed. In the unlikely event that the valve is open at the time of an accident initiation, a high Reactor Building pressure Engineered Safeguards Actuation System signal would close the valve.

At the time of the ESAS signal, the limit switch will have received an insignificant radiation dose and could be expected to give proper indication. The harsh environment (other than radiation) exists only for a HELB outside the Reactor Building, in which case closure of CV-4400 is not required. In addition, Reactor Building sump drain line isolation can be verified by the redundant environmentally qualified isolation valve inside the Reactor Building.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Gas Vent Line Isolation Valve Position Switch

TAG NO(S).: ZS-4804

SER RESPONSE PAGE NO(S).: B051

MANUFACTURER AND MODEL NO.: Micro BZE6-2RN

SYSTEM - P&ID NO.: Gas Radioactive Waste M-215

LOCATION: Room 79

• SAFETY FUNCTION:

This component indicates the position of the reactor building gas vent line isolation valve.

• QUALIFICATION DISCREPANCY:

Qualification documentation does not envelope environmental parameters for the following:

Operating time	1 minute
Temperature	211°F
Pressure	1.1 psig
Relative Humidity	100%
Radiation	specified: 3.6×10^7 rads qualified: 1.0×10^5 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The specified harsh environment (other than radiation) for this valve exists as a result of a HELB outside the reactor building, but this valve is needed only for breaks resulting in high pressure inside the reactor building. For a LOCA event, the valve would be actuated and complete its safety function well before a significant radiation dose could be received. If at some later time, the position switch should malfunction and indicate that the valve is open, the operator could attempt to reclose the valve. This attempted operation would have no adverse affect on the valve. Also, the operator could reverify that the redundant environmentally qualified valve inside containment is closed.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Chilled Water Outlet Line Reactor Building Isolation Valve
Position Switch

TAG NO(S).: ZS-6202

SER RESPONSE PAGE NO(S).: B055

MANUFACTURER AND MODEL NO.: NAMCO D2400X

SYSTEM - P&ID NO.: Chilled Water M-222

LOCATION: Room 77

• SAFETY FUNCTION:

This switch is used to verify closure of the chilled water outlet line reactor building isolation valve.

• QUALIFICATION DISCREPANCY:

No qualification documentation exist to support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment calculated for this valve exists as a result of a HELB outside containment, but this valve is needed only for breaks resulting in a high reactor building pressure. If the switch should malfunction and indicate that the valve is open when it is closed, the operator could attempt to reclose the valve manually if necessary. This operation would have no adverse affect on the valve. Also, the operator could reverify that the redundant environmentally qualified valve on the outlet line inside containment is closed.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Chilled Water Inlet Reactor Building Isolation Valve
Position Switch

TAG NO(S).: ZS-6203

SER RESPONSE PAGE NO(S).: B057

MANUFACTURER AND MODEL NO.: NAMCO D2400X

SYSTEM - P&ID NO.: Chilled Water M-222

LOCATION: Room 77

• SAFETY FUNCTION:

This switch is used to verify closure of the chilled water inlet Reactor Building isolation valve, CV-6203

• QUALIFICATION DISCREPANCY:

No qualification documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	196°F
Pressure	0.7 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The harsh environment calculated for this component exists as a result of a HELB outside the Reactor Building, but the isolation valve is only required for breaks resulting in high Reactor Building pressure. If the limit switch should malfunction and indicate that the valve is open when it should be closed, the operator could attempt to reclose the valve. This would have no adverse effect on the valve. If the switch continues to indicate an open valve position, valve closure can be assured by manual operation. In addition, the chilled water inlet line is equipped with an isolation check valve inside containment.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Cooling Unit Damper Overtravel Protection Switches

TAG NO(S).: ZS-7406, ZS-7408, ZS-7424, ZS-7426

SER RESPONSE PAGE NO(S).: A073, A075, A089, A091

MANUFACTURER AND MODEL NO.: General Electric (CR9440 D2CA)

SYSTEM - P&ID NO.: HVAC - Reactor Building M261

LOCATION: Reactor Building

• SAFETY FUNCTION:

The function of these limit switches is to prevent the damper motor from traveling beyond its set point by stopping the motor.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	280°F
Pressure	53.82 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The environmental parameters specified for these switches are the calculated results for the design basis LOCA. These limit switches are not required to operate to mitigate the effects of a LOCA. The overprotection close limit switches are only used when the dampers are returned to their normal closed position after a test or safety related Opening. There is no identifiable failure mode for these limit switches to adversely affect the safe shutdown of the plant.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Cooling Unit Damper Position Switches

TAG NO(S).: ZS-7407, ZS-7409, ZS-7425, ZS-7427

SER RESPONSE PAGE NO(S).: A074, A076, A090, A092

MANUFACTURER AND MODEL NO.: General Electric CR9440 D2CA

SYSTEM - P&ID NO.: HVAC - Reactor Building M261

LOCATION: Reactor Building

• SAFETY FUNCTION:

The safety function for these limit switches is to complete the circuit which lights a red indicating light in the control room. The red indicating light designates that the Reactor Building cooling unit damper is in its open safety position.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	1 min.
Temperature	280°F
Pressure	53.82 psig
Relative Humid	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The safety function of the dampers is to open and allow the air intake to the coolers to bypass the intake filters. This results in a higher flowrate through the coolers under accident conditions.

The intake filters have been removed from the cooling units since they were frequently becoming clogged during normal operation. The cooling coils of the unit are now periodically steam cleaned to insure adequate heat removal. The removal of the intake filters eliminates the need for the damper's safety function.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Cooling Unit Damper Overtravel Protection Switches

TAG NO(S).: ZS-7410, ZS-7411, ZS-7412, ZS-7413

SER RESPONSE PAGE NO(S).: A078, A080, A082, A084

MANUFACTURER AND MODEL NO.: General Electric CR9440 D2CA

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Reactor Building

• SAFETY FUNCTION:

The safety function of these limit switches is to provide overtravel protection for the dampers when they open.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	1 min.
Temperature	280°F
Pressure	53.82 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The safety function of the dampers is to open and allow the air intake to the coolers to bypass the intake filters. This results in a high flowrate through the coolers under accident conditions.

The intake filters have been removed from the fooling units since they were frequently becoming clogged during normal operation. The cooling coils of the unit are now periodically steam cleaned to insure adequate heat removal. The removal of the intake filters eliminates the need for the damper's safety function.

Based on the above, justification for interim operation is demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-1

COMPONENT: Reactor Building Cooling Unit Damper Position Switches

TAG NO(S).: ZS-7420, ZS-7421, ZS-7422, ZS-7423

SER RESPONSE PAGE NO(S).: A085, A086, A087, A088

MANUFACTURER AND MODEL NO.: General Electric CF940 D2CA

SYSTEM - P&ID NO.: HVAC - Reactor Building M-261

LOCATION: Reactor Building

• SAFETY FUNCTION:

The safety function of these limit switches is to complete the circuit which lights a green indicating light in the control room. The green light designates that the Reactor Building cooling unit damper is closed.

• QUALIFICATION DISCREPANCY:

No documentation exists to support qualification to the following parameters:

Operating Time	1 minute
Temperature	280°F
Pressure	53.82 psig
Relative Humidity	100%

• JUSTIFICATION FOR INTERIM OPERATION:

The safety function of the damper is to open and allow the air intake to the coolers to bypass the intake filters. This results in a high flowrate through the coolers under accident conditions.

The intake filters have been removed from the cooling units since they were frequently becoming clogged during normal operation. The cooling coils of the unit are now periodically steam cleaned to insure adequate heat removal. The removal of the intake filters eliminates the need for the damper's safety function.

Based on the above, justification for interim operation is demonstrated.

Regulatory Report Review

Plant: Arkansas Nuclear One Unit: 2
Report Title: Justification for Interim Operation for
Environmental Qualification Deficiencies (Ref: 0CAN028211)
Report Number: NA
Report Type: Routine: () Non-Routine: ()
Special: (x) Reportable Occurrence: 14 day () 30 day ()
Prepared By: NUS Corporation Date: February 26, 1982
Reviewed By: NA Date: _____
General Manager or Cognizant
Manager/Supervisor (Signature, reference or NA)
Reviewed By: *Don Howard* Date: 2/27/82
Cognizant Licensing Reviewer
Reviewed and Approved By: *John R. McNeill* Date: 2/27/82
Manager, Licensing

Review Required: PSC YES () NO (x)
SRC YES () NO (x)

Reviewed By: NA Date: _____
Plant Safety Committee
(Signature or reference)
Reviewed By: NA Date: _____
Safety Review Committee

ARKANSAS NUCLEAR ONE

UNIT 2

JUSTIFICATIONS FOR INTERIM
OPERATION FOR ENVIRONMENTAL
QUALIFICATION DEFICIENCIES

March 1, 1982

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EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Control Panel for the Turbine Driven Emergency Feedwater (EFW) Pump

TAG NO(S).: 2C-143

SER RESPONSE PAGE NO(S).: B004

MANUFACTURER AND MODEL NO.: Terry Steam Turbine Co.: Type GS₂

SYSTEM - P&ID NO.: Main Steam System M-2202

LOCATION: Room 2040E

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This panel contains the control components and circuits for automatic turbine speed control.

• QUALIFICATION DISCREPANCY:

No traceable qualification data regarding harsh environment is currently available. The maximum harsh environment in this case would be caused by a postulated rupture of a main feedwater line. A conservative HELB analysis² indicates a maximum harsh condition of 214°F and 1.02 psig, and a non-harsh radiation environment. The analysis also indicates a return to ambient temperature conditions within one hour. The control panel has a NEMA 1 protective enclosure.

• JUSTIFICATION FOR INTERIM OPERATION:

1. If the steam driven pump were unavailable, the motor driven pump can provide adequate cooling capability. Qualification of the EFW pump motor is discussed for item 2PM-7B.
2. If both the steam driven and motor driven pump should fail, adequate core cooling can be provided by utilizing high pressure injection and rejecting heat through the pressurizer ECCS vents.³ This method of cooling can be utilized until EFW is restored. The high pressure injection pump motors and valve actuators are not exposed to the environment resulting from postulated rupture of the main feedwater line.²

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

3. Even if total worst-case failure of this panel and its components were to occur, the turbine driven pump would not be damaged, since independent mechanical overspeed protection is provided. It would be possible to restart and operate the turbine under local manual control, after the environment returns to habitable conditions (one hour or less). Hand operation would require operation of the mechanical trip reset (if required), the trip and throttle valve, and communication with the control room.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Motor Operator for Steam Supply Valve to the Turbine Driven
Emergency Feedwater (EFW) Pump

TAG NO(S):: 2CV-0340-2

SER RESPONSE PAGE NO(S):: B003

MANUFACTURER AND MODEL NO.: Limitorque SMB-00

SYSTEM - P&ID NO.: Main Steam System M-2202

LOCATION: Room 2043

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve opens automatically on an Engineered Safeguard Features Actuation Signal (ESFAS), admitting steam to the trip and throttle valve of the turbine driven EFW pump. The valve may also be manually actuated from the control room.

• QUALIFICATION DISCREPANCY:

This valve operator utilizes a DC motor for which no traceable qualification data regarding harsh environment is currently available. The maximum harsh temperature environment in this case would be caused by a postulated rupture of a main feedwater line. A conservative HELB analysis² indicates a maximum harsh condition of 214°F and 1.02 psig, and a non-harsh radiation environment.³ The analysis also indicates a return to ambient temperature conditions within one hour.

• JUSTIFICATION FOR INTERIM OPERATION:

1. The significant potential damage mechanism is the effect of high temperature on the motor insulation. The insulation class for this motor is the same as that for the qualified limitorque AC motor. The AC motors are shown to be qualified to 250°F, therefore no loss of safety function would be expected.
2. The motor driven EFW pump could provide adequate cooling capability if the turbine drive EFW pump were not available.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

Qualification of the EFW pump motor is discussed for item 2PM-7B.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

- REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Motor Operator for Service Water Supply Valve to Emergency Feedwater (EFW) Pump 2P7A

TAG NO(S).: 2CV-0711-2

SER RESPONSE PAGE NO(S).: B006

MANUFACTURER AND MODEL NO.: Limitorque Mod. No. SMB-000-5

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2024

• SAFETY FUNCTION¹:

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This backup supply valve provides one of several alternate services of emergency feedwater. If the normal condensate supply is unavailable, this valve is automatically opened (and the corresponding valve from the condensate supply is closed), allowing service water to be supplied to the EFW pump suction. This valve has a redundant counterpart that performs the same function for the other EFW pump.

• QUALIFICATION DISCREPANCY:

This valve operator utilizes a DC motor for which no traceable qualification data regarding harsh temperature environment is currently available. The maximum harsh environment in this case would be caused by a postulated rupture of a main feedwater line. A conservative HELB analysis² indicates a maximum harsh condition of 214°F and 1.02 psig, and a non-harsh radiation environment³. The analysis also indicates a return to ambient temperature conditions within one hour.

• JUSTIFICATION FOR INTERIM OPERATION:

There are several reasons why interim operation is justified:

1. The significant potential damage mechanism is the effect of high temperature on the motor insulation. The insulation class for the motor is the same as that for the qualified Limitorque

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

AC motor. The A.C. motors are shown to qualify to 250°F therefore, no loss of safety function would be expected.

2. For the accident/event scenarios that would reasonably be expected, immediate (therefore electrical) operation is not required to assure safety. The postulated harsh environment would be dissipated in sufficient time for handwheel operation, in the unlikely event that the valve had failed to operate electrically. Hand operation would not be required until all other water supply sources were depleted or rendered unavailable.
3. This valve has a redundant seismic category 1 counterpart (2CV-0716-1) which supplies the other EFW pump. The redundant valve has no qualification discrepancies.
4. In addition to the redundant, qualified Category I valve (2CV-0716-1) alternate supply paths for emergency feedwater are available from valves 2CV-0706 (normal suction path) and 2CV-0707 (condensate storage tank).

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

- REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Motor Operator for Emergency Feedwater (EFW) Pump 2P7A
Suction Valve (normal supply)

TAG NO(S).: 2CV-0795-2

SER RESPONSE PAGE NO(S).: B013 (see also B006)

MANUFACTURER AND MODEL NO.: Limitorque Model SMB-00-7½

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2024

• SAFETY FUNCTION:

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve is normally open, providing the normal EFW suction path from the startup and blowdown demineralizer effluent or condensate storage tank. The valve closes on low condensate suction line pressure if condensate becomes unavailable, and suction is obtained from the service water system. This valve has a redundant counterpart that performs the same function for EFW pump 2P7B.

• QUALIFICATION DISCREPANCY:

This valve operator utilizes a DC motor for which no traceable qualification data regarding harsh temperature environment is currently available. The maximum harsh environment in this case would be caused by a postulated rupture of a main feedwater line. A conservative HELB analysis² indicates a maximum harsh condition of 214°F and 1.02 psig, and a non-harsh radiation environment.³ The analysis also indicates a return to ambient temperature conditions within one hour.

• JUSTIFICATION FOR INTERIM OPERATION:

There are several reasons why interim operation is justified:

1. The significant potential damage mechanism is the effect of high temperature on the motor insulation. The insulation class for this motor is the same as that for the qualified Limitorque

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

AC motors. Therefore, no loss of safety function would be expected.

2. For the accident/event scenarios that would reasonably be expected, immediate (therefore electrical) operation is not required to assume safety. The valve is normally open to allow the EFW pump to draw suction from the Condensate Storage Tank. It is closed only as that tank becomes depleted. At that time, the postulated harsh environment would be dissipated in sufficient time for handwheel operation, in the unlikely event that the valve failed to operate electrically.
3. This valve has a redundant, seismic category 1 counterpart (2CV-0789-1), which will supply condensate to EFW Pump 2P7B.
4. Valve 2CV-0716-1 opens to supply emergency feedwater from the service water system.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANC-2

COMPONENT: Motor Operator for Steam Supply Valve from Steam Generator
2E24A to Emergency Feedwater (EFW) Pump Turbine

TAG NO(S).: 2CV-1000-1

SER RESPONSE PAGE NO(S).: B025

MANUFACTURER AND MODEL NO.: Limitorque SMB-00-10

SYSTEM - P&ID NO.: Steam Generator Secondary System M-2206

LOCATION: Room 2155

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve is one of two series valves (the other is a check valve) supplying steam to the turbine driven EFW pump from steam generator 2E24A. The valve is normally open, and remains open following EFW initiation.

• QUALIFICATION DISCREPANCY:

The motor operator was qualified to a temperature environment of 250°F maximum. Conservative T/H HELB analysis² indicates a maximum harsh temperature condition of 292°F. The analysis also indicates that this temperature would be sustained for 7 minutes or less, and would return to ambient within one hour.

Except for this temperature discrepancy, the actuator has been shown to be fully qualified.

• JUSTIFICATION FOR INTERIM OPERATION:

1. This valve is not required to operate during EFW operation; it is aligned in the safe position prior to and during operation of the EFW system.
2. A redundant qualified valve (2CV-1050-2), also normally open, can supply motive steam to the turbine driven pump if steam generator 2E24B is intact.
3. The motor-driven EFW pump is available to serve the decay heat removal and cooldown functions. Its qualification status is discussed in the Sept. 12, 1981 submittal and this submittal.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

4. While the actuator is only shown qualified to 250°F, the qualification test allows the entire actuator to reach thermal equilibrium at 250°F for a prolonged period. It is judged that equilibrium at temperatures significantly higher than 250°F would not be reached during the comparatively brief exposure time during a HELB.

Based on the above analysis, justification for continued operation has been demonstrated.

• REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.
4. IEEE Std 275-1966, "Thermal Evaluation of Insulation Systems for AC Electric Machinery Employing Form-Wound Pre-Insulated Stator Coils, Machines Rated 6900V and Below".
5. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Electrohydraulic Operator for Emergency Feedwater (Erw) Pump
2P7B Isolation Valve to Steam Generator 2E24A

TAG NO(S).: 2CV-1025-1

SER RESPONSE PAGE NO(S).: B015

MANUFACTURER AND MODEL NO.: Copes Vulcan - Weston Hydraulics Type C
DIAG/EH OP

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2084

• SAFETY FUNCTION¹:

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve is opened automatically to supply water from the EFW pump to steam generator 2E24A if it is intact. The signal logic will not open the valve if the steam generator is not intact (the valve then remains closed). The signal logic will continue to maintain level in the intact steam generator unless manual control is elected. This valve is also used for manual flow control following system initiation.

• QUALIFICATION DISCREPANCY:

No traceable qualification data is currently available for this actuator. The specific environment of 227°F and 9.17 psig results from a steam generator blowdown line break. In that case the normal feedwater system would not be affected (because of the separation between it and the EFW system) and would be expected to continue to be operable. The HELB's that would disable the normal feedwater system and require operation of the EFW system are the main steam line break and main feedwater line break. The postulated main steam line break will not affect this component due to its location. However, a conservative HELB analysis for a postulated feedwater break indicates that a harsh temperature and pressure environment is not attained in this area (essentially ambient temperature and 1.07 psig maximum)², nor is there a harsh radiation environment.³ The 100% R.H. at ambient temperature is therefore the worst of the environmental conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

1. Except for humidity, no harsh environment exists for this valve actuator following the postulated feedwater line break. Based on engineering judgement the actuator can be expected to perform its function for the 8 hour required duration in an environment of 100% R.H. at ambient temperature.
2. The valve is required to open early in the postulated accident sequence giving additional assurance it will function. Further, alternate paths are available to provide EFW to the steam generators from both the motor-driven and the turbine-driven EFW pumps.
3. Even if this valve together with all of the other EFW injection valves failed, adequate core cooling can be provided by utilizing high pressure injection and rejecting heat through the pressurizer ECCS vents.⁴ This method of cooling can be utilized until EFW is restored. The HPI injection pump motors and valve actuators are not exposed to the postulated rupture of the main feedwater line.

Based on the above analysis, it is concluded that continued operation has been demonstrated.

• REFERENCES (NUMBERS APPLY TO EFW WRITEUPS ONLY)

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 41, 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.
4. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Motor Operator for Emergency Feedwater (EFW) Pump 2P7A
Discharge Isolation Valve to Steam Generator 2E24A

TAG NO(S).: 2CV-1026-2

SER RESPONSE PAGE NO(S).: B016

MANUFACTURER AND MODEL NO.: Limitorque SMB-00-7½

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2084

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve is opened automatically to supply water from the appropriate EFW pump to the intact steam generator(s). The signal logic will not open the valve if the steam generator is not intact (the valve then remains closed).

• QUALIFICATION DISCREPANCY:

No traceable qualification data is currently available for this actuator. The specified environment of 227°F and 9.17 psig results from a steam generator blowdown line break. In that case the normal feedwater system would not be affected (because of the separation between it and the EFW system) and would be expected to continue to be operable. The HELB's that would disable the normal feedwater system and require operation of the EFW system are the main steam line break and main feedwater line break. The postulated main steam line break will not affect this component due to its location. However, a conservative HELB analysis for a postulated feedwater break indicates that a harsh temperature and pressure environment is not attained in this area (essentially ambient temperature and 1.07 psig maximum)², nor is there a harsh radiation environment.³ The 100% R.H. at ambient temperature is therefore the worst of the environmental conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

1. Except for humidity, no harsh environment exists for this valve actuator following the postulated feedwater line break. Based on

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

engineering judgement the actuator can be expected to perform its function for the 8 hour required duration in an environment of 100% R.H. at ambient temperature.

2. The valve is required to open early in the postulate accident sequence, giving additional assurance it will function. Further, alternate paths are available to provide EFW to the steam generator from both the motor-driven and the turbine-driven EFW pumps.
3. Even if this valve together with all of the other EFW injection valves failed, adequate core cooling can be provided by utilizing high pressure injection and rejecting heat through the pressurized ECCS vents.⁴ This method of cooling can be utilized until EFW is restored. The HPI injection pump motors and valve actuators are not exposed to the postulated rupture of the main feedwater line.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES (NUMBERS APPLY TO EFW WRITEUPS ONLY)

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51, p. 41.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.
4. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Actuator for Emergency Feedwater (EFW) Pump 2P7B discharge isolation valve to Steam Generator 2E24B

TAG NO(S).: 2CV-1036-1

SER RESPONSE PAGE NO(S).: B017

MANUFACTURER AND MODEL NO.: EBV Systems/EFCO Matic 4

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2081

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve is opened automatically to supply water from the appropriate EFW pump to steam generator 2E24B, if it is intact. The signal logic will not open the valve if the steam generator is not intact. The signal logic will continue to maintain level in the intact steam generator unless manual control is elected.

• QUALIFICATION DISCREPANCY:

This valve utilizes an actuator for which no traceable qualification data regarding harsh environment is currently available. The maximum harsh environment in this case would be caused by a postulated main feedwater line rupture. A conservative HELB analysis² indicates a maximum harsh condition of 220°F and 2.07 psig, and a non-harsh radiation environment.³ The analysis also indicates a return to ambient temperature conditions within one hour.

• JUSTIFICATION FOR INTERIM OPERATION:

If this valve should fail to open, two other flow paths are directly available for supplying steam generator 2E24A, and one other is directly available for 2E24B:

1. Through 2CV-1026-2 and 2CV-1037-2 from EFW pump 2P7A to steam generator 2E24A (These valves are in a non-harsh environment except for humidity.)

- JUSTIFICATION FOR INTERIM OPERATION: (Continued)

2. Through 2CV-1025-1 and 2CV-1038-1 from EFW pump 2P7B to Steam Generator 2E24A (These valves are in a non-harsh environment except for humidity).
3. Through 2CV-1076-2 and 2CV-1039-2 from EFW pump 2P7A to Steam Generator 2E24B (the former valve is qualified for the environment and the latter is in a non-harsh environment except for humidity)

In addition hand operated discharge cross-connect valves 2EFW-5A, 2EFW-5B, 2EFW-11A and 2EFW-11B could eventually be utilized to achieve other combinations of flow paths.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

- REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
AND-2

COMPONENT: Electrohydraulic Actuator for Emergency Feedwater (EFW) Pump
2P7A Discharge Isolation Valve to Steam Generator 2E24A

TAG NO(S).: 2CV-1037-2

SER RESPONSE PAGE NO(S).: B018

MANUFACTURER AND MODEL NO.: EBV Systems/EFCO Matic 4

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2084

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve is opened automatically to supply water from the appropriate EFW pump to steam generator 2E24A if it is intact. The signal logic will not open the valve if the steam generator is not intact (the valve then remains closed). The signal logic will control level in the intact steam generator unless manual control is elected.

• QUALIFICATION DISCREPANCY:

No traceable qualification data is currently available for this actuator. The specified environment of 227°F and 9.17 psig results from a steam generator blowdown line break. In that case the normal feedwater system would not be affected (because of the separation between it and the EFW system) and would be expected to continue to be operable. The HELB's that would require operation of the EFW system are the main steam line break and the main feedwater line break. The postulated main steam line break will not affect this component due to its location. However, a conservative HELB analysis for a postulated feedwater break indicates that a harsh temperature and pressure environment is not attained in this area (essentially ambient temperature and 1.07 psig maximum)², nor is there a harsh radiation environment.³ The 100% R.R. at ambient temperature is therefore the worst of the environmental conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

1. No harsh environment exists for this valve actuator following the postulated feedwater line break. Based on engineering judgement the actuator can be expected to perform its function for the 8 hour required duration in an environment of 100% R.H. at ambient temperature.
2. The valve is required to open early in the postulated accident sequence, giving additional assurance it will function. Further, alternate paths are available to provide EFW to the steam generators from both the turbine-driven and the motor-driven EFW pumps.
3. Even if this valve together with all of the other EFW injection valves failed, adequate core cooling can be provided by utilizing high pressure injection and rejecting heat through the pressurized ECCS vents.⁴ This method of cooling can be utilized until EFW is restored. The HPI injection pump motors and valve actuators are not exposed to the postulated rupture of the main feedwater line.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51, p. 41.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.
4. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Electrohydraulic Actuator for Emergency Feedwater (EFW) Pumps
2P7B Discharge Isolation Valve to Steam Generator 2E24A

TAG NO(S).: 2CV-1038-1

SER RESPONSE PAGE NO(S).: B019

MANUFACTURER AND MODEL NO.: EBV Systems/EFCO Matic 4

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2084

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam line break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve is opened automatically to supply water from the appropriate EFW pump to steam generator 2E24A if it is intact. The signal logic will not open the valve if the steam generator is not intact (the valve then remains closed). The signal logic will continue to control level in the intact steam generator unless manual control is elected.

• QUALIFICATION DISCREPANCY:

No traceable qualification data is currently available for this actuator. The specified environment of 227°F and 9.17 psig results from a steam generator blowdown line break. In that case the normal feedwater system would not be affected (because of the separation between it and the EFW system) and would be expected to continue to be operable. The HELB's that would require operation of the EFW system are the main steam line break and the main feedwater line break. The postulated main steam line break will not affect this component due to its location. However, a conservative HELB analysis for a postulated feedwater break indicates that a harsh temperature and pressure environment is not attained in this area (essentially ambient temperature and 1.07 psig maximum)², nor is there a harsh radiation environment.³ The 100% R.H. at ambient temperature is therefore the worst of the environmental conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

1. No harsh environment exists for this valve actuator following the postulated feedwater line break. Based on engineering judgement, the actuator can be expected to perform its function for the 8 hour required duration in an environment of 100% R.H. at ambient temperature.
2. The valve is required to operate early in the postulated accident sequence, giving additional assurance it will function. Further, alternate paths are available to provide EFW to the steam generators from both the turbine driven and the motor driven EFW pumps.
3. Even if this valve together with all of the other EFW injection valves failed, adequate core cooling can be provided by utilizing high pressure injection and rejecting heat through the pressurized ECCS vents.⁴ This method of cooling can be utilized until EFW is restored. The HPI injection pump motors and valve actuators are not exposed to the postulated rupture of the main feedwater line.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51, p. 41.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.
4. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Electrohydraulic Actuator for Emergency Feedwater (EFW) Pump
2P7A Discharge Isolation Valve to Steam Generator 2E24B

TAG NO(S).: 2CV-1039-2

SER RESPONSE PAGE NO(S).: B020

MANUFACTURER AND MODEL NO.: EBV Systems/EFCO Matic 4

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2084

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve is opened automatically to supply water from the appropriate EFW pump to the intact steam generator(s). The signal logic will not open the valve if the steam generator is not intact (the valve then remains closed.) The signal logic will continue to maintain level in the intact steam generator unless manual units are elected.

• QUALIFICATION DISCREPANCY:

No traceable qualification data is currently available for this actuator. The specified environment of 227°F and 9.17 psig results from a steam generator blowdown line break. In that case the normal feedwater system would not be affected (because of the separation between it and the EFW system) and would be expected to continue to be operable. The HELB's that would require operation of the EFW system are the main steam line break and the main feedwater line break. The postulated main steam line break will not affect this component due to its location. However, a conservative HELB analysis for a postulated feedwater break indicates that a harsh temperature and pressure environment is not attained in this area (essentially ambient temperature and 1.07 psig maximum)², nor is there a harsh radiation environment.³ The 100% R. H. at ambient temperature is therefore the worst of the environmental conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

1. No harsh environment exists for this valve actuator following the postulated feedwater line break. Based on engineering judgement, the actuator can be expected to perform its function for the 8 hour required duration in an environment of 100% R.H. at ambient temperature.
2. The valve is required to operate early in the postulated accident sequence, giving additional assurance it will function. Further, alternate paths are available to provide EFW to the steam generators from both the turbine-driven and the motor-driven EFW pumps.
3. Even if this valve together with all of the other EFW injection valves failed, adequate core cooling can be provided by utilizing high pressure injection and rejecting heat through the pressurized ECCS vents.⁴ This method of cooling can be utilized until EFW is restored. The HPI pump motors and valve actuators are not exposed to the postulated rupture of the main feedwater line.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.
4. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT.: Electrohydraulic Operator for (EFW) Pump 2P7B Emergency Feedwater Isolation Valve to Steam Generator 2E24B

TAG NO(S).: 2CV-1075-1

SER RESPONSE PAGE NO(S).: B021

MANUFACTURER AND MODEL NO.: Copes Vulcan Weston Hydraulics Type C DIAG/EH OP

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2081

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

This valve is opened automatically to supply water from the EFW pump to the steam generator 2E24B if it is intact. The signal logic will not open the valve if the steam generator is not intact. The signal logic will continue to maintain level in the intact steam generator unless manual control is elected. The valve is also used for manual flow control following initiation.

• QUALIFICATION DISCREPANCY:

No traceable qualification data is currently available for this actuator. The maximum harsh environment in this case would be caused by a postulated main feedwater line rupture. A conservative HELB analysis² indicates a maximum harsh condition of 220°F and 2.07 psig, and a non-harsh radiation environment.³ The analysis also indicates a return to ambient temperature conditions within one hour.

• JUSTIFICATION FOR INTERIM OPERATION:

If this valve should fail to open, two other flow paths are directly available for supplying steam generator 2E4A, and one other is directly available for 2E24B:

1. Through 2CV-1026-2 and 2CV-1037-2 from EFW pump 2P7A to steam generator 2E24A (these valves are in a non-harsh environment).

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

2. Through 2CV-1025-1 and 2CV-1038-1 from EFW pump 2P7B to steam generator 2E24A (these valves are in a non-harsh environment, except for humidity).
3. Through 2CV-1076-2 and 2CV-1039-2 from EFW pump 2P7A to steam generator 2E24B (the former valve is qualified for the environment and the latter is in a non-harsh environment).

In addition, hand operated discharge cross-connect valves 2EFW-5A, 2EFW-5B, 2EFW-11A, 2EFW-11B could eventually be utilized to achieve other combinations of flow paths.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Control Room Emergency Cooling Unit Water Control Valves

TAG NO(S).: 2CV-1506-2, 2CV-1509-2

SER RESPONSE PAGE NO(S).: B076, B078

MANUFACTURER AND MODEL NO.: ITT General AH 93

SYSTEM - P&ID NO.: Service Water M-2210

LOCATION: RM 2139

• SAFETY FUNCTION:

These valves control the flow of cooling water for condensing the refrigerant in the control room emergency cooling units.

• QUALIFICATION DISCREPANCY:

The units have been qualified to more severe conditions than required, except that test Relative Humidity was not 100%.

• JUSTIFICATION FOR INTERIM OPERATION:

Humidity was the only discrepancy. Information recently received from the manufacturer indicates that the valves are capable of operation in a 100% RH environment. They are NEMA 4 (Watertite).

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
AND-2

COMPONENT: Pressurizer Manually Controlled Vent Valves With Internal Position Switch

TAG NO(S).: 2CV-4698-1, 2CV-4740

SER RESPONSE PAGE NO(S).: A039

MANUFACTURER AND MODEL NO.: Limitorque SMB-00-10

SYSTEM - P&ID NO.: Reactor Coolant M-2230

LOCATION: Top of Pressurizer, Reactor Building

• SAFETY FUNCTION:

These vent valves provide the capability to manually vent the reactor coolant system (RCS) through the pressurizer. This capability is referenced in the operating procedures as a means of providing core cooling in the event that RCS pressure is above the high pressure injection (HPI) pump shutoff head and no other means of core cooling is available. These valves are installed in series and supplied by separate safety power trains.

• QUALIFICATION DISCREPANCY:

Documentation does not exist to qualify the valve operator for the specified chemical spray of 15000 PPM boric acid, pH of 10.5.

It is qualified to an integrated radiation dose of 1.0×10^7 rads, while the specified dose is 3.3×10^7 rads.

• JUSTIFICATION FOR INTERIM OPERATION:

Although these valves are referenced in the operating procedures as a backup method of core cooling, the FSAR accident analysis shows they are not required since the emergency core cooling system (ECCS) provides adequate cooling over the entire range of postulated break sizes.

This vent valve is located under a concrete shield and is not subjected to spray.

The radiation specification is for the full dose calculated for 40 years of plant operation plus the 30 day integrated dose resulting from a LOCA.

For the near term, the integrated dose from plant operation is small. Reference to FSAR Table 3.11-1 shows that the accident dose

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

rates are such that the qualified dose level of 1.0×10^7 rad would not be reached until several days into the postulated LOCA. During this time the valve could serve its required function and the unit brought to a safe stable condition.

Based on these facts, it is concluded that continued operation of the unit is justified with this component.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Shutdown Cooling Line Outboard Containment Isolation Valve

TAG NO(S).: 2CV-5038-1

SER RESPONSE PAGE NO(S).: B133

MANUFACTURER AND MODEL NO.: Rotork 70NA21235

SYSTEM - P&ID NO.: Safety Injection M-2232

LOCATION: Room 2084

• SAFETY FUNCTION:

The subject valve is an outboard isolation valve for the shutdown cooling recirculation water return line from the reactor coolant system to the shutdown cooling (low pressure injection) pumps. This valve is normally locked closed but is opened when the reactor system pressure is below 300 PSIG to permit use of the pumps and shutdown cooling heat exchanger for shutdown cooling. The safety function of this valve is to maintain containment isolation following a LOCA.

• QUALIFICATION DISCREPANCY:

The specified temperature is 227°F and the operator is qualified to 163°F.

• JUSTIFICATION FOR INTERIM OPERATION:

This valve remains closed until the reactor has been cooled and the pressure reduced to the point where the shutdown cooling system can be brought into operation (below 300 psi). The 227°F temperature results from HELB outside containment. The valve has no safety function following a HELB.

Based on the above, there is adequate justification for continued operation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Motor Valve Operator and Position Switch for Refueling Water Storage Tank Discharge Valve to Containment Spray and Safety Injection

TAG NO(S).: 2CV-5630-1, 2CV-5631-2

SER RESPONSE PAGE NO(S).: B165 and B166

MANUFACTURER AND MODEL NO.: Rotork 40A

SYSTEM - P&ID NO.: Containment Spray M-2236

LOCATION: Room Number 2062

• SAFETY FUNCTION:

The valve motor operators must close the discharge valves from the refueling water tank 2T3 when the tank has emptied at the end of the injection phase of a LOCA. The position switches indicate the position of the valve to the plant operator.

• QUALIFICATION DISCREPANCY:

Temperature qualification is the only outstanding item. The specified temperature is 212°F, while the motor valve operators and position switches have been qualified to 163°F. This problem is due to a postulated HELB in the auxiliary building, not a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION:

These valve operators and position switches are only required to function during a LOCA. The 212°F temperature to which they may be exposed is caused by a HELB. Therefore, they will not have to perform a safety function during or following an accident that would expose them to the temperature that they are not qualified for.

A check valve in line with each of these valves prevents backflow to the tank.

It is therefore concluded that continued operation of the unit is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Sodium Hydroxide Addition Tank Discharge Valves
Motor Operators and Position Switches.

TAG NO(S).: 2CV-5657-1, 2CV-5667-2

SER RESPONSE PAGE NO(S).: B169 and B170

MANUFACTURER AND MODEL NO.: Rotork 11A

SYSTEM - P&ID NO.: Containment Spray M-2236

LOCATION: Room 2054

• SAFETY FUNCTION:

In the event of a LOCA, the valve motor operator is required to open the valve on signal to supply sodium hydroxide to the containment spray to assure it will absorb iodine from the containment atmosphere. The valve is closed upon operator option or low sodium hydroxide tank level. The position switch indicates the valve status. The valve has no function in the event of a HELB.

• QUALIFICATION DISCREPANCY:

Temperature qualification is the only outstanding item. The postulated HELB in this area would produce a temperature, for a short time of 214°F. The valve operator is qualified to 163°F. A LOCA would not result in a temperature above the qualified value.

• JUSTIFICATION FOR INTERIM OPERATION:

The sodium hydroxide tank valves open upon signal from the containment spray actuation system. The valve remains open until the low level signal from the tank or the operator closes it. The component is not required to mitigate the HELB causing the 212°F temperature. The valves are qualified for the accident environment in which they must operate.

Therefore, continued operation of the unit is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Control and Penetration Room HVAC Electro Hydraulic Damper
Control Valves with Position Switches

TAG NO(S).: 2E/H-8829-1, 2E/H-8830-2,
2E/H-8831-1, 2E/H-8832-2

SER RESPONSE PAGE NO(S).: B188, B189, B190, B191

MANUFACTURER AND MODEL NO.: ITT General AH96

SYSTEM - P&ID NO.: HVAC - Penetration Rooms M-2264

LOCATION: Room 2049

• SAFETY FUNCTION:

These damper motors control the selection of the redundant emergency ventilation and filtration system. The primary safety function is to remove possible airborne radioactive contamination from the penetration areas and other rooms under LOCA conditions; thereby reducing release of airborne radioactivity to the atmosphere.

• QUALIFICATION DISCREPANCY:

At the time of the original SER response documentation was not available to establish qualification for 100% relative humidity. Information was obtained at a later date removing the discrepancy.

• JUSTIFICATION FOR INTERIM OPERATION:

The standard specifications for this class of operator is NEMA 4 watertite. The operating humidity range is 0-100%, as stated on the manufacturer's data sheets. Based on the above information, no discrepancy exists and continued operation is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Electrical Penetration

TAG NO(S).: 2GEN-1001A

SER RESPONSE PAGE NO(S).: A109

MANUFACTURER AND MODEL NO.: Amphenol Sams - Medium Voltage

SYSTEM - P&ID NO.: N/A

LOCATION: Reactor Building

• SAFETY FUNCTION:

- 1) Provide electrical power to medium voltage loads and
- 2) Maintain containment integrity during and after LOCA.

• QUALIFICATION DISCREPANCY:

The containment penetrations are required to operate in the long term recirculation phase following LOCA (30 days). The penetrations must function in the LOCA environment of 289°F maximum temperature. ANO-2 qualification tests were 24 hours in duration with 251°F maximum temperature.

• JUSTIFICATION FOR INTERIM OPERATION:

Generic tests performed on Amphenol-Sams penetrations in 1972 showed that the penetrations were suitable for use at 350°F.¹ In 1975, LOCA tests were performed specifically for ANO-2.² These tests were conducted at temperatures lower than those performed in 1972. The 1972 tests included 4 cycles of thermal transients including one transient at 300°F for 1 hour followed by 250°F for 23 hours. Both the ANO-2 and the generic tests resulted in no electrical degradation or loss of leak tightness.

The ANO-2 containment temperature response after LOCA peaks at 289°F in 50 seconds. The temperature is above 250°F for approximately 15 minutes of the 28 hour transient.³ At no time does the LOCA temperature transient exceed the 1972 test maximum temperature. The LOCA transient temperature exceeds the ANO-2 test temperature for approximately 15 minutes. The short duration of the temperature differential between the ANO-2 test and the LOCA induced transient and the favorable results of the 1972 generic tests give adequate assurance that the penetrations will perform their safety function in the LOCA environment.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

The containment vapor temperature returns to normal in approximately 28 hours (10^5 seconds) after LOCA.³ The containment environment before and after LOCA is within the normal range. The ANO-2 tests lasted for 24 hours and the generic tests spanned 29 hours when the 4 cycles of transients are considered. Electrical and leak tightness measurements performed before and after the environmental tests confirmed operability in ambient environments. The penetrations will, therefore, perform in the long term ambient environment following LOCA. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. Sorenson, C. C., "Design Verification Test Report No. 123-1275", Amphenol-Sams Division, May 5, 1972
2. Yue, D. D., "Special Prototype Radiation and Environmental (LOCA) Tests of Medium and Low Voltage Electric Penetration Assembly Used on Arkansas Power and Light Company, Arkansas Nuclear One, Unit 2 . . . No. 123-2045," Amphenol-Sams Operation, March 28, 1975
3. "Arkansas Nuclear One, Unit 2, FSAR," Fig. 6.2-13.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Electrical Penetrations

TAG NO(S).: 2GEN-1001B

SER RESPONSE PAGE NO(S).: A110

MANUFACTURER AND MODEL NO.: Amphenol-Sams Low Voltage

SYSTEM - P&ID NO.: N/A

LOCATION: Reactor Building

• SAFETY FUNCTION:

- 1) Provide electrical power to low voltage loads and
- 2) Maintain containment integrity during and after LOCA.

• QUALIFICATION DISCREPANCY:

The containment penetrations are required to operate in the long term recirculation phase following LOCA (30 days). The penetrations must function in the LOCA environment of 289°F. ANO-2 qualification tests were 24 hours in duration with 259°F maximum temperature.

• JUSTIFICATION FOR INTERIM OPERATION:

Generic tests performed on Amphenol-Sams penetrations in 1972 showed that the penetrations were suitable for use at 350°F.¹ In 1975, the LOCA tests were performed specifically for ANO-2.² These tests were conducted at temperatures lower than those performed in 1972. The 1972 tests included 4 cycles of thermal transients including one transient at 300°F for 1 hour followed by 250°F for 23 hours. Both the ANO-2 and the generic tests resulted in no electrical degradation or loss of leak tightness.

The ANO-2 containment temperature response after LOCA peaks at 289°F in 50 seconds. The temperature is above 250°F for approximately 15 minutes of the 28 hour transient.³ At no time does the LOCA temperature transient exceed the 1972 test maximum temperature. The LOCA transient temperature exceeds the ANO-2 test temperature for approximately 15 minutes. The short duration of the temperature differential between the ANO-2 test and the LOCA induced transient and the favorable results of the 1972 generic tests give adequate assurance that the penetrations will perform their safety function in the LOCA environment.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

The containment vapor temperature returns to normal in approximately 28 hours (10^5 seconds) after LOCA.³ The containment environment before and after LOCA is within the normal range. The ANO-2 tests lasted for 24 hours and the generic tests spanned 29 hours when the 4 cycles of transients are considered. Electrical and leak tightness measurements performed before and after the environmental tests confirmed operability in ambient environments. The penetrations will, therefore, perform in the long term ambient environment following LOCA. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

- REFERENCES

1. Sorenson, C. C., "Design Verification Test Report No. 123-1275", Amphenol-Sams Division, May 5, 1972
2. Yue, D. D., "Special Prototype Radiation and Environmental (LOCA) Tests of Medium and Low Voltage Electric Penetration Assembly Used on Arkansas Power and Light Company, Arkansas Nuclear One, Unit 2 . . . No. 123-2045," Amphenol-Sams Operation, March 28, 1975
3. "Arkansas Nuclear One, Unit 2, FSAR," Fig. 6.2-13.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Electrical Penetrations

TAG NO(S).: 2GEN-1001C

SER RESPONSE PAGE NO(S).: A111

MANUFACTURER AND MODEL NO.: Amphenol - Sams Hybrid Low Voltage

SYSTEM - P&ID NO.: N/A

LOCATION: Reactor Building

• SAFETY FUNCTION:

- 1) Provide electrical control and power to control devices and 2) maintain containment during and after LOCA

• QUALIFICATION DISCREPANCY:

The containment penetrations are required to operate in the long term recirculation phase following LOCA (30 days). The penetrations must function in the LOCA environment of 289°F maximum temperature. ANO-2 qualification tests were 24 hours in duration with 242°F maximum temperature.

• JUSTIFICATION FOR INTERIM OPERATION:

Generic tests performed on Amphenol-Sams penetrations in 1972 showed that the penetrations were suitable for use at 350°F¹. In 1975, the LOCA tests were performed specifically for ANO-2². These tests were conducted at temperatures lower than those performed in 1972. The 1972 test included 4 cycles of thermal transients including one transient at 300°F for 1 hour followed by 250°F for 23 hours. Both the ANO-2 and the generic tests resulted in no electrical degradation or loss of leak tightness.

The ANO-2 containment temperature response after LOCA peaks at 288°F in 50 seconds. The temperature is above 250°F for approximately 15 minutes of the 28 hour transient³. At no time does the LOCA temperature transient exceed the 1972 test maximum temperature. The LOCA transient temperature exceeds the ANO-2 test temperature for approximately 15 minutes. The short duration of the temperature differential between the ANO-2 test and the LOCA induced transient and the favorable results of the 1972 generic tests give adequate assurance that the penetration will perform their safety function in the LOCA environment.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

The containment vapor temperature returns to normal in approximately 28 hours (10^5 seconds) after LOCA³. The containment environment before and after LOCA is within the normal range. The ANO-2 tests lasted for 24 hours and the generic test spanned 29 hours when the 4 cycles of transient are considered. Electrical and leak tightness measurements performed before and after the environmental tests confirmed operability in ambient environments. The penetrations will, therefore, perform in the long term ambient environment following LOCA. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

- REFERENCES

1. Sorenson, C. C., "Design Verification Test Report No. 123-1275", Amphenol-Sams Division, May 5, 1972.
2. Yue, D. D., "Special Prototype Radiation and Environmental (LOCA) Tests of Medium and Low Voltage Electric Penetration Assembly used on Arkansas Power and Light Company Arkansas Nuclear One Unit 2 No. 123-2045," Amphenol-Sams Operation, March 28, 1975.
3. " Arkansas Nuclear One Unit 2, FSAR," Fig. 62-13.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Electrical Penetrations

TAG NO(S).: 2GEN-1001D

SER RESPONSE PAGE NO(S).: A112

MANUFACTURER AND MODEL NO.: Amphenol Sams - Instrumentation

SYSTEM - P&ID NO.: N/A

LOCATION: Reactor Building

• SAFETY FUNCTION:

- 1) Provide electrical signals to instruments and,
- 2) maintain containment integrity during and after LOCA.

• QUALIFICATION DISCREPANCY:

The containment penetrations are required to operate in the long term recirculation phase following LOCA (30 days). The penetrations must function in the LOCA environment of 289°F maximum temperature. ANO-2 qualification tests were 24 hours in duration with 238°F maximum temperature.

• JUSTIFICATION FOR INTERIM OPERATION:

Generic tests performed on Amphenol-Sams penetrations in 1972 showed that the penetrations were suitable for use at 350°F¹. In 1975, the LOCA tests were performed specifically for ANO-2². These tests were conducted at temperatures lower than those performed in 1972. The 1972 test included 4 cycles of thermal transients including one transient at 300°F for 1 hour followed by 250°F for 23 hours. Both the ANO-2 and the generic tests resulted in no electrical degradation or loss of leak tightness.

The ANO-2 containment temperature response after LOCA peaks at 288°F in 50 seconds. The temperature is above 250°F for approximately 15 minutes of the 28 hour transient³. At no time does the LOCA temperature transient exceed the 1972 test maximum temperature. The LOCA transient temperature exceeds the ANO-2 test temperature for approximately 15 minutes. The short duration of the temperature differential between the ANO-2 test and the LOCA induced transient and the favorable results of the 1972 generic tests give adequate assurance that the penetration will perform their safety function in the LOCA environment.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

The containment vapor temperature returns to normal in approximately 28 hours (10^5 seconds) after LOCA³. The containment environment before and after LOCA is within the normal range. The ANO-2 tests lasted for 24 hours and the generic test spanned 29 hours when the 4 cycles of transient are considered. Electrical and leak tightness measurements performed before and after the environmental tests confirmed operability in ambient environments. The penetrations will, therefore, perform in the long term ambient environment following LOCA. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

- REFERENCES

1. Sorenson, C. C., "Design Verification Test Report No. 123-1275", Amphenol-Sams Division, May 5, 1972.
2. Yue, D. D., "Special Prototype Radiation and Environmental (LOCA) Tests of Medium and Low Voltage Electric Penetration Assembly used on Arkansas Power and Light Company Arkansas Nuclear One Unit 2 No. 123-2045," Amphenol-Sams Operation, March 28, 1975.
3. " Arkansas Nuclear One Unit 2, FSAR," Fig. 62-13.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Containment Sump Level Indicator
TAG NO(S).: 2LE-5641-2
SER RESPONSE PAGE NO(S).: A080
MANUFACTURER AND MODEL NO.: GEMS XM-54854-56-2000
SYSTEM - P&ID NO.: Containment Spray M-2236
LOCATION: Reactor Building Sump

• SAFETY FUNCTION:

The level transmitter indicates the Reactor Building Sump level by an alarm in the control room. The instrument starts reading at approximately 3½ inches of fluid, and alarms at 5½ inches of fluid in the sump. It indicates level up to the top of the sump. Readings from floor level to 12 feet are obtained from two similar instruments with ranges of 72 inches.

The level transmitter is to indicate sump filling initially which would give warning of a leak or break in the reactor building.

• QUALIFICATION DISCREPANCY:

Documentation does not exist to verify qualification to the following conditions:

Operating time	30 days
Temperature	289°F
Pressure	48 psig
Humidity	100%
Chemical spray	15,000 ppm boric acid at pH 10.5 (77°F)
Radiation	3.3E7 rads
Submergence	

• JUSTIFICATION FOR INTERIM OPERATION:

This instrument was installed during the last outage per requirements of NUREG 0737. Due to the time constraints imposed, the instrument was installed prior to completion of environmental qualification testing. Testing is currently underway and is scheduled for completion by mid 1982. Although documentation does not exist to establish qualification, the instrument was designed to function in an environment exceeding that specified for ANO-2.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

In the unlikely event of a LOCA, or HELB this instrument would provide verification that adequate level existed in the sump to allow initiation of recirculation and/or containment spray from the sump.

Other instruments located in a mild environment outside the Reactor Building may be used to verify recirculation adequacy. They include the Refueling Water Storage Tank level transmitters, and containment spray flow instruments.

Based on the above information, it is concluded that continued operation is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Containment Hydrogen Recombiners

TAG NO(S).: 2M-55A, 2M-55B

SER RESPONSE PAGE NO(S).: A107, A108

MANUFACTURER AND MODEL NO.: Westinghouse WCAP 7709-L

SYSTEM - P&ID NO.: Hydrogen Recombiners (No P&ID)

LOCATION: Reactor Building

• SAFETY FUNCTION:

In the event of a LOCA, the hydrogen recombiner function is to keep the hydrogen concentration in the containment atmosphere below the lower limit of flammability.

• QUALIFICATION DISCREPANCY:

The recombiners have been successfully qualified to more severe requirements than those of ANO-2. However, the operating time requirement is 30 days, but the qualification test duration was 21 days.

• JUSTIFICATION FOR INTERIM OPERATION:

The hydrogen recombiner was successfully qualified under LOCA conditions for 21 days under environmental conditions significantly more severe than required for ANO-2. The building will return to a near ambient temperature and pressure with 28 hours. The units are designed in such a fashion that partial loss of heating elements will not prevent the units from completing their duty.

The hydrogen recombiners need not be placed in operation until 3 days after the postulated LOCA.¹

Based on the successful qualification tests described above and the redundancy provided, it is concluded that continued operation of the unit is justified.

• REFERENCES

1. FSAR Section 6.2.5.3.1.4 and Figure 6.2-25.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Pressure Indicating Switch - Emergency Feedwater (EFW) Pumps Suction

TAG NO(S).: 2PIS-0789-1, 2PIS-0795-2

SER RESPONSE PAGE NO(S).: B011, B014

MANUFACTURER AND MODEL NO.: ITT Barton Model 288A

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2025, 2024

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

During EFW operation pressure switches 2PIS-0789-1 actuate on low suction pressure following EFAS actuation to open valve 2CV-0716-1 while closing valve 2CV-0789-1. This automatically transfers EFW pump suction to the service water system after the normal condensate source is depleted or rendered unavailable. Pressure switch 2PIS-0795-2 similarly switches the suction of the second EFW pump.

• QUALIFICATION DISCREPANCY:

No traceable qualification data regarding harsh environment is currently available. The maximum harsh environment in this case would be caused by a postulated main feedwater line rupture. A conservative HELB analysis² indicates a maximum harsh condition of 214°F and 1.02 psig, and a non-harsh radiation environment.³ The analysis also indicates a return to ambient temperature conditions within one hour.

• JUSTIFICATION FOR INTERIM OPERATION:

Postulated failure of these pressure switches would either result in early transfer of suction from the normal supply to the service water supply or would result in a failure to transfer when required.

A failure mode leading to an early transfer does not defeat the EFW safety function since service water can provide adequate cooling. This failure mode would also cause a false alarm. This alarm is in a conservative direction in that continued availability of EFW is

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

assured. Operating procedures⁴ emphasize monitoring variables such as condensate storage tank level, steam generator level, and EFW flow.

The other failure mode would result in failure to alarm and failure to automatically transfer. Manual transfer capability would not be affected. Operating procedures require careful monitoring of the EFW system variables so as to anticipate the time for transfer, and the operator does not rely on an automatic transfer.

Due to the substantial liquid inventory of the steam generators and the thermal capacity of the reactor coolant system, interruption of the EFW flow to manually transfer the pumps suction would not cause loss of cooling.

Based on the above analysis it is concluded that justification for continued operation has been demonstrated.

- REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.
4. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Emergency Feedwater (EFW) Pump 2P7B Motor

TAG NO(S).: 2PM-7B

SER RESPONSE PAGE NO(S).: B024

MANUFACTURER AND MODEL NO.: Allis Chalmers Model 123

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2025

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

Either the motor driven pump or the redundant turbine driven pump can provide 100% feedwater capacity for decay heat removal and cooldown of the Reactor Coolant System.

• QUALIFICATION DISCREPANCY:

This pump utilizes a motor for which no traceable qualification data regarding harsh environment is currently available. The maximum harsh environment in this case would be caused by a postulated rupture of a main feedwater line. A conservative HELB analysis² indicates a maximum harsh condition of 214°F and 1.02 psig, and a non-harsh radiation environment.³ The analysis also indicates a return to ambient temperature conditions within one hour.

• JUSTIFICATION FOR INTERIM OPERATION:

There are several reasons why interim operation is justified:

1. The significant potential damage mechanisms are the effects of high temperature and humidity on the motor insulation. The motor has an 80°C temperature rise rating and uses Class B insulation. Class B insulation (classification temperature 130°C) designed in accordance with standard industry practice would not be expected to fail even if exposed to the maximum harsh environment for the full eight hours (although the insulation life might be reduced.)⁴ The harsh environment will only exist for less than one hour. The motor is on

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

stand by during normal plant operation, and would start during the postulated accidents. Thus the environment would moderate during the time when the motor is coming up to temperature. The motor is of open drip proof construction, which will preclude moisture damage.

2. If the motor driven pump should fail, the turbine driven pump can perform the required safety function. The qualification status of the turbine driven pump auxiliaries qualification is presented in the September 12, 1981 submittal and this submittal.
3. If both the motor driven and steam driven pump should fail, adequate core cooling can be provided by utilizing high pressure injection and rejecting heat through the pressurizer ECCS vents.⁵ This method of cooling can be utilized until EFW is restored. The high pressure injection pump motors and valve actuator, are not exposed to the postulated rupture of the main feedwater line.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.
4. IEEE Std 275-1966, "Thermal Evaluation of Insulation Systems for AC Electric Machinery Employing Form-Wound Pre-Insulated Stator Coils, Machines Rated 6900V and Below".
5. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Containment Spray Pump Motors
TAG NO(S).: 2PM-35A, 2PM-35B
SER RESPONSE PAGE NO(S).: B158, B159
MANUFACTURER AND MODEL NO.: ALLIS CHALMERS GV
SYSTEM - P&ID NO.: Containment Spray M-2236
LOCATION: Room 2007, 2014

• SAFETY FUNCTION:

Provide containment pressure suppression and air cooling during LOCA and post-LOCA conditions.

• QUALIFICATION DISCREPANCY:

The listed discrepancies are operating time, 30 days; temperature, 107°F; pressure, 2.22 psig; humidity, 100%; and radiation, 1.1E7 Rads.

The rating of class B or F motors envelopes all of the conditions except pressure and radiation. (NEMA MG-1, Section 20-40)

• JUSTIFICATION FOR INTERIM OPERATION:

A temperature of 40°C (104°F - See NEMA MG-1 Sec. 20-40) has been specified for the Class B insulation of these motors. The 3°F differential between the specified and the peak temperature as a result of steam line break is of short duration (less than 1 hr.) and is negligible with respect to both Class B ambient (40°C) and Class B rise (80°C). Maximum pressure and humidity conditions are mild when compared to normal operating conditions.

The motors are open and drip proof. This construction coupled with internal heat generation will preclude moisture damage from condensation. The sole potential damage mechanism is, therefore, radiation. Note that these pumps are not required for mitigation of the steam line break which causes the high temperature, pressure, and humidity conditions. The radiation environment does not occur at the same time as the other elevated conditions, since the high radiation dose occurs during recirculation, at which time temperature, pressure, and humidity are within the normal range.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Allis Chalmers catalog information shows that non-hygroscopic impregnated, form-wound coils are used for motor insulation in Class B or Class F applications. Dacron-glass tape, mylar, mica, and polyester varnish are mentioned as materials used for insulating the motors.

Mica is an inorganic compound with a threshold value of 10^8 rads.¹ Dacron-glass tape and mylar are both polyethylene terephthalate² with a radiation damage threshold of 10^8 rads.³ Polyester resins have a damage threshold of between 10^5 and 10^6 rads.² This value was determined from tests on the elastomer rather than on varnish. Other tests on polyester - glass laminates show a threshold of 10^9 rads.⁴ The primary purpose of the varnish is to exclude moisture during non-operating periods. Since the polyester varnish produces a laminated insulation and since the motors will be running when receiving the accident radiation dose, the motors will not fail due to radiation. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. Nuclear Engineering Handbook
2. "Radiation Effects of Organic Materials in Nuclear Plants", EPRINP-2129
3. Broadway, N.J. et. al. "Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials", Battelle Memorial Institute, 1964.
4. Bolt and Carroll, "Radiation Effects on Organic Materials", Academic Press, 1963.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Low Pressure Injection (LPI) Pump Motor

TAG NO(S).: 2PM-60A, 2PM-60B

SER RESPONSE PAGE NO(S).: B151, B152

MANUFACTURER AND MODEL NO.: Allis Chalmers GV

SYSTEM - P&ID NO.: Safety Injection M-2232

LOCATION: Room 2014, 2007

• SAFETY FUNCTION:

The pump provides cooling water to core during large break LOCA. The LPI pump motors are tripped during the recirculation phase by the Recirculation Actuation Signal (RAS) on low level in the Reactor Water Tank (RWT). LPI motors are started on low pressurizer pressure or high containment pressure signals (see FSAR Table 7.2-4).

• QUALIFICATION DISCREPANCY:

The discrepancies are as follows:

Operating time	1 hour
Temperature	107°F
Pressure	2.22 psig
Humidity	100%
Radiation	7.0E6 rads.

• JUSTIFICATION FOR INTERIM OPERATION:

A temperature of 40°C (104°F-See NEMA MG-1 Sec 20-40) has been specified for the Class B insulation of these motors. The 3°F differential between the specified and the peak temperature as a result of steam line break is of short duration (less than 1 hr) and is negligible with respect to both Class B ambient (40°C) and Class B rise (80°C). Maximum pressure and humidity conditions are mild when compared to normal operating conditions.

The motors are open and drip proof. This construction coupled with internal heat generation will preclude moisture damage from condensation. The sole potential damage mechanism is, therefore, radiation. Note that these pumps are not required for mitigation of the steam line break which causes the high temperature, pressure,

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

and humidity conditions. Radiation values are conservatively estimated doses which occur during a full year of the recirculation phase after LOCA. LPI is only required for 1 hour after a LOCA, so the actual dose will be much less in that time interval.

Allis Chalmers catalog information shows that non-hygroscopic impregnated, form-wound coils are used for motor insulation in Class B or Class F applications. Dacron-glass tape, mylar, mica, and polyester varnish are mentioned as materials used for insulating the motors.

Mica is an inorganic compound with a threshold value of 10^8 rads.¹ Dacron-glass tape and mylar are both polyethylene terephthalate² with a radiation damage threshold of 10^8 rads.³ Polyester resins have a damage threshold of between 10^5 and 10^6 rads.² This value was determined from tests on the elastomer rather than on varnish. Other tests on polyester - glass laminates show a threshold of 10^9 rads.⁴ The primary purpose of the varnish is to exclude moisture during non-operating periods. Since the polyester varnish produces a laminated insulation and since the motor will be running when receiving the accident radiation dose, the motor will not fail due to radiation. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. Nuclear Engineering Handbook
2. "Radiation Effects of Organic Materials in Nuclear Plants", EPRINP-2129
3. Broadway, N.J. et. al. "Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials", Battelle Memorial Institute, 1964.
4. Bolt and Carroll, "Radiation Effects on Organic Materials", Academic Press, 1963.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANG-2

COMPONENT: High Pressure Injection (HPI) Pump Motors

TAG NO(S).: 2PM-89A, 2PM-89B, 2PM-89C

SER RESPONSE PAGE NO(S).: B153, B154, B155

MANUFACTURER AND MODEL NO.: Allis Chalmers RG

SYSTEM - P&ID NO.: Safety Injection M-2232

LOCATION: Rm. 2009

• SAFETY FUNCTION:

- 1) Provides cooling water to core during a LOCA.
- 2) Provide makeup for reactor coolant shrinkage due to steam line break.
- 3) Provide recirculation to core after LOCA. This function is initiated by the Recirculation Actuation Signal (RAS) on low level in the Reactor Water Tank (RWT). HPI pumps start on low pressurizer pressure or high containment pressure signals (see FSAR Table 7.2.4).

• QUALIFICATION DISCREPANCY:

The listed discrepancies are operating time, 30 days; temperature, 107°F, pressure, 2.22 psig; humidity, 100%, and radiation, 7.0E6 RADS. The rating of class B or F motor envelopes all of the conditions except pressure and radiation. (NEMA MG-1 Sec. 20-40).

• JUSTIFICATION FOR INTERIM OPERATION:

A temperature of 40°C (104°F - See NEMA MG-1 Sec. 20-40) has been specified for the Class B insulation of these motors. The 3°F differential between the specified and the peak temperature as a result of steam line break is of short duration (less than 1 hr) and is negligible with respect to both Class F ambient (40°C) and Class F rise (115°C). Maximum pressure and humidity conditions are mild when compared to normal operating conditions.

The motor are open and drip proof. This construction coupled with internal heat generation will preclude moisture damage from condensation. The sole potential damage mechanism is, therefore, radiation. Note that the radiation environment does not occur at the same time as the elevated temperature, pressure, and humidity conditions. The latter environments are caused by steam line break

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

during which there is no recirculation. Recirculation occurs during the post-LOCA phase, at which time temperature, pressure, and humidity are within the normal range. Also note that Class F has more thermal margin than Class B, resulting in a longer expected life.

Allis Chalmers catalog information shows that non-hygroscopic impregnated, form-wound coils are used for motor insulation in Class B or Class F applications. Dacron-glass tape, mylar, mica, and polyester varnish are mentioned as materials used for insulating the motors.

Mica is an inorganic compound with a threshold value of 10^8 rads.¹ Dacron-glass tape and mylar are both polyethylene terephthalate² with a radiation damage threshold of 10^8 rads.³ Polyester resins have a damage threshold of between 10^5 and 10^6 rads.² This value was determined from tests on the elastomer rather than a varnish. Other tests on polyester - glass laminates show a threshold of 10^9 rads.⁴ The primary purpose of the varnish is to exclude moisture during non-operating periods. Since the polyester varnish produces a laminated insulation and since the motors will be running when receiving the accident radiation dose, the motor will not fail due to radiation. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

- REFERENCES

1. Nuclear Engineering Handbook
2. "Radiation Effects of Organic Materials in Nuclear Plants", EPRINP-2129
3. Broadway, N.J. et. al. "Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials", Battelle Memorial Institute, 1964.
4. Bolt and Carroll, "Radiation Effects on Organic Materials", Academic Press, 1963.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Sodium Hydroxide Addition Pump Motors

TAG NO(S).: 2PM-136A, 2PM-136B

SER RESPONSE PAGE NO(S).: B160, B161

MANUFACTURER AND MODEL NO.: Westinghouse TBFC CLF

SYSTEM - P&ID NO.: Containment Spray M-2236

LOCATION: Room No. 2014

• SAFETY FUNCTION:

The safety function of this motor is to drive Sodium Hydroxide addition pump B (2P136B) which pumps from NaOH addition tank 2T10 into the containment spray system during a LOCA. It must run until the tank is drained. The addition of NaOH to the containment spray is for chemically removing the Iodine from the reactor building gases.

• QUALIFICATION DISCREPANCY:

Documentation does not exist to verify qualification for the following documents:

Operating time	8 hours
Temperature	107°F
Pressure	2.22 psig
Humidity	100%
Radiation	1.1E7 rads.

The rating of class B or F motor envelopes all of the conditions except pressure and radiation. (NEMA MG-1 Section 20-40).

• JUSTIFICATION FOR INTERIM OPERATION:

An ambient temperature of 40°C (104°F - See NEMA M6-1 Section 20-40) has been specified for the Class F insulation of these motors. The pressure and humidity requirement are for a steam line break not a LOCA. The totally enclosed fan cooled system is designed for harsh industrial environment. The specified conditions are mild compared to the motor's capability. The class F insulation system is designed to accommodate a rise of 110°C above 40°C. Totally enclosed motors are expected to operate in harsh environments and a pressure change of 2.2 psig would be insignificant.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

The Sole potential damage mechanism is, therefore, radiation. Note that these pumps are not required for mitigation of the steam line break which causes the high temperature, pressure, and humidity conditions. The radiation environment does not occur at the same time as the other elevated conditions, since the high radiation dose occurs during recirculation, at which time temperature, pressure, and humidity are within the normal range.

Dacron-glass tape, mylar, mica, and polyester varnish are mentioned as materials used for insulating the motors.

Mica is an inorganic component with a threshold value of 10^8 rads.¹ Dacron-glass tape and mylar are both polyethylene terephthalate² with a radiation damage threshold of 10^8 rads.³ Polyester resins have a damage threshold of between 10^5 and 10^6 rads.² This value was determined from tests on the elastomer rather than on varnish. Other tests on polyester - glass laminates show a threshold of 10^9 rads.⁴ The primary purpose of the varnish is to exclude moisture during non-operating periods. Since the polyester varnish produces a laminated insulation and since the motors will be running when receiving the accident radiation dose, the motors will not fail due to radiation. The motors will have completed most of their function before radiation appears since radiation begins during the recirculation phase of the spray system function. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

• REFERENCES

1. Nuclear Engineering Handbook
2. "Radiation Effects of Organic Materials in Nuclear Plants", EPRINP-2129
3. Broadway, N.J. et. al. "Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials", Battelle Memorial Institute, 1964.
4. Bolt and Carroll, "Radiation Effects on Organic Materials", Academic Press, 1963.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Radiation Monitor for Service Water Return from Containment Cooling Units

TAG NO(S).: 2RE-1513-2; 2RE-1519-1

SER RESPONSE PAGE NO(S).: B083; B085

MANUFACTURER AND MODEL NO.: Westinghouse 1058E93602

SYSTEM - P&ID NO.: Service Water M-2210

LOCATION: Room 2040D, 2040E.

• SAFETY FUNCTION:

These radiation monitors are designed to provide an alarm signal if the service water returned from the containment cooling units becomes radioactive. This function is necessary under LOCA conditions when the containment building atmosphere contains radiation and the Reactor Building pressure exceeds the service water pressure, so there is a potential for leakage into the service water.

• QUALIFICATION DISCREPANCY:

Qualification data are not available to demonstrate operability under conditions resulting from HELB outside containment. These have been calculated to be:

Temperature	214°F
Pressure	1.04 psig
Humidity	100%
Radiation	2.0E5 rads

• JUSTIFICATION FOR INTERIM OPERATION:

The radiation monitor provides an alarm signal if radiation exceeds a preset level in the service water return line from the containment cooling coils. As discussed above, operation of these monitors is required only in the event of a LOCA. The harsh environmental conditions for which the units are not qualified result from a HELB outside containment. Since these monitors are not required for this accident, it is concluded that continued operation of the unit is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Speed Control Sensor for (EFW) Emergency Feedwater Turbine Driven Pump

TAG NO(S).: 2SE-0336B-2

SER RESPONSE PAGE NO(S).: B002

MANUFACTURER AND MODEL NO.: Airpax (Terry Steam Turbine)

SYSTEM - P&ID NO.: Main Steam System M-2202

LOCATION: Room 2043

• SAFETY FUNCTION:¹

The EFW system provides a means of supplying water to the intact steam generator(s) following a postulated main steam break or loss of main feedwater, for the purpose of decay heat removal and cooldown to conditions where the shutdown cooling system can be placed in operation.

The speed sensor provides a speed feedback signal to the turbine speed control system, and provides local and remote indication of pump speed. Speed may be controlled by the operator to regulate flow to the intact steam generator(s).

• QUALIFICATION DISCREPANCY:

No traceable qualification data regarding harsh environment is currently available. The maximum harsh environment in this case would be caused by a postulated rupture of a main feedwater line. A conservative HELB analysis² indicates a maximum harsh condition of 214°F and 1.02 psig, and a non-harsh radiation environment.³ The analysis also indicates a return to ambient temperature conditions within one hour.

• JUSTIFICATION FOR INTERIM OPERATION:

This type of sensor is designed to operate in severe service environments, since it is closely coupled to high temperature machinery and must also withstand vibration. The magnetic pickup type of sensor has been used successfully in this type of application for many years.

As discussed for the control panel 2C143 for the turbine-driven EFW pump, (item B004), even if this sensor should fail, means are available for safely removing decay heat by the following:

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

1. Operation of the Motor Driven EFW pump
2. Feeding the Reactor Coolant System by means of the high pressure injection pumps and venting steam through the pressurizer vents; and
3. Operation of the turbine driven EFW pump under local manual control.

Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

- REFERENCES

1. ANO Unit 2 FSAR, pp. 10.4-24 through 10.4-30a.
2. NUS Report 1957-SA-A9, Rev. 2, "Calculation of Maximum Harsh T/H Environmental Conditions for ANO-2 Auxiliary Building for 79-10B Analysis," pp. 47-51.
3. NUS Report 1957-SA-A12, "Electrical Equipment Integrated Dose Analysis for ANO Units 1 and 2," pp. 26, 27.
4. IEEE Std 275-1966, "Thermal Evaluation of Insulation Systems for AC Electric Machinery Employing Form-Wound Pre-Insulated Stator Coils, Machines Rated 6900V and Below".
5. ANO Unit 2 Emergency Operating Procedure 2202.06 Rev. 6, "Loss of Reactor Coolant".

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Steam Generator Main Steam Isolation Valve Pilots

TAG NO(S).: 2SV-1010-1A, 2SV-1010-2A, 2SV-1060-1A, 2SV-1060-2A

SER RESPONSE PAGE NO(S).: B027, B028, B036, B037

MANUFACTURER AND MODEL NO.: ASCO Ft 8321 A 6

SYSTEM - P&ID NO.: Main Steam M-2206

LOCATION: Room 2155

• SAFETY FUNCTION:

These valves control the main steam isolation valves (MSIV). During normal operation two solenoid valves must be energized open to hold each MSIV open. Closure of only one valve will close its MSIV.

• QUALIFICATION DISCREPANCY:

Operating Time	8 hours
Temperature	292°F
Pressure	Ambient (no discrepancy)
Humidity	100%

The conditions are due to a postulated HELB.

• JUSTIFICATION FOR INTERIM OPERATION:

These valves have materials of construction that will allow temperature transients within the specified limits. The enclosure is NEMA 4 (watertite) as well as explosion proof (NEMA 7C and 7D). Moisture from steam will not enter the enclosure. The coil (the only electrical component in the valve) is class "F", (311°F) rated, which is 9°F above the specified.

All valves will be tripped immediately on an isolation signal or in the unlikely event of a HELB in that area. Valve failure will also allow the main steam valves to close, since the de-energized or failure position causes the air to dump from the main steam valves.

Valves of similar construction by the same vendor have been qualified for more stringent requirements. Therefore, it is concluded that continued operation is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Steam Generator Blowdown Isolation Pilot Valves

TAG NO(S): 2SV-1016-1, 2SV-1016-2, 2SV-1066-1, 2SV-1066-2

SER RESPONSE PAGE NO(S): B029, B031, B038, B040

MANUFACTURER AND MODEL NO.: ASCO HT8321A6

SYSTEM - P&ID NO.: Steam Generator Secondary M2206

LOCATION: Room 2081

• SAFETY FUNCTION:

These pilot valves control the steam generator blowdown isolation valve in the Auxiliary Building. To open an isolation valve, both its solenoid pilot valves must be energized and open. If either pilot is de-energized or fails closed, the isolation valves closes.

• QUALIFICATION DISCREPANCY:

Documentation does not exist to demonstrate qualification to conditions of:

Operating Time	8 hours
Temperature	220°F max
Pressure	2.07 psig
Humidity	100%
Radiation	1.5E4 rads (Unit qualified)

The pressure, temperature and humidity conditions are caused by a postulated HELB.

• JUSTIFICATION FOR INTERIM OPERATION:

The main purpose of these valves is to provide isolation in case of a postulated HELB. A steam break (HELB) in the area would require immediate isolation of the blowdown line. The valves inside containment would also close to provide isolation. Long term (8 hours) use of these valves is for a LOCA in the reactor building and is not associated with the postulated HELB which causes the harsh environmental conditions.

The valves are class H, Nema 4 watertite, as well as explosion proof. Class H coils operate up to 356°F continuous. Valves of similar construction by the same vendor have been qualified to more stringent specifications. Therefore, it is concluded that continued operation of the unit is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Solenoid Pilot Valve for Isolation Valve in Reactor Building Sump Line

TAG NO(S).: 2SV-2061-2

SER RESPONSE PAGE NO(S).: B111

MANUFACTURER AND MODEL NO.: ASCO

SYSTEM - P&ID NO.: Liquid Radioactive Waste M-2213

LOCATION: Room No. 2013

• SAFETY FUNCTION:

The safety function of this solenoid valve is to control the valve which isolates the Reactor Building Sump from the Auxiliary Building Sump. This valve is de-energized by a containment isolation signal, closing it and causing the isolation valve to close.

• QUALIFICATION DISCREPANCY:

Documentation is not available to demonstrate justification for operating time, temperature, pressure, relative humidity and radiation.

• JUSTIFICATION FOR INTERIM OPERATION:

The solenoid pilot valve will de-energize to close the isolation valve upon receipt of a Containment Isolation Actuation signal. The isolation valve will also close upon loss of air and this, coupled with the de-energize to close design of the pilot, ensures a safe failure mode of the valve.

For the LOCA conditions under which the valve is required to operate, it is not exposed to harsh temperature, pressure or humidity conditions. Because of the short time specified (1 minute) between the initiating event of the postulated LOCA and the completion of valve operation, radiation exposure would also be negligible.

There is a redundant valve (2CV-2060-1) which provides isolation inside containment. The redundant valve is only exposed to a harsh environment in the event of LOCA or HELB inside containment, while this valve is only exposed to harsh environments due to HELB outside containment, thus ensuring operability of the isolation

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

valve in the mild environment. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Solenoid Pilot Valve for Containment Isolation Valve in Line
From Reactor Drain Tank

TAG NO(S).: 2SV-2201-2

SER RESPONSE PAGE NO(S).: B113

MANUFACTURER AND MODEL NO.: ASCO HT8321A6

SYSTEM - P&ID NO.: Boron Management M-2214

LOCATION: Room Number 2013

• SAFETY FUNCTION:

Control the containment isolation valve in the line from the reactor drain tank 2T68. The solenoid pilot valve is de-energized by a Containment Isolation signal, closing it and causing the isolation valve to close.

• QUALIFICATION DISCREPANCY:

Documentation is not available to demonstrate qualification for operating time, temperature, pressure and radiation.

• JUSTIFICATION FOR INTERIM OPERATION:

The solenoid pilot valve will de-energize to close the valve upon receipt of a Containment Isolation Actuation signal. The valve will also close upon loss of air and this, coupled with the de-energize to close design of the pilot, ensures a safe failure mode of the isolation valve.

For the LOCA conditions under which the valve is required to operate, it is not exposed to harsh temperature, pressure or humidity conditions. Because of the short time specified (1 minute) between the initiating event of the postulated LOCA and the completion of valve operation, radiation exposure would also be negligible.

There is a redundant valve (2CV-2202-1) which provides isolation inside containment. The redundant valve is only exposed to a harsh environment in the event of LOCA or HELB inside containment, while this valve is only exposed to harsh environments due to HELB outside containment, thus ensuring operability of the isolation

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

valve in the mild environment. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Solenoid Pilot Valve for Gaseous Radwaste Containment
Isolation Valve

TAG NO(S).: 2SV-2400-2

SER RESPONSE PAGE NO(S).: B115

MANUFACTURER AND MODEL NO.: ASCO HTX 8320A184

SYSTEM - P&ID NO.: Gaseous Radioactive Waste M-2215

LOCATION: Room No. 2084

• SAFETY FUNCTION:

The safety function of this valve is to control the valve which isolates the containment vent header from the Waste Gas Surge Tank. The pilot valve is de-energized to close and to close the isolation valve.

• QUALIFICATION DISCREPANCY:

Documentation is not available to verify qualification of the valve to the required operating time, temperature, pressure and relative humidity.

• JUSTIFICATION FOR INTERIM OPERATION:

The solenoid pilot valve will de-energize to close the isolation valve upon receipt of a Containment Isolation Actuation Signal. The isolation valve will also close upon loss of air and this, coupled with the de-energize to close design of the pilot, ensures a safe failure mode of the valve.

For the LOCA conditions under which the valve is required to operate, it is not exposed to harsh temperature, pressure or humidity conditions. Because of the short time specified (1 minute) between the initiating event of the postulated LOCA and the completion of valve operation, radiation exposure would also be negligible.

There is a redundant valve (2CV-2401-1) which provides isolation inside containment. The redundant valve is only exposed to a harsh environment in the event of LOCA or HELB inside containment, while this valve is only exposed to harsh environments due to HELB outside containment, thus ensuring operability of the isolation valve in the mild environment. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
AND-2

COMPONENT: Solenoid Pilot Valve for Chilled Water Containment Isolation Valve

TAG NO(S).: 2SV-3851-1

SER RESPONSE PAGE NO(S).: B117

MANUFACTURER AND MODEL NO.: ASCO HT 8321A6

SYSTEM - P&ID NO.: Chilled Water M-2222

LOCATION: Room No. 2081

• SAFETY FUNCTION:

The safety function of this solenoid valve is to control the valve which isolates the chilled water system from the containment. The solenoid pilot valve is de-energized to close. The isolation valve closes if the pilot valve closes. Operation is required under LOCA conditions.

• QUALIFICATION DISCREPANCY:

Qualification data are not available to document the operating time of 1 minute; temperature of 220°F; pressure of 2.07 psig; and humidity of 100%. This environment results from a HELB.

• JUSTIFICATION FOR INTERIM OPERATION:

This valve is required to operate in the event of a LOCA. Electrical failure of this valve causes isolation, so the failure mode is safe. Control valve 2CV-3850-2, which is inside the containment provides a redundant separate isolation function.

For the LOCA conditions under which the valve is required to operate, it is not exposed to harsh temperature, pressure or humidity conditions. Because of the short time specified (1 minute) between the initiating event of the postulated LOCA and the completion of valve operation, radiation exposure would also be negligible.

The specified environment results from a HELB in the auxiliary building, not the postulated LOCA. The valve has a class H coil, and NEMA 4, 7C and 7D enclosure. (356°F, watertite). Similar valves made by the same vendor have been qualified to much more severe conditions.

It is therefore concluded that continued operation of the unit is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Solenoid Pilot Valve for Chilled Water Containment Isolation Valve

TAG NO(S).: 2SV-3852-1

SER RESPONSE PAGE NO(S).: B119

MANUFACTURER AND MODEL NO.: ASCO HT 8321A6

SYSTEM - P&ID NO.: Chilled Water M-2222

LOCATION: Room No. 2081

• SAFETY FUNCTION:

The safety function of this solenoid valve is to control the valve which isolates the chilled water system from the containment. The solenoid pilot valve is de-energized to close. The isolation valve closes if the pilot valve closes. An isolation signal supplies the trip signal during the postulated LOCA.

• QUALIFICATION DISCREPANCY:

Qualification data are not available to document the operating time, temperature of 220°F, pressure of 2.07 psig or humidity of 100%. This environment results from a HELB outside the containment.

• JUSTIFICATION FOR INTERIM OPERATION:

This valve is only required to operate in the event of a LOCA. Electrical failure of the valve causes isolation, so the failure mode is safe. Check valve 2AC-49, which is inside the containment provides isolation from leakage from the containment. The containment isolation function is required under LOCA conditions.

For the LOCA conditions under which the valve is required to operate, it is not exposed to harsh temperature, pressure or humidity conditions. Because of the short time specified (1 minute) between the initiating event of the postulated LOCA and the completion of valve operation, radiation exposure would also be negligible.

The valve would not have to respond to the postulated HELB.

This valve has a class H coil and is supplied with a NEMA 4, 7 and 7D enclosure (350°F, water tight). Similar valves supplied by the same vendor have been qualified for more severe service.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

It is therefore concluded that continued operation of the unit is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Reactor Coolant Letdown Isolation Valve Pilot

TAG NO(S).: 2SV-4823-2

SER RESPONSE PAGE NO(S).: B122

MANUFACTURER AND MODEL NO.: ASCO HPX 8320A26

SYSTEM - P&ID NO.: Chemical and Volume Control M-2231

LOCATION: Room 2084

• SAFETY FUNCTION:

During normal plant operation the valve is energized and open, passing air to the isolation valve. Upon receipt of a Containment Isolation signal in the event of a LOCA, it is deenergized, causing the letdown line valve to provide containment isolation of the letdown line.

• QUALIFICATION DISCREPANCY:

Documentation is not available that the valve is qualified for the required operating time or pressure of 9.17 psig. This environment is caused by a HELB, not a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION:

The solenoid valve is required to control air for the letdown line isolation valve in the event of a LOCA. It closes on de-energization. Failure of the solenoid will cause the valve to isolate. A second valve 2CV-4817 (Pressure level control), or either of two valves inside containment may be hand actuated to isolate the system.

For the LOCA conditions under which the valve is required to operate, it is not exposed to harsh temperature, pressure or humidity conditions. Because of the short time specified (1 minute) between the initiating event of the postulated LOCA and the completion of valve operation, radiation exposure would also be negligible.

All of the harsh environment discrepancies are from the result of a postulated HELB, not a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION: (continued)

Similar valves made by the same vendor have been qualified to withstand this environment.

Based on these factors, continued operation of the unit is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Containment Cooling Fan Filter Bypass Damper Motors

TAG NO(S).: 2UCD-8203-1, 2UCD-8209-1, 2UCD-8216-2, 2UCD-8222-2

SER RESPONSE PAGE NO(S).: A093, A094, A095, A096

MANUFACTURER AND MODEL NO.: Baldor M-3534 TEFC

SYSTEM - P&ID NO.: HVAC - Reactor Building M-2261

LOCATION: Reactor Building

• SAFETY FUNCTION:

In the unlikely event of a LOCA or HELB within the reactor building, the pressure drop across the filters in the Containment Cooling Units would be excessive. Bypass damper doors open upon a Containment Cooling Actuation Signal (CCAS), allowing the flow to bypass the filters and pass directly to the emergency cooling coils.

• QUALIFICATION DISCREPANCY:

Documentation does not exist to show that the motors are qualified for Chemical Spray (15000 ppm of boric acid, pH of 10.5) or for the specified radiation dose of 3.3×10^7 rads.

• JUSTIFICATION FOR INTERIM OPERATION:

Upon receipt of a CCAS, the damper motors open the damper door latches. The dampers open by gravity, and may be reset only by jacking them shut and resetting the latches. The CCAS occurs at a containment pressure of 18.4 psia, while the Containment Spray (CS) is actuated at 23.3 psia. Before spray is initiated the CS pumps must start, the Spray Header Isolation Valves must open, and the spray header system must fill with water. Thus, it is believed that containment spray would not affect the damper motors.

The specified radiation dose is for 40 years plant operation plus the entire integrated LOCA dose. For the near-term, and considering the fact that the damper motors complete their safety function during the first minute of a postulated LOCA, radiation would not be expected to render the motors incapable of performing their safety function.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

The design basis for the containment cooling systems is that in the event of LOCA or MSLB, the required cooling function can be accomplished by both loops of the containment spray system.

Thus it is concluded that continued operation of the unit is acceptable.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Containment Penetration Room Ventilation Fan Motors
TAG NO(S).: 2VEFM-38A-1; 2VEFM-38B-2
SER RESPONSE PAGE NO(S).: B184, B185
MANUFACTURER AND MODEL NO.: Westinghouse SB
SYSTEM - P&ID NO.: HVAC Control Room & Penetration Rooms M-2264
LOCATION: Room 2049

• SAFETY FUNCTION:

The motors drive ventilation equipment for ventilating and purifying air in case of a LOCA. A containment isolation signal activates the system.

• QUALIFICATION DISCREPANCY:

Documentation does not exist to verify qualification to the following conditions:

Operating Time	30 days
Temperature	214°F
Pressure	1.02 psig
Humidity	100%

These discrepancies are caused by a HELB, not a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION:

The system was never intended to operate in a steam atmosphere. The filter system is designed to filter ventilation air exhausting from penetration rooms and pump rooms so it may be discharged safely to the atmosphere under LOCA conditions.

It would serve no useful purpose in case of a HELB; therefore, the discrepancy indicated would not affect the service function of the equipment.

Based on the above analysis, it is concluded that adequate justification for continued operation exists.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Control Room Emergency Colling Unit Freon Compressor Motor

TAG NO(S).: 2VEM-1A, 2VEM-1B

SER RESPONSE PAGE NO(S).: B109, B110

MANUFACTURER AND MODEL NO.: Westinghouse 74C26625

SYSTEM - P&ID NO.: Service Water M-2210

LOCATION: Room 2139

• SAFETY FUNCTION:

These are the refrigeration motors for the control room emergency air conditioning systems. The systems maintain the control room atmosphere at suitable temperature and humidity conditions for occupancy after a postulated LOCA accident.

• QUALIFICATION DISCREPANCY:

The discrepancies are:

Operating Time	30 days
Temperature	212°F
Pressure	1.07 psig
Humidity	100%

The HELB accident causing this environment causes no significant radiation hazard, so the normal cooling system is available. Also, units are in ANO-1 which would not be exposed to the same accident.

• JUSTIFICATION FOR INTERIM OPERATION:

The control room emergency cooling units are to supply cooling for both ANO-1 and ANO-2 control rooms. There are two units in each auxiliary building, so two units would not be exposed to the same accident. The unit motors are of totally enclosed fan cooled construction and can withstand a temperature in excess of the postulated accident condition. Totally enclosed motors are rated 65°C above ambient 40°C which equates to 221°F (NEMA MG 1-12.41) for operation. The motors are not required to respond to the HELB, therefore, they will not be needed.

Based on redundancy of ANO-1 units, and engineering judgement of the factors cited above, interim operation is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Control Room Ventilation Fan Motor

TAG NO(S).: 2VSFM-9

SER RESPONSE PAGE NO(S).: B183

MANUFACTURER AND MODEL NO.: Westinghouse SBDP

SYSTEM - P&ID NO.: HVAC Control Rooms and Penetration Rooms M-2263

LOCATION: Room 123 (ANO-1)

• SAFETY FUNCTION:

The fan motor is to provide ventilation air to the control rooms during a LOCA event.

• QUALIFICATION DISCREPANCY:

The only discrepancy is radiation (2.56E6 rads).

The other conditions are normal environment for motors of this type.

• JUSTIFICATION FOR INTERIM OPERATION:

The fan drive motor is a class NEMA Standard B drip-proof motor with a rated service factor of 1.15. Motors of this insulation class generally can withstand radiation approaching $1.0E7$ rads, or more. The materials used in Class B motors that are susceptible to radiation are polyester varnish, mica, mylar, Dacrum-glass tape, etc. The lowest threshold material is polyester with a threshold of between 10^3 to 10^6 rads, but this was determined on the elastomer not on a varnish. Polyester laminates show a threshold of 10^9 rads. Since the varnish produces a laminated insulation and serves to prevent moisture impregnation when the motor is not running, and the fact the motor will be operating while receiving the dose, the motor will not fail due to radiation. Based on the above analysis, it is concluded that justification for continued operations has been demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Position Switch, Steam Generator Blowdown Auxiliary Building
Valves 2CV-1016-1, 2CV-1066-1.

TAG NO(S): 2ZS-1016-1, 2ZS-1066-1

SER RESPONSE PAGE NO(S): B030, B039

MANUFACTURER AND MODEL NO.: Micro DTF2 2RNLH

SYSTEM - Steam Generator Secondary M-2206

LOCATION: Room 2081

• SAFETY FUNCTION:

These switches provide position indication of the Auxiliary Building steam generator blowdown valves.

• QUALIFICATION DISCREPANCY:

The discrepancies are:

Operating Time	8 hours
Temperature	220°F
Pressure	2.07 psig
Humidity	100%

No documentation exists to verify qualification to these conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

The switches provide valve position for steam generator blowdown isolation valves 2CV-1016-1 and 2CV-1066-1. They serve only for indication, not operation. Position of redundant blowdown valves 2CV-1015 and 2CV-1065 would be available as indication because they would not be exposed to the same accident. Flow transmitters 2FT-1017 and 2FT-1067 are available as well as the position of valves 2CV-1017 and 2CV-1067. Thus, for isolation purposes there are other available indicators, and to mitigate the blowdown line break there is a valve in the reactor building in each line. Based upon the above information, continued operation is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Position Switch - Emergency Feedwater (EFW) Pump 2P7A
Discharge Isolation Valve

TAG NO(S).: 2ZS-1076-2

SER RESPONSE PAGE NO(S).: B023

MANUFACTURER AND MODEL NO.: Microswitch DTEG-2RN

SYSTEM - P&ID NO.: Emergency Feedwater System M-2204

LOCATION: Room 2048

• SAFETY FUNCTION:

No such limit switch could be found in the EFW system documentation available, nor could any EFW safety function for such a device be found.

• QUALIFICATION DISCREPANCY:

The outstanding discrepancies listed were:

Operating Time	8 hours
Temperature	218F
Pressure	1.71 psig
Humidity	100%

No documentation exists for the qualification of the switch.

• JUSTIFICATION FOR INTERIM OPERATION:

At the time of the SER it was believed that the switch was stem mounted in the valve. It was later determined that the switch is mounted on a breaker panel in a remote location to provide information as to the circuit breaker position.

Based on the information that the switch is not in a location where it will be exposed to a harsh environment, and in itself has no control function of the valve, interim operation is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
AND-2

COMPONENT: Position Switch for Reactor Building Sump Containment Isolation Valve

TAG NO(S).: ZZS-2061-2

SER RESPONSE PAGE NO(S).: B112

MANUFACTURER AND MODEL NO.: NAMCO EA70080100

SYSTEM - P&ID NO.: Liquid Radioactive Waste M-2213

LOCATION: Room No. 2013

• SAFETY FUNCTION:

The safety function of this switch is to indicate the position of valve 2CV-2061-2 which isolates the Reactor Building Sump from the Auxiliary Building Sump.

• QUALIFICATION DISCREPANCY:

The outstanding discrepancies are:

Operating Time	1 minute
Temperature	107°F
Pressure	2.22 psig
Humidity	100%
Radiation	7.0×10^6 rads

With the exception of radiation, these were caused by a lone break outside the reactor building.

Documentation does not exist to verify qualification to the above conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

The position switch provides indication of valve closure. The valve and solenoid are fail safe (see justification for 2CV-2061-2). The redundant valve (2CV-2060-1) provides redundant indication as well as redundant function. The redundant valve is only exposed to a harsh environment in the event of LOCA or HELB inside containment, while this switch is only exposed to a harsh environment due to HELB outside containment, thus ensuring indication for the valve in the mild environment. The reactor building sump level indicator and auxiliary building sump level instrumentation will also verify closure. Based on the above analysis, it is concluded that justification for continued operation has been demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Position Switch for Reactor Drain Tank 2T68 Isolation Valve

TAG NO(S).: ZZS-2201-2

SER RESPONSE PAGE NO(S).: B114

MANUFACTURER AND MODEL NO.: NAMCO

SYSTEM - P&ID NO.: Boron Management M-2214

LOCATION: Room Number 2013

• SAFETY FUNCTION:

The position switch indicates the position of valve 2CV-2201-2 which is used to isolate reactor drain tank 2T68. The limit switch does not affect the operation of the valve.

• QUALIFICATION DISCREPANCY:

Documentation does not exist to verify qualification for the following conditions:

Operating Time	1 minute
Temperature	107°F
Pressure	2.22 psig
Humidity	100%
Radiation	7.0E6 rads

The close to ambient conditions are due to a HELB and the radiation environment is due to recirculation after a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION:

The position switch function is to indicate position of the isolation valve 2CV-2201-2 which closes immediately upon receipt of a Safety Injection System or Containment Isolation Actuation Signal. Environment during this short interval is normal because this valve is outside Containment and the radiation level is due to recirculation during a LOCA. Another valve inside the reactor building closes and provides isolation as well as indication (2CV-2202-1). Similar NAMCO switches have been radiated to excess of 1.0E6 rads. The switch is rated 92°C, and is NEMA 4 (water-tite). Based on the above information, this is justification for continued operation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Position Switch for Containment Isolation Valve to Waste Gas Surge Tank 2T17

TAG NO(S).: 2ZS-2400

SER RESPONSE PAGE NO(S).: B116

MANUFACTURER AND MODEL NO.:

SYSTEM - P&ID NO.: Gaseous Radioactive Waste M-2215

LOCATION: Room No. 2084

• SAFETY FUNCTION:

The safety function of this switch is to indicate the position of valve 2CV-2400-2 which isolates the containment vent header from the Waste Gas Surge Tank.

• QUALIFICATION DISCREPANCY:

The outstanding discrepancies are:

Operating Time	1 minute
Temperature	227°F
Pressure	9.17 psig
Humidity	100%

No documentation exists to verify qualifications to these conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

The position switch serves as an indicator only. Upon receipt of a Containment Isolation Actuation Signal, valve 2CV-2400-2 closes to isolate the gaseous radioactive waste header from the reactor building. The harsh conditions listed for this switch result from a postulated steam line break and not a LOCA. The switch and valve are not needed to mitigate the steam line weak. Other means are available to verify isolation of the line. A redundant valve and position switch are located inside the reactor building .

Based upon the above, justification for continued operation is concluded to be adequately demonstrated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Position Switch for Containment Cooling Chilled Water
Isolation Valve 2CV-3TS1-1

TAG NO(S).: 2ZS-3851

SER RESPONSE PAGE NO(S).: B118

MANUFACTURER AND MODEL NO.: MICRO DTS 2RNRH

SYSTEM - P&ID NO.: Chilled Water M-2222

LOCATION: Room No. 2081

• SAFETY FUNCTION:

The safety function of this position switch is to indicate the position of valve 2CV-3851-1 which isolates the chilled water system from the containment upon a Containment Isolation System signal. Operation is required under LOCA conditions.

• QUALIFICATION DISCREPANCY:

The listed discrepancies are:

Operating Time	1 minute
Temperature	220°F
Pressure	2.07 psig
Humidity	100%

Documentation does not exist to support qualification to these conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

This only switch provides information on the position of isolation valve 2CV-3851-1, which fails in the closed position. Control valve 2CV-3850-2, which is inside the containment, provides a redundant separate isolation function. During a LOCA, when the valve must operate, the operating conditions (environment) are less severe than indicated since those conditions are for HELB outside containment, when valve operation is not needed.

Valve position may also be verified by 2FE-3899 which shows system flow into the reactor building.

Based on the above information continued operation of the unit is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Position Switch for Containment Cooling Chilled Water
Isolation Valve 2CV-3852-1

TAG NO(S).: 2ZS-3852

SER RESPONSE PAGE NO(S).: B120

MANUFACTURER AND MODEL NO.: MICRO BZ-R077

SYSTEM - P&ID NO.: Chilled Water M-2222

LOCATION: Room No. 2081

• SAFETY FUNCTION:

The safety function of this position switch is to indicate the position of valve 2CV-3852-1 which isolates the Chilled Water System from the containment upon a Containment Isolation System signal.

• QUALIFICATION DISCREPANCY:

The listed discrepancies are:

Operating Time	1 minute
Temperature	220°F
Pressure	2.07 psig
Humidity	100%

Documentation does not exist to verify qualification to these conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

This switch provides information only on the position of isolation valve 2CV-3852-1 which fails in the closed position. Check valve 2AC-49, which is inside containment provides isolation from radiation leakage out of the containment. The containment isolation function is required under LOCA conditions where the environmental conditions are much less severe than those indicated, which are for HELB outside containment. This switch is not required to function to mitigate the HELB. A return line flow indicates 2FE-3899 will also verify valve closure and line isolation.

Based on the above information justification for interim operation is adequate.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Position Switch for Letdown Isolation Valve 2CV-4823-2

TAG NO(S).: 2ZS-4823-2

-LR RESPONSE PAGE NO(S).: B123

MANUFACTURER AND MODEL NO.: Masoneilan 496-2

SYSTEM - P&ID NO.: Chemical and Volume Control M-2231

LOCATION: Room Number 2084

• SAFETY FUNCTION:

Serves to indicate to the plant operator the position of isolation valve 2CV-4823-2 which isolates the reactor coolant letdown system.

• QUALIFICATION DISCREPANCY:

The listed discrepancies are:

Operating Time	1 minute
Temperature	227°F
Pressure	9.17 psig
Humidity	100%

Documentation does not exist to verify qualification to these conditions.

• JUSTIFICATION FOR INTERIM OPERATION:

The isolation valve and position switch are required to operate within one minute of an accident and is tripped by the Containment Isolation Actuation signal. Because of this short reaction time it is likely that the position switch will perform its safety function. In the unlikely event that the switch does fail, there are two additional indicator switches (2ZS-4820-2 and 2ZS-4821-1), on isolation valves located inside of containment, that are not subject to the effects of the same accident. These additional switches would indicate to the plant operator whether the system has been isolated.

Isolation in the Auxiliary Building may also be completed by manually closing 2CV-4817 which also has a position switch indication.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

A LOCA would not affect operation of this switch. The switch has no effect on operation of the valve.

Based on the above information, continuing operation of the unit is justified.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Position Switch for Steam Generator Sample Isolation Valve

TAG NO(S).: 2ZS-5859A-2

SER RESPONSE PAGE NO(S).: B176

MANUFACTURER AND MODEL NO.: Contromatics 11SP2

SYSTEM - P&ID NO.: Sampling M-2237

LOCATION: Room 2084

• SAFETY FUNCTION:

The safety function of the position switch is to indicate valve position of the steam generator sample line isolation valve (2CV-5859-2) in the unlikely event of a LOCA.

• QUALIFICATION DISCREPANCY:

The discrepancies are:

Operating Time	30 days
Temperature	227°F
Pressure	9.17 psig
Humidity	100%

Documentation does not exist to verify qualification to these conditions.

These discrepancies are caused by a HELB, not a LOCA.

• JUSTIFICATION FOR INTERIM OPERATION:

Valve 2CV-5858 inside the Reactor Building has a position indication that could be used for backup. Manual valves are also in the sample room. Since the main function of the position switch is for containment isolation indication in case of a LOCA, an outside HELB would not interfere with the safety function of the switch.

The switch is for indication purposes only, and does not affect valve operation.

Based on the above facts, justification for interim operation should continue.

EQUIPMENT ENVIRONMENTAL QUALIFICATION
JUSTIFICATION FOR INTERIM OPERATION
ANO-2

COMPONENT: Containment Cooling Fan Bypass Damper Door Position Switches

TAG NO(S).: 2ZS-8203-1, 2ZS-8204-1, 2ZS-8209-1, 2ZS-8210-1, 2ZS-8216-2,
2ZS-8217-2, 2ZS-8222-2, 2ZS-8223-2

SER RESPONSE PAGE NO(S).: A098 thru A105

MANUFACTURER AND MODEL NO.: Not Specified

SYSTEM - P&ID NO.: HVAC Reactor Building M2261

LOCATION: Reactor Building

• SAFETY FUNCTION:

The safety function of these switches is to provide information regarding the position of the containment cooling fan bypass damper motors, and damper doors. See the justification sheet for 2UCD-8203-1 for additional information.

• QUALIFICATION DISCREPANCY:

There is no qualification documentation relating to:

Time	
Temperature	289°F Specified
Pressure	48 psig
Relative Humidity	100%
Chemical Spray	15,000 ppm boric acid, pH 10.5
Radiation	3.3E7 rads

• JUSTIFICATION FOR INTERIM OPERATION:

As discussed in the justification for 2UCD-8203-1, the damper motors are actuated prior to containment spray and early in the postulated LOCA sequence. The damper motors open the damper door latches. The dampers open by gravity and may be reset only by jacking them shut and resetting the latches. These switches provide stop limits for the damper motors and indicate to the operator the positions of the damper motors and doors. Failure of any or all of the position switches will not cause a reversal of the damper doors. Operation of the Containment Cooling Systems may be verified by observation of the pressure and temperature of the Containment.

- JUSTIFICATION FOR INTERIM OPERATION: (continued)

The design basis for the Containment Cooling Systems is that in the event of LOCA or MSLB, the required cooling function can be accomplished by both loops of the Containment Spray System. Based on the function of the switches, the redundancy provided, and the alternate methods available to verify containment cooling, it is concluded that continued operation is justified.