CALCULATION/PROBLEM COVER SHEET

Calculation/Problem No: 1040-001-016

Title: Reactor Coolant Pump Seal Return Valves 2.13

Client: Toledo Edison Company Project: Davis-Besse Unit 1

Job No: 1040-001-671

I & E Bulletin 79-01B
Equipment Qualification

Design Input/References:

Design Inputs are outlined in the Cover Report.

Assumptions:

Assumptions areoutlined in the Cover Report.

Method:

Methocs are outlined in the Cover Report.

Remarks:

EDS Nuclear Report No. 02-1040-1076.

REV. NO.	REVISION	APPROVED	DATE
0	Original	Jeffrey S Hawsley	10-2-81
2	GENERAL MANUAL REVISIONS	NK Woodward	11/2/83

Facility: Davis-Besse Unit 1
Docket: 50-346

MASTER LIST
HARSH ENVIRONMENT
REACTOR COOLANT PUMP SEAL RETURN VALVES

Index No: 213M-001
Rev.: 2

Prepared by: N. Lewis Date: 11/1/83
Checked by: [signature] Date: 11/2/83

Worksheet Index No.	Rev.	Plant ID Number	Generic Name	LOCATION: Inside Primary Containment	LOCATION: Outside Primary Containment	REMARKS
213H-004	2	MVMU59A	Valve Motor Operator	Rm. 214		
213H-005	2	MVMU59B	Valve Motor Operator	Rm. 214		
213H-006	2	MVMU59C	Valve Motor Operator	Rm. 214		
213H-007	2	MVMU59D	Valve Motor Operator	Rm. 214		
	2	BE11B	Motor Control Center		Rm. 304	See 2.21
	2	CDE11B-1	Disconnect Switch Cabinet		Rm. 304	See 2.21
	2	CDE11B-2	Disconnect Switch Cabinet		Rm. 304	See 2.21

Facility: Davis-Besse Unit 1
Docket: 50-346

MASTER LIST
NON-HARSH ENVIRONMENT
REACTOR COOLANT PUMP SEAL RETURN VALVES

Index No: 213M-002
Rev.: 2

Prepared by: N. Lewis Date: 11/1/83
Checked by: [signature] Date: 11/2/83

Worksheet Index No.	Rev.	Plant ID Number	Generic Name	LOCATION		REMARKS
				Inside Primary Containment	Outside Primary Containment	
	0	C5717	Engineering Safety Feature Panel		Rm. 505	

Facility: Davis-Besse Unit 1
Docket: 50-346

MASTER LIST

Index No: 213M-003
Rev.: 2

REACTOR COOLANT PUMP SEAL RETURN VALVES

Prepared by: N. Lewis Date: 11/1/83
Checked by: [signature] Date: 11/2/83

Worksheet Index No.	Rev.	Plant ID Number	Generic Name	LOCATION		REMARKS
				Inside Primary Containment	Outside Primary Containment	

Facility: Davis-Besse Unit 1
Docket: 50-346

SYSTEM COMPONENT EVALUATION WORKSHEET

Index No.: 213H-004
Rev.: 2

Prepared by: N Lewis Date: 11/1/83
Checked by: [signature] Date: 11/4/83

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		Qualification Method	Outstanding Items
	Parameter	Specification	Qualification	Specification	Qualification		
System: Reactor Coolant Pump Seal Return Plant ID No. MVMU59A Component: Valve Motor Operator Manufacturer: Limitorque Model Number: SMB-000-2 O/N: 364187C S/N: 158237 Function: Operates Valve MU59A Accuracy: Spec: N/A Demon: N/A Service: Reactor Coolant Pump 2-1 Seal Return Line Valve Location: Containment Flood Level Elev: 572'-2" Above Flood Level: No Needed for: Hot Shutdown [X] Cold Shutdown [ ]	Operating Time	45 Seconds	7 Days	K	M-24 V-24A Note 1	Simultaneous Test	None
	Temperature (°F)	283.0	329.0	H, X	M-24 V-24A	Simultaneous Test	None
	Pressure (PSIA)	52.0	104.7	G, X	M-24 V-24A	Simultaneous Test	None
	Relative Humidity (%)	100.0	100.0	A	M-24 V-24A	Simultaneous Test	None
	Chemical Spray	Boric Acid 1800 ppm pH 5.0	Boric Acid 1800 ppm pH 5.0	A	M-24 V-24A CAL-40 Note 2	Simultaneous Test, Analysis	None
	Radiation	1.7×10^7 RADS	2.0×10^8 RADS	CAL-44	M-25 V-24A	Sequential Test	None
	Aging	40 Years	40 Years	I	CAL-93	Sequential Test Analysis	None
	Submergence	572'-2"	567'-6" Note 3	B	M-16	N/A	None

Facility: Davis-Besse Unit 1
Docket: 50-346

SYSTEM COMPONENT EVALUATION WORKSHEET

NOTES

Index No.: 213H-004A
Rev.: 2

Prepared by: N Lewis Date 11/1/83
Checked by: [signature] Date 11/2/83

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1. The test subjected the valve motor operator to 1 hour at 329°F and 104.7 psia, then 2 hours at 312°F and 84.7 psia, then 2 hours at 287°F and 54.7 psia, then 19 hours at 256°F and 34.7 psia, and 250°F and 29.7 psia for 6 days. The temperature and pressure inside containment peak at 283°F and 52.0 psia in 17 and 50 seconds, respectively. At 1 hour the conditions are 214.7°F and 32.32 psia; at 3 hours the conditions are 204°F and 29.46 psia; at 5 hours the conditions are 193.2°F and 27.08 psia; and at 24 hours the conditions are 143°F and 18.03 psia. The containment returns to ambient conditions in 7 days.

   Based on this information, it can be concluded that the laboratory test subjected the valve motor operator to an overall more severe environment than that which would result from a postulated LOCA. Since the valve motor operator remained operable throughout the test and functional after the test, it can be concluded that the valve motor operator will remain functional during and after exposure to the accident environment which would result from the postulated LOCA. (Reference G, H, and X)

2. CAL-40 qualifies components tested in a high pH boric acid spray to a pH value of 5.

3. This valve motor operator will become submerged during a postulated LOCA in 9 minutes and 38 seconds. This is a worst-case value based on a postulated DBA LOCA. For smaller LOCAs, component submergence will occur further into the accident, if it occurs at all. The valve motor operator will close in 45 seconds after receipt of a signal by the safety features actuation system (SFAS incident level II). The valve is qualified for exposure to a steam/chemical spray environment but not for submerged operation. The valve will close prior to becoming submerged as it is qualified for the harsh environment and the SFAS signal which closes the valve also actuates the HPI, Containment Spray, and LPI/DH pumps which furnish the water which leads to containment flooding. If the valve would not close due to receiving an SFAS signal, then the pumps to flood containment would not be energized. Based on the components qualification for the harsh environment, valve closure time, and the time required for the valve motor operator to become submerged, it is felt that adequate justification is provided for exempting this component from the required one-hour operating time margin.

   This valve motor operator is the reactor coolant pump 2-1 seal return line valve. Once this valve is closed, any further operation would not be required to mitigate a LOCA. Once closed, the valve motor is deenergized by opening its main line contactors at a 480 volt motor control center located outside containment. The only parts of the electrical power and control circuits for this valve motor operator, which are exposed to the LOCA containment atmosphere are the motor leads, internal geared limit and torque switches, and the cabling inside containment. The cabling is addressed elsewhere in the submittal. Once the valve motor operator is deenergized after stroking its respective valve to the closed position, there is no way that it can be opened due to any potential failure of any of its circuit components which are exposed to the LOCA environment. The motor is controlled from outside containment and to energize it after is has been closed by SFAS it is necessary to reset the SFAS output relays. If submerged, the motor leads could short circuit and the torque and limit

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Index No.: 213H-004B
Rev.: 2

Prepared by: N Lewis Date 11/1/83
Checked by: [signature] Date 11/2/83

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switches could possibly short circuit. Since the power circuit is deenergized, any short circuit here due to submergence would have no affect on the circuit. Parts of the control circuit containing the limit and torque switches are within the valve motor operator and are energized when the valve is closed. Any short circuits in this circuit due to submergence would not cause the valve to become energized. The control circuit is protected by 2.5 amp fuses which would blow on a control circuit short and would deenergize the control circuit and prevent energizing the motor operator and preclude valve operation. After failure of the control circuit resulting in a blower fuse would not affect any other circuits on the same motor control center as this valve motor operator.

Since this valve is a containment isolation valve, the operator would be required to verify the position of this valve as one of his immediate actions following a SFAS signal to affect containment isolation. The 9 minute and 38 second submergence time, compared to the 45 second valve closing time, would give the operator sufficient time to verify valve closure prior to the potential loss of indication due to shorting of the control circuit, which could occur after valve motor operator submergence. In addition, the four seal return lines come together into one line inside contanment, and there is a containment isolation valve located outside of containment on this same line to ensure that this containment penetration is isolated. This outside containment isolation valve (HVMU38) is also closed by a SFAS incident level II signal and it would not be exposed to a harsh environment due to a LOCA. The operator would be able to verify that the seal return penetration was isolated by verifying the position of this valve (HVMU38). (Reference CAL-49 and Elem. Wiring Diag. 7749-E52B-SH30)

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Docket: 50-346

SYSTEM COMPONENT EVALUATION WORKSHEET

Index No.: 213H-005
Rev.: 2

Prepared by: N Lewis Date: 11/1/83
Checked by: [illegible] Date: 11/2/83

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		Qualification Method	Outstanding Items
	Parameter	Specification	Qualification	Specification	Qualification		
System: Reactor Coolant Pump Seal Return Plant ID No. MVMU59B Component: Valve Motor Operator Manufacturer: Limitorque Model Number: SMB-000-2 O/N: 364187C S/N: 158238 Function: Operates Valve MU59B Accuracy: Spec: N/A Demon: N/A Service: Reactor Coolant 2-2 Seal Return Line Valve Location: Containment Flood Level Elev: 572'-2" Above Flood Level: No Needed for: Hot Shutdown [X] Cold Shutdown [ ]	Operating Time	45 Seconds	7 Days	K	M-24 V-24A Note 1	Simultaneous Test	None
	Temperature (°F)	283.0	329.0	H, X	M-24 V-24A	Simultaneous Test	None
	Pressure (PSIA)	52.0	104.7	G, X	M-24 V-24A	Simultaneous Test	None
	Relative Humidity (%)	100.0	100.0	A	M-24 V-24A	Simultaneous Test	None
	Chemical Spray	Boric Acid 1800 ppm pH 5.0	Boric Acid 1800 ppm pH 5.0	A	M-24 V-24A CAL-40 Note 2	Simultaneous Test, Analysis	None
	Radiation	1.7×10^7 RADS	2.0×10^8 RADS	CAL-44	M-25 V-24A	Sequential Test	None
	Aging	40 Years	40 Years	I	CAL-93	Sequential Test Analysis	None
	Submergence	572'-2"	566'-0" Note 3	B	M-16	N/A	None

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SYSTEM COMPONENT EVALUATION WORKSHEET

Index No.: 213H-005A
Rev.: 2

NOTES

Prepared by: N Lewis Date 11/1/83
Checked by: [illegible] Date 11/3/83

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1. The test subjected the valve motor operator to 1 hour at 329°F and 104.7 psia, then 2 hours at 312°F and 84.7 psia, then 2 hours at 287°F and 54.7 psia, then 19 hours at 256°F and 34.7 psia, and 250°F and 29.7 psia for 6 days. The temperature and pressure inside containment peak at 283°F and 52.0 psia in 17 and 50 seconds, respectively. At 1 hour the conditions are 214.7°F and 32.32 psia; at 3 hours the conditions are 204°F and 29.46 psia; at 5 hours the conditions are 193.2°F and 27.08 psia; and at 24 hours the conditions are 143°F and 18.03 psia. The containment returns to ambient conditions in 7 days.

   Based on this information, it can be concluded that the laboratory test subjected the valve motor operator to an overall more severe environment than that which would result from a postulated LOCA. Since the valve motor operator remained operable throughout the test and functional after the test, it can be concluded that the valve motor operator will remain functional during and after exposure to the accident environment which would result from the postulated LOCA. (Reference G, H, and X)

2. CAL-40 qualifies components tested in a high pH boric acid spray to a pH value of 5.

3. This valve motor operator will become submerged during a postulated LOCA in 17 minutes and 15 seconds. This is a worst-case value based on a postulated DBA LOCA. For smaller LOCAs, component submergence will occur further into the accident, if it occurs at all. The valve motor operator will close in 45 seconds after receipt of a signal by the safety features actuation system (SFAS incident level II). The valve is qualified for exposure to a steam/chemical spray environment but not for submerged operation. The valve will close prior to becoming submerged as it is qualified for the harsh environment and the SFAS signal which closes the valve also actuates the HPI, Containment Spray, and LPI/DH pumps which furnish the water which leads to containment flooding. If the valve would not close due to receiving an SFAS signal, then the pumps to flood containment would not be energized. Based on the components qualification for the harsh environment, valve closure time, and the time required for the valve motor operator to become submerged, it is felt that adequate justification is provided for exempting this component from the required one-hour operating time margin.

   This valve motor operator is the reactor coolant pump 2-2 seal return line valve. Once this valve is closed, any further operation would not be required to mitigate a LOCA. Once closed, the valve motor is deenergized by opening its main line contactors at a 480 volt motor control center located outside containment. The only parts of the electrical power and control circuits for this valve motor operator, which are exposed to the LOCA containment atmosphere are the motor leads, internal geared limit and torque switches, and the cabling inside containment. The cabling is addressed elsewhere in the submittal. Once the valve motor operator is deenergized after stroking its respective valve to the closed position, there is no way that it can be opened due to any potential failure of any of its circuit components which are exposed to the LOCA environment. The motor is controlled from outside containment and to energize it after is has been closed by SFAS it is necessary to reset the SFAS output relays. If submerged, the motor leads could short circuit and the torque and limit

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Index No.: 213H-005B
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NOTES

Prepared by: N Lewis Date 11/1/83
Checked by: [signature] Date 11/2/83

switches could possibly short circuit. Since the power circuit is deenergized, any short circuit here due to submergence would have no affect on the circuit. Parts of the control circuit containing the limit and torque switches are within the valve motor operator and are energized when the valve is closed. Any short circuits in this circuit due to submergence would not cause the valve to become energized. The control circuit is protected by 2.5 amp fuses which would blow on a control circuit short and would deenergize the control circuit and prevent energizing the motor operator and preclude valve operation. After failure of the control circuit resulting in a blower fuse would not affect any other circuits on the same motor control center as this valve motor operator.

Since this valve is a containment isolation valve, the operator would be required to verify the position of this valve as one of his immediate actions following a SFAS signal to affect containment isolation. The 17 minute and 15 second submergence time, compared to the 45 second valve closing time, would give the operator sufficient time to verify valve closure prior to the potential loss of indication due to shorting of the control circuit, which could occur after valve motor operator submergence. In addition, the four seal return lines come together into one line inside contanment, and there is a containment isolation valve located outside of containment on this same line to ensure that this containment penetration is isolated. This outside containment isolation valve (HVMU38) is also closed by a SFAS incident level II signal and it would not be exposed to a harsh environment due to a LOCA. The operator would be able to verify that the seal return penetration was isolated by verifying the position of this valve (HVMU38). (Reference CAL-49 and Elem. Wiring Diag. 7749-E52B-SH30.)

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SYSTEM COMPONENT EVALUATION WORKSHEET

Index No.: 213H-006
Rev.: 2

Prepared by: N Lewis Date: 11/1/83
Checked by: [signature] Date: 11/4/83

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		Qualification Method	Outstanding Items
	Parameter	Specification	Qualification	Specification	Qualification		
System: Reactor Coolant Pump Seal Return Plant ID No. MVMU59C Component: Valve Motor Operator Manufacturer: Limitorque Model Number: SMB-000-2 O/N: 364187C S/N: 158239 Function: Operates Valve MU59C Accuracy: Spec: N/A Demon: N/A Service: Reactor Coolant 1-1 Seal Return Line Valve Location: Containment Flood Level Elev: 572'-2" Above Flood Level: No Needed for: Hot Shutdown [X] Cold Shutdown [ ]	Operating Time	45 Seconds	7 Days	K	M-24 V-24A Note 1	Simultaneous Test	None
	Temperature (°F)	283.0	329.0	H, X	M-24 V-24A	Simultaneous Test	None
	Pressure (PSIA)	52.0	104.7	G, X	M-24 V-24A	Simultaneous Test	None
	Relative Humidity (%)	100.0	100.0	A	M-24 V-24A	Simultaneous Test	None
	Chemical Spray	Boric Acid 1800 ppm pH 5.0	Boric Acid 1800 ppm pH 5.0	A	M-24 V-24A CAL-40 Note 2	Simultaneous Test, Analysis	None
	Radiation	1.7×10^7 RADS	2.0×10^8 RADS	CAL-44	M-25 V-24A	Sequential Test	None
	Aging	40 Years	40 Years	I	CAL-93	Sequential Test Analysis	None
	Submergence	572'-2"	570'-6" Note 3	B	M-17	N/A	None

Facility: Davis-Besse Unit 1
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SYSTEM COMPONENT EVALUATION WORKSHEET

Index No.: 213H-006A
Rev.: 2

NOTES

Prepared by: N Lewis Date 11/1/83
Checked by: [signature] Date 11/2/83

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1. The test subjected the valve motor operator to 1 hour at 329°F and 104.7 psia, then 2 hours at 312°F and 84.7 psia, then 2 hours at 287°F and 54.7 psia, then 19 hours at 256°F and 34.7 psia, and 250°F and 29.7 psia for 6 days. The temperature and pressure inside containment peak at 283°F and 52.0 psia in 17 and 50 seconds, respectively. At 1 hour the conditions are 214.7°F and 32.32 psia; at 3 hours the conditions are 204°F and 29.46 psia; at 5 hours the conditions are 193.2°F and 27.08 psia; and at 24 hours the conditions are 143°F and 18.03 psia. The containment returns to ambient conditions in 7 days.

   Based on this information, it can be concluded that the laboratory test subjected the valve motor operator to an overall more severe environment than that which would result from a postulated LOCA. Since the valve motor operator remained operable throughout the test and functional after the test, it can be concluded that the valve motor operator will remain functional during and after exposure to the accident environment which would result from the postulated LOCA. (Reference G, H, and X)

2. CAL-40 qualifies components tested in a high pH boric acid spray to a pH value of 5.

3. This valve motor operator will become submerged during a postulated LOCA in 33 minutes and 31 seconds. This is a worst-case value based on a postulated DBA LOCA. For smaller LOCAs, component submergence will occur further into the accident, if it occurs at all. The valve motor operator will close in 45 seconds after receipt of a signal by the safety features actuation system (SFAS incident level II). The valve is qualified for exposure to a steam/chemical spray environment but not for submerged operation. The valve will close prior to becoming submerged as it is qualified for the harsh environment and the SFAS signal which closes the valve also actuates the HPI, Containment Spray, and LPI/DH pumps which furnish the water which leads to containment flooding. If the valve would not close due to receiving an SFAS signal, then the pumps to flood containment would not be energized. Based on the components qualification for the harsh environment, valve closure time, and the time required for the valve motor operator to become submerged, it is felt that adequate justification is provided for exempting this component from the required one-hour operating time margin.

   This valve motor operator is the reactor coolant pump 1-1 seal return line valve. Once this valve is closed, any further operation would not be required to mitigate a LOCA. Once closed, the valve motor is deenergized by opening its main line contactors at a 480 volt motor control center located outside containment. The only parts of the electrical power and control circuits for this valve motor operator, which are exposed to the LOCA containment atmosphere are the motor leads, internal geared limit and torque switches, and the cabling inside containment. The cabling is addressed elsewhere in the submittal. Once the valve motor operator is deenergized after stroking its respective valve to the closed position, there is no way that it can be opened due to any potential failure of any of its circuit components which are exposed to the LOCA environment. The motor is controlled from outside containment and to energize it after is has been closed by SFAS it is necessary to reset the SFAS output relays. If submerged, the motor leads could short circuit and the torque and limit

NOTES

Prepared by: N Lewis Date 11/1/83
Checked by: [illegible] Date 11/4/83

switches could possibly short circuit. Since the power circuit is deenergized, any short circuit here due to submergence would have no affect on the circuit. Parts of the control circuit containing the limit and torque switches are within the valve motor operator and are energized when the valve is closed. Any short circuits in this circuit due to submergence would not cause the valve to become energized. The control circuit is protected by 2.5 amp fuses which would blow on a control circuit short and would deenergize the control circuit and prevent energizing the motor operator and preclude valve operation. After failure of the control circuit resulting in a blower fuse would not affect any other circuits on the same motor control center as this valve motor operator.

Since this valve is a containment isolation valve, the operator would be required to verify the position of this valve as one of his immediate actions following a SFAS signal to affect containment isolation. The 33 minute and 31 second submergence time, compared to the 45 second valve closing time, would give the operator sufficient time to verify valve closure prior to the potential loss of indication due to shorting of the control circuit, which could occur after valve motor operator submergence. In addition, the four seal return lines come together into one line inside contanment, and there is a containment isolation valve located outside of containment on this same line to ensure that this containment penetration is isolated. This outside containment isolation valve (HVMU38) is also closed by a SFAS incident level II signal and it would not be exposed to a harsh environment due to a LOCA. The operator would be able to verify that the seal return penetration was isolated by verifying the position of this valve (HVMU38). (Reference CAL-49 and Elem. Wiring Diag. 7749-E52B-SH30)

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SYSTEM COMPONENT EVALUATION WORKSHEET

Prepared by: N Lewis Date: 11/1/93
Checked by: [signature] Date: 11/4/93

Index No.: 213H-G07
Rev.: 2

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		Qualification Method	Outstanding Items
	Parameter	Specification	Qualification	Specification	Qualification		
System: Reactor Coolant Pump Seal Return Plant ID No. MVMU59D Component: Valve Motor Operator Manufacturer: Limitorque Model Number: SMB-000-2 O/N: 364187C S/N: 158240 Function: Operates Valve MU59D Accuracy: Spec: N/A Demon: N/A Service: Reactor Coolant 1-2 Seal Return Line Valve Location: Containment Flood Level Elev: 572'-2" Above Flood Level: No Needed for: Hot Shutdown [X] Cold Shutdown [ ]	Operating Time	45 Seconds	7 Days	K	M-24 V-24A Note 1	Simultaneous Test	None
	Temperature (°F)	283.0	329.0	H, X	M-24 V-24A	Simultaneous Test	None
	Pressure (PSIA)	52.0	104.7	G, X	M-24 V-24A	Simultaneous Test	None
	Relative Humidity (%)	100.0	100.0	A	M-24 V-24A	Simultaneous Test	None
	Chemical Spray	Boric Acid 1800 ppm pH 5.0	Boric Acid 1800 ppm pH 5.0	A	M-24 V-24A CAL-40 Note 2	Simultaneous Test, Analysis	None
	Radiation	1.7×10^7 RADS	2.0×10^8 RADS	CAL-44	M-25 V-24A	Sequential Test	None
	Aging	40 Years	40 Years	I	CAL-93	Sequential Test Analysis	None
	Submergence	572'-2"	569'-0" Note 3	B	M-18	N/A	None

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SYSTEM COMPONENT EVALUATION WORKSHEET

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Rev.: 2

Prepared by: N Lewis Date 11/1/83
Checked by: [signature] Date 11/2/83

NOTES

1. The test subjected the valve motor operator to 1 hour at 329°F and 104.7 psia, then 2 hours at 312°F and 84.7 psia, then 2 hours at 287°F and 54.7 psia, then 19 hours at 256°F and 34.7 psia, and 250°F and 29.7 psia for 6 days. The temperature and pressure inside containment peak at 283°F and 52.0 psia in 17 and 50 seconds, respectively. At 1 hour the conditions are 214.7°F and 32.32 psia; at 3 hours the conditions are 204°F and 29.46 psia; at 5 hours the conditions are 193.2°F and 27.08 psia; and at 24 hours the conditions are 143°F and 18.03 psia. The containment returns to ambient conditions in 7 days.

   Based on this information, it can be concluded that the laboratory test subjected the valve motor operator to an overall more severe environment than that which would result from a postulated LOCA. Since the valve motor operator remained operable throughout the test and functional after the test, it can be concluded that the valve motor operator will remain functional during and after exposure to the accident environment which would result from the postulated LOCA. (Reference G, H, and X)

2. CAL-40 qualifies components tested in a high pH boric acid spray to a pH value of 5.

3. This valve motor operator will become submerged during a postulated LOCA in 25 minutes and 24 seconds. This is a worst-case value based on a postulated DBA LOCA. For smaller LOCAs, component submergence will occur further into the accident, if it occurs at all. The valve motor operator will close in 45 seconds after receipt of a signal by the safety features actuation system (SFAS incident level II). The valve is qualified for exposure to a steam/chemical spray environment but not for submerged operation. The valve will close prior to becoming submerged as it is qualified for the harsh environment and the SFAS signal which closes the valve also actuates the HPI, Containment Spray, and LPI/DH pumps which furnish the water which leads to containment flooding. If the valve would not close due to receiving an SFAS signal, then the pumps to flood containment would not be energized. Based on the components qualification for the harsh environment, valve closure time, and the time required for the valve motor operator to become submerged, it is felt that adequate justification is provided for exempting this component from the required one-hour operating time margin.

   This valve motor operator is the reactor coolant pump 1-2 seal return line valve. Once this valve is closed, any further operation would not be required to mitigate a LOCA. Once closed, the valve motor is deenergized by opening its main line contactors at a 480 volt motor control center located outside containment. The only parts of the electrical power and control circuits for this valve motor operator, which are exposed to the LOCA containment atmosphere are the motor leads, internal geared limit and torque switches, and the cabling inside containment. The cabling is addressed elsewhere in the submittal. Once the valve motor operator is deenergized after stroking its respective valve to the closed position, there is no way that it can be opened due to any potential failure of any of its circuit components which are exposed to the LOCA environment. The motor is controlled from outside containment and to energize it after is has been closed by SFAS it is necessary to reset the SFAS output relays. If submerged, the motor leads could short circuit and the torque and limit

Facility: [redacted]is-Besse Unit 1
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Index No.: 213H-007B
Rev.: 2

Prepared by: N Lewis Date 11/1/83
Checked by: [illegible] Date 11/4/83

switches could possibly short circuit. Since the power circuit is deenergized, any short circuit here due to submergence would have no affect on the circuit. Parts of the control circuit containing the limit and torque switches are within the valve motor operator and are energized when the valve is closed. Any short circuits in this circuit due to submergence would not cause the valve to become energized. The control circuit is protected by 2.5 amp fuses which would blow on a control circuit short and would deenergize the control circuit and prevent energizing the motor operator and preclude valve operation. After failure of the control circuit resulting in a blower fuse would not affect any other circuits on the same motor control center as this valve motor operator.

Since this valve is a containment isolation valve, the operator would be required to verify the position of this valve as one of his immediate actions following a SFAS signal to affect containment isolation. The 25 minute and 24 second submergence time, compared to the 45 second valve closing time, would give the operator sufficient time to verify valve closure prior to the potential loss of indication due to shorting of the control circuit, which could occur after valve motor operator submergence. In addition, the four seal return lines come together into one line inside containment, and there is a containment isolation valve located outside of containment on this same line to ensure that this containment penetration is isolated. This outside containment isolation valve (HVMU38) is also closed by a SFAS incident level II signal and it would not be exposed to a harsh environment due to a LOCA. The operator would be able to verify that the seal return penetration was isolated by verifying the position of this valve (HVMU38). (Reference CAL-49 and Elem. Wiring Diag. 7749-E52B-SH30)