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DUKE POWER

July 9, 1996

U. S. Nuclear Regulator Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Subject: McGuire Nuclear Station
Docket No. 50-369
Response to the Preliminary Accident Sequence Precursor Analysis
of Loss of Vital I&C Bus and Trip Event at McGuire Unit 1

Thank you for the opportunity to provide comments on Oak Ridge National Laboratory's preliminary Accident Sequence Precursor analysis of the June 13, 1982 loss of ac vital power bus and trip event at McGuire Unit 1.

For your consideration, Attachment A provides Duke's response on the subject analysis. Also enclosed are Attachment 1 (Reactor Trip Initiated Core Damage Sequences With Nominal Main Feedwater Recovery) and Attachment 2 (Reactor Trip Initiated Core Damage Sequences Assuming No Main Feedwater Recovery), which are referenced by Attachment A.

If there are any questions regarding this response, please contact Kay Crane, McGuire Regulatory Compliance, at (803) 875-4306.

Very Truly Yours,

A handwritten signature in dark ink, appearing to read "T. C. McMeekin".

T. C. McMeekin, Vice President

McGuire Nuclear Station

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cc: Mr. Victor Nerses

U. S. Nuclear Regulatory Commission

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Washington, D.C. 20555

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ATTACHMENT A

Response to the Preliminary Accident Sequence Precursor Analysis of Loss of Vital I&C Bus and Trip Event at McGuire Nuclear Station, Unit 1

Comment 1. Event Quantification

The draft ASP report "Summary" section states that typical channel A vital 120 Vac loads would possibly include a train of ESF slave relays. This is indeed the case for McGuire, since the train A slave relays are powered from 120 Vac vital power bus 1EKVA. Thus automatic initiation of ESF train A loads was unavailable while bus 1EKVA was unavailable. However, ESF train A loads could still have been actuated manually from the control room. This action is proceduralized and trained on, and is considered to be highly reliable.

The McGuire PRA model does not include loss of a 120 Vac vital power bus as an initiator, since this event is considered to be bounded by the loss of 125 Vdc power panelboard 1EVDD. From the McGuire PRA, the loss of 125 Vdc power panelboard 1EVDD initiator is not risk-significant, since there are no cut sets associated with this initiator in the final core damage sequences.

The risk associated with the loss of 120 Vac vital power bus 1EKVA can be estimated by considering reactor trip initiated sequences, along with any sequences in which loss of auto-initiation of a train of ESF loads could be expected to have an impact.

The reactor trip initiating event has a conditional core damage probability of $4.2E-7$, or 0.6% of the nominal CDF of $7.4E-5$. From Attachment 1, the dominant sequence (TQsU) involves an induced seal LOCA failure and failure of injection. Other sequences involve loss of secondary side cooling and either a failure to establish feed-and-bleed (TBP) or high pressure recirculation (TBX).

These results were generated assuming that Main Feedwater is recovered at the historical rate of 0.8. McGuire's Reportable Occurrence Report No. 82-52 refers to the overpressurization of the condensate-feedwater system but states "through operator action these adverse effects were soon controlled and a stable hot standby condition was then maintained." For example, a rupture on reheater 1D1 relief line piping could be mitigated by closing ICM190 and ICM223, the reheater inlet and outlet motor-operated valves. The available information on this event does not suggest that any other system (AFW, ECCS, etc.) was unavailable at the time of this event. However, if the analysis assumes that Main Feedwater is not recovered, then the reactor trip initiating event conditional core damage probability increases to $5.6E-7$, or 0.8% of the nominal CDF.

A scenario involving a large-break LOCA is an example of a sequence which might be impacted by the loss of auto-initiation of a train of ESF loads, since the time available for manual action is relatively short. However, the likelihood of experiencing a large LOCA following a reactor trip is remote, since McGuire's large LOCA frequency is estimated at $3E-4$ /reactor-yr.

In summary, this event is very similar to a routine reactor trip event and does not appear to meet the precursor threshold of $1E-6$.

It is recommended that the preliminary ORNL analysis be reviewed to take into account the comment provided herein.

Attachment 1

Sequence	Percent	Event			
<u>Name</u>	<u>Frequency</u>	<u>of CDF</u>	<u>Prob.</u>	<u>Event Name</u>	<u>Event Description</u>
TQsU	1.40E-6	0.2%	1.00E+1	T1	Reactor Trip Initiating Event
			1.40E-5	WRNABPRCOM	Common Cause Run Failure of Both RN Pumps
			1.00E-0	WRNRVBKREC	Operators Fail to Align RV Backup to RN
TQsU	7.60E-7	0.1%	1.00E+1	T1	Reactor Trip Initiating Event
			1.00E-2	PACBOFTDEX	Blackout Following Trip
			2.00E-0	JDG001ADGR	Diesel Generator 1A Fails to Run
			2.00E-0	JDG001BDGR	Diesel Generator 1B Fails to Run
			1.90E-2	AC02DGRREC	Off-site Power Not Restored Prior to Seal LOCA CM - 2 Run
TQsU	6.10E-7	0.0%	1.00E+1	T1	Reactor Trip Initiating Event
			1.00E-2	PACBOFTDEX	Blackout Following Trip
			4.36E-1	JDG001ATRM	Diesel Generator 1A in Maintenance or Testing
			2.00E-0	JDG001BDGR	Diesel Generator 1B Fails to Run
			7.00E-2	AC01DGRREC	Off-site Power Not Restored Prior to Seal LOCA CM - 1 Run
TQsU	6.10E-7	0.0%	1.00E+1	T1	Reactor Trip Initiating Event
			1.00E-2	PACBOFTDEX	Blackout Following Trip
			4.36E-1	JDG001BTRM	Diesel Generator 1B in Maintenance or Testing
			2.00E-0	JDG001ADGR	Diesel Generator 1A Fails to Run
			7.00E-2	AC01DGRREC	Off-site Power Not Restored Prior to Seal LOCA CM - 1 Run
TQsU	3.92E-7	0.0%	1.00E+1	T1	Reactor Trip Initiating Event
			1.00E-2	PACBOFTDEX	Blackout Following Trip
			2.80E-1	WRNTRNBTRM	RN Train 1B Unavailable Due to Maintenance or Testing
TBP	1.80E-7	0.0%	1.40E-2	WRN001AWPS	RN Pump 1A Fails to Start
			1.00E+1	T1	Reactor Trip Initiating Event
			9.00E-0	-TNCOSRVDEX	Pressurizer SRV Fails to Reseat After Relieving Liquid
			2.00E-0	TCF0001REC	Failure to Restore Main Feedwater After Plant Trip
			1.00E-1	FCACLMSCOM	Common Cause Failure of CA Assured Sources
TBX	1.80E-7	0.0%	1.00E-2	FCAHOTWDHE	Failure to Throttle During CA Suction From the Hotwell
			1.00E-1	TFBLD01DHE	Operators Fail To Establish Feed-and-Bleed Cooling
			1.00E+1	T1	Reactor Trip Initiating Event
			9.00E-0	-TNCOSRVDEX	Pressurizer SRV Fails to Reseat After Relieving Liquid
			2.00E-0	TCF0001REC	Failure to Restore Main Feedwater After Plant Trip
			1.00E-1	FCACLMSCOM	Common Cause Failure of CA Assured Sources
			1.00E-2	FCAHOTWDHE	Failure to Throttle During CA Suction From the Hotwell
			1.00E-1	TRECIRCDHE	Operators Fail to Establish High Pressure Recirculation

Sequence	Percent	Event			
<u>Name</u>	<u>Frequency</u>	<u>of CDF</u>	<u>Prob.</u>	<u>Event Name</u>	<u>Event Description</u>
TQsU	1.74E-8	0.0%	1.00E+1	T1	Reactor Trip Initiating Event
			1.40E-5	WRNABPRCOM	Common Cause Run Failure of Both RN Pumps
			1.24E-1	NNVRCPSLHE	Latent Human Error Fails Reactor Coolant Pump Injection
TQsU	7.60E-9	0.0%	1.00E-0	WRNRVBKREC	Operators Fail to Align RV Backup to RN
			1.00E+1	T1	Reactor Trip Initiating Event
			1.00E-2	PACBOFTDEX	Blackout Following Trip
			2.00E-0	JDG001ADGR	Diesel Generator 1A Fails to Run
			2.00E-0	JDG001BDGR	Diesel Generator 1B Fails to Run
			1.00E-1	ZWLM221DHE	Failure to Correct M221 Valves Being Left Open
TQsU	6.10E-9	0.0%	1.90E-2	AC02DGRREC	Off-site Power Not Restored Prior to Seal LOCA CM - 2 Run
			1.00E+1	T1	Reactor Trip Initiating Event
			1.00E-2	PACBOFTDEX	Blackout Following Trip
			4.36E-1	JDG001BTRM	Diesel Generator 1B in Maintenance or Testing
			2.00E-0	JDG001ADGR	Diesel Generator 1A Fails to Run
			1.00E-1	ZWLM221DHE	Failure to Correct M221 Valves Being Left Open
TQsU	6.10E-9	0.0%	7.00E-2	AC01DGRREC	Off-site Power Not Restored Prior to Seal LOCA CM - 1 Run
			1.00E+1	T1	Reactor Trip Initiating Event
			1.00E-2	PACBOFTDEX	Blackout Following Trip
			4.36E-1	JDG001ATRM	Diesel Generator 1A in Maintenance or Testing
			2.00E-0	JDG001BDGR	Diesel Generator 1B Fails to Run
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			1.00E+1	T1	Reactor Trip Initiating Event
			1.00E-2	PACBOFTDEX	Blackout Following Trip
			2.80E-1	WRNTRNBTRM	RN Train 1B Unavailable Due to Maintenance or Testing
			1.40E-2	WRN001AWPS	RN Pump 1A Fails to Start
			1.00E-1	ZWLM221DHE	Failure to Correct M221 Valves Being Left Open

Sequence Name	Frequency	Percent of CDF	Event Prob.	Event Name	Event Description
TQsU	1.74E-10	0.0%	1.00E+1	T1	Reactor Trip Initiating Event
			1.40E-5	WRNABPRCOM	Common Cause Run Failure of Both RN Pumps
			1.24E-1	NNVRCPSLHE	Latent Human Error Fails Reactor Coolant Pump Injection
			1.00E-0	WRNRVBKREC	Operators Fail to Align RV Backup to RN
			1.00E-1	ZWLM221DHE	Failure to Correct M221 Valves Being Left Open
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Total:	4.17E-6	0.6%	of Total CDF of 7.41E-05		

Sequence	Percent of Total
TQsU	91%
TBP	4%
TBX	4%

Attachment 2

Sequence	Percent	Event			
<u>Name</u>	<u>Frequency</u>	<u>of CDF</u>	<u>Prob.</u>	<u>Event Name</u>	<u>Event Description</u>
TQsU	1.40E-6	0.2%	1.00E+1	T1	Reactor Trip Initiating Event
			1.40E-5	WRNABPRCOM	Common Cause Run Failure of Both RN Pumps
			1.00E-0	WRNRVBKREC	Operators Fail to Align RV Backup to RN
TBP	9.00E-7	0.1%	1.00E+1	T1	Reactor Trip Initiating Event
			9.00E-0	-TNCOSRVDEX	Pressurizer SRV Fails to Reseat After Relieving Liquid
			1.00E+1	TCF0001REC	Failure to Restore Main Feedwater After Plant Trip
			1.00E-1	FCACLMSCOM	Common Cause Failure of CA Assured Sources
			1.00E-2	FCAHOTWDHE	Failure to Throttle During CA Suction From the Hotwell
			1.00E-1	TFBLD01DHE	Operators Fail To Establish Feed-and-Bleed Cooling
TBX	9.00E-7	0.1%	1.00E+1	T1	Reactor Trip Initiating Event
			9.00E-0	-TNCOSRVDEX	Pressurizer SRV Fails to Reseat After Relieving Liquid
			1.00E+1	TCF0001REC	Failure to Restore Main Feedwater After Plant Trip
			1.00E-1	FCACLMSCOM	Common Cause Failure of CA Assured Sources
			1.00E-2	FCAHOTWDHE	Failure to Throttle During CA Suction From the Hotwell
			1.00E-1	TRECIRCDHE	Operators Fail to Establish High Pressure Recirculation
TQsU	7.60E-7	0.1%	1.00E+1	T1	Reactor Trip Initiating Event
			1.00E-2	PACBOFTDEX	Blackout Following Trip
			2.00E-0	JDG001ADGR	Diesel Generator 1A Fails to Run
			2.00E-0	JDG001BDGR	Diesel Generator 1B Fails to Run
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			1.00E-2	PACBOFTDEX	Blackout Following Trip
			2.80E-1	WRNTRNBTRM	RN Train 1B Unavailable Due to Maintenance or Testing
TQsU	1.74E-8	0.0%	1.40E-2	WRN001AWPS	RN Pump 1A Fails to Start
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=====	=====	=====	=====	=====	=====
Total:	5.61E-6	0.8%	of Total CDF of 7.41E-05		

<u>Sequence</u>	<u>Percent of Total</u>
TQsU	68%
TBP	16%
TBX	16%