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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Additional Information Related to Request for License Amendment for Technical Specification 3.7.2, Main Steam Isolation Valves (MSIVs)

Reference: Letter from K. A. Ainger (Exelon Generation Company, LLC) to U. S. NRC, "Request for Notice of Enforcement Discretion and Exigent License Amendment for Technical Specification 3.7.2, Main Steam Isolation Valves (MSIVs)," dated October 1, 2001

In the Reference letter, in accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," we requested a change to the Technical Specifications (TS) of Facility Operating License Nos. NPF-72, NPF-77, NPF-37 and NPF-66, for the Braidwood Station, Units 1 and 2, and the Byron Station, Units 1 and 2, respectively. As a result of discussions with representatives of the NRC and Exelon Generation Company, LLC on October 17, 2001, we are providing additional information related to the proposed TS change in the Attachment to this letter.

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Should you have any questions concerning this letter, please contact Ms. Kelly M. Root at (630) 657-2820.

Respectfully,

A handwritten signature in black ink, appearing to read "K. A. Ainger". The signature is fluid and cursive, with the first letters of each name being capitalized and prominent.

K. A. Ainger
Director - Licensing
Mid-West Regional Operating Group

Attachment: Additional Information Related to Request for License Amendment for Technical Specification 3.7.2, Main Steam Isolation Valves (MSIVs)

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector - Braidwood Station
NRC Senior Resident Inspector - Byron Station
Office of Nuclear Facility Safety - Illinois Department of Nuclear Safety

**Additional Information Related to Request for License Amendment for
Technical Specification 3.7.2, Main Steam Isolation Valves (MSIVs)**

The following additional information was discussed during a telephone conference call with representatives of the NRC and Exelon Generation Company, LLC, on October 17, 2001.

Question 1

"Who is the valve & actuator manufacturer(s)? Is this a steam assist MSIV design? Provide a cut-away drawing of the valve internals and hydraulic actuator."

Response

Anchor/Darling Valve Company manufactured the valves and actuators. The Byron and Braidwood Stations' Main Steam Isolation Valves (MSIVs) are hydraulically operated double disc gate valves. The Byron and Braidwood Stations' MSIVs are not a steam assist design. Drawings were faxed to the NRC on October 16, 2001.

Question 2

"Please describe what maintenance activities have been performed on the MSIV (valves and actuators) in the past four years. Please include work performed on any supporting solenoid operated valves (SOVs)."

Response

The MSIVs and their supporting components, such as solenoid valves, are not normally subject to maintenance activities with the unit on-line. The vast majority of the MSIV work is in the form of preventive maintenance (PM) tasks, however, corrective maintenance (CM) tasks have been performed. A summary table is provided below of PM and CM tasks performed on the MSIVs in the last four years.

BYRON/BRAIDWOOD MSIV PREVENTIVE MAINTENANCE ACTIVITIES

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
All MSIVs	Every refuel outage (~18 months)	Electrical wiring and components	PM-Environmental qualification (EQ) electrical inspection
All MSIVs	Every 13 th refuel outage (~19.5 years)	Replace Skinner solenoid valves	PM-EQ Replacement of Skinner solenoid valves (8 per actuator)
All MSIVs	Every refuel outage (~18 months)	Hydraulic fluid	PM-Replacement of fluid
All MSIVs	Every refuel outage (~18 months)	Pressure switches	PM-Calibration of accumulator and air/oil pump pressure switches
All MSIVs	Replace EQ limit switches:	Full open, full closed, 90%	PM-Replace limit switch with new

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
	Open & 90%: Every 25 th refuel outage (~ 37.5 years) Closed: Every 10 th refuel outage (~15 years) Note: Byron Closed limit switch PM freq. 6 years	Namco EA-180 Limit switches	
All MSIVs	Byron: Every four years Braidwood: Every six years EQ Life: 10 yrs	Mechanical components, four way valves thermal relief valves, o-rings, seals, air/oil pump, etc.	PM-EQ rebuild of actuator
All MSIVs	Byron: Every refuel outage (~18 months) Braidwood: 12 months	Instrument air check valves	PM-Perform instrument air check valve seat leakage test

BYRON MAINTENANCE HISTORY (4 YEAR PERIOD)

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
1MS001A	04/1999	Instrument air (IA) check valves	CM-Replaced active IA check valve during B2R09 based on testing results
1MS001A	04/1999	Solenoid valves	PM-Replaced Skinner solenoid valves during B1R09 based on existing EQ frequency
1MS001A	02/1998	IA tubing	CM-Repaired leaking manifold IA tubing and fitting during B1R08
1MS001A	04/1999	Limit switches	PM-Replaced stem mounted limit switches during B1R09 based on existing EQ frequency
1MS001A	01/1998	Air/oil pump	PM-Replaced air/oil pump during B1R08 based on existing PM frequency

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
1MS001B	10/2000	Hydraulic system	CM-Repaired hydraulic leak on plug on the active manifold during B1R10
1MS001B	10/2000	IA regulator gage	CM-Replaced air regulator gage that was melted during B1R10
1MS001B	04/1999	Hydraulic system	CM-Repaired oil leak at air/oil pump and "G" valve packing during B1R09
1MS001B	04/1999	Solenoid valves	PM-Replaced Skinner solenoid valves during B1R09 based on existing EQ frequency
1MS001B	01/1998	Valve stem	CM-Repacked valve during B1R08
1MS001B	02/1998	Limit switches	PM-Replaced stem mounted limit switches during B1R08 based on existing EQ frequency
1MS001C	10/2000	Air/oil Pump	CM-Replaced air/oil pump regulator during B1R10 due to body-to-bonnet leak
1MS001C	04/1999	IA regulator	CM-Replaced IA system regulator during B1R09 due to body-to-bonnet leak
1MS001C	03/1998	Standby accumulator	CM-Repaired standby accumulator N2 leak during B1R08 due to valve packing leak at bottom of accumulator
1MS001C	04/1999	Solenoid valves	PM-Replaced Skinner solenoid valves during B1R09 based on existing EQ frequency
1MS001C	02/1998	Limit switches	PM-Replaced stem mounted limit switches during B1R08 based on existing EQ frequency
1MS001C	02/1997	Limit switches	CM-Adjusted closed limit switches to reflect actual valve closed position
1MS001D	10/2000	Air/oil Pump	CM-Replaced air/oil pump relief valve during B1R10 due to lifting early
1MS001D	10/2000	Limit switches	CM-Replaced open limit switch during B1R10 due to broken spring
1MS001D	10/2000	Valve stem	CM-Tightened valve stem packing during B1R10 to stop minor leakage
1MS001D	10/2000	Air/oil Pump	PM-Replaced air/oil pump during B1R10 due to existing PM frequency
1MS001D	12/2000	Standby accumulator	CM-Replaced standby accumulator relief valve due to leak by
1MS001D	04/1999	Limit switch	CM-Adjusted open limit switch during B1R09 to allow proper valve operation
1MS001D	11/1998	Active accumulator	CM-Active accumulator found low on N2 pressure-recharged
1MS001D	04/1999	Solenoid valves	PM-Replaced Skinner solenoid valves during B1R09 based on

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
			existing EQ frequency
1MS001D	01/1998	Air/oil Pump	PM-Replaced air/oil pump during B1R08 due to existing PM frequency
1MS001D	02/1998	Limit switches	PM-Replaced stem mounted limit switches during B1R08 based on existing EQ frequency
1MS001D	02/1998	Limit switch	CM-Replaced stem mounted limit switch for "MSIV not full open" alarm to restore alarm function
2MS001A	04/2001	IA check valve	CM-Active side IA check valve replaced due to failed surveillance seat leakage test during B2R09
2MS001A	11/1999	Valve	CM-Installed missing pipe plug in valve body leak off hole during B2R08 to stop steam leak
2MS001A	11/1999	Air/oil Pump	PM-Replaced air/oil pump during B2R08 due to existing PM frequency
2MS001A	04/2001	Limit switches	PM-Replaced stem mounted limit switches during B2R09 based on existing EQ frequency
2MS001A	05/1998	Solenoid valves	PM-Replaced Skinner solenoid valves during B2R07 based on existing EQ frequency
2MS001B	04/2001	Air/oil pump	CM-Replaced air/oil pump during B2R08 due to pump failing to maintain required pressure
2MS001B	04/2001	Hydraulic system	CM-Replaced leaking reservoir sight glass
2MS001B	11/1999	N2 system	CM-Added N2 during B2R08 due to low N2 pre charge pressure.
2MS001B	11/1999	Limit switch	CM-Adjusted active side partial stroke limit switch due to failure of valve to partial stroke
2MS001B	11/1999	Solenoid valves	PM-Replaced Skinner solenoid valves during B2R08 based on existing EQ frequency
2MS001B	05/1998	Hydraulic system	CM-Repaired leaking hydraulic oil fitting on accumulator
2MS001B	05/1998	Standby accumulator	CM-Replaced pilot operated check valve on standby side accumulator-found due to hydraulic fluid being on N2 side of standby accumulator
2MS001B	04/1998	Air/oil pump	PM-Replaced air/oil pump during B2R07 due to existing PM frequency
2MS001B	03/1997	Limit switch	CM-Replaced standby side partial stroke limit switch due to failure of valve to partial stroke
2MS001B	04/1998	Limit switches	PM-Replaced stem mounted limit

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
			switches during B2R07 based on existing EQ frequency
2MS001C	04/2001	Solenoid valves	CM-Replaced one solenoid valve due to IA seat leak by noted during the IA pressure boundary leak test during B2R09
2MS001C	04/2001	Valve stem	CM-Repacked valve to stop packing leak during B2R09
2MS001C	11/1999	N2 system	CM-Added N2 during B2R08 due to low N2 pre charge pressure
2MS001C	11/1999	Solenoid valves	PM-Replaced Skinner solenoid valves during B2R08 based on existing EQ frequency
2MS001C	05/1998	IA regulator gage	CM-Replaced IA regulator gage due to broken dial during B2R07
2MS001C	04/1998	Air/oil Pump	PM-Replaced air/oil pump during B2R07 due to existing PM frequency
2MS001C	04/1998	Limit switches	PM-Replaced stem mounted limit switches during B2R07 based on existing EQ frequency
2MS001D	04/2001	Standby accumulator	CM-Repaired standby manifold o-ring leak during B2R09
2MS001D	11/1999	Air/oil pump	CM-Reset air/oil pump relief valve that was lifting early
2MS001D	11/1999	Pressure gages	CM-Replaced pressure gage isolation valve during B2R08 due to leak by
2MS001D	11/1999	Air/oil pump	PM-Replaced air/oil pump during B2R08 due to existing PM frequency
2MS001D	05/1998	Active accumulator	CM-Repaired leaking on N2 fill valve fitting on active accumulator
2MS001D	05/1998	Solenoid valves	PM-Replaced Skinner solenoid valves during B2R07 based on existing EQ frequency
2MS001D	05/1998	Limit switches	PM-Replaced stem mounted limit switches during B2R07 based on existing EQ frequency

BRAIDWOOD MAINTENANCE HISTORY (4 YEAR PERIOD)

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
1MS001A	A1R06	MSIV Actuator	PM-EQ Rebuild of actuator
1MS001B	A1R08	MSIV Actuator	PM-EQ Rebuild of actuator
1MS001C	A1R08	MSIV Actuator	PM-EQ Rebuild of actuator
1MS001D	A1R09	MSIV Actuator	PM-EQ Rebuild of actuator
2MS001A	A2R08	MSIV Actuator	PM-EQ Rebuild of actuator

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
2MS001B	A2R07	MSIV Actuator	PM-EQ Rebuild of actuator
2MS001C	A2R07	MSIV Actuator	PM-EQ Rebuild of actuator
2MS001D	A2R08	MSIV Actuator	PM-EQ Rebuild of actuator
1MS001A	08/09/1997	Hydraulic leak	CM-Hydraulic fitting leak at P3, tighten fitting.
1MS001A	11/05/1998	Hydraulic leak	CM-Hydraulic leak from bottom of active manifold, o-ring failed.
1MS001A	11/09/1998	Limit switch	CM-Switch contacts being held open during partial stroke resulting the valve not returning open.
1MS001A	03/27/2000	Valve packing	CM-Packing leak, repack.
1MS001A	03/28/2000	MSIV Accumulator relief valves	Install Relief Valve Modification
1MS001A	03/28/2000	Reservoir sight gauge	Install Sight Gauge Modification
1MS001A	04/03/2000	Air regulator, pump	CM-Regulator degraded, replace
1MS001A	10/09/2000	Hydraulic pump	CM-Hydraulic pump degraded, replace.
1MS001A	10/02/2001	Accumulator relief valves	CM-Relief valves lifting low, reset relief valve lift setpoint 5400.
1MS001B	05/09/1997	Reservoir	CM-Hydraulic leak in reservoir weld, replaced reservoir
1MS001B	08/15/1997	Reservoir sight gauge	CM-Sight gauge leak, replace
1MS001B	02/02/1998	Hydraulic leak	CM-Hydraulic leak at fitting downstream of pump
1MS001B	03/28/2000	Reservoir Sight Gauge	Install sight gauge modification
1MS001B	03/30/2000	Directional control valve	CM-Replaced 4-way due to hydraulic leak from endcap o-ring
1MS001B	03/30/2000	MSIV Accumulator relief valves	Install relief valve modification
1MS001B	03/30/2000	Pilot air regulator	CM-Regulator degraded, replace
1MS001B	03/30/2000	Pilot air regulator	CM-Peanut gauge needle broken, replace gauge
1MS001B	04/01/2000	Air relief valve	CM-Hydraulic pump air relief valve lifting early, adjust relief
1MS001B	10/02/2001	Valve packing	CM-Packing leak, repack

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
1MS001C	11/13/1997	Hydraulic leak	CM-Hydraulic leak at fitting downstream of pump
1MS001C	05/30/1998	Hydraulic leak	CM-Hydraulic leak on standby accumulator large bore tubing, o-ring replacement
1MS001C	10/21/1998	Valve packing	CM-Packing leak, packing adjustment
1MS001C	10/31/1998	Hydraulic pump	CM-Hydraulic pump degraded, replace
1MS001C	10/31/1998	Air regulator, pump	CM-Replace peanut gauge on regulator, reading high
1MS001C	03/28/2000	Reservoir sight gauge	Install sight gauge modification
1MS001C	03/30/2000	MSIV Accumulator relief valves	Install relief valve modification
1MS001C	02/07/2001	Hydraulic pump	CM-Hydraulic pump degraded, replace.
1MS001D	08/19/1997	Hydraulic leak	CM-Fitting leak on P3
1MS001D	11/07/1997	Pump air regulator	CM-Regulator degraded, replace
1MS001D	10/23/1998	Valve packing	CM-Packing leak, packing adjustment
1MS001D	03/28/2000	MSIV Accumulator relief valves	Install relief valve modification
1MS001D	03/28/2000	Reservoir sight gauge	Install sight gauge modification
1MS001D	03/29/2000	Air regulator, pump	CM-Regulator degraded, replace
1MS001D	04/04/2000	Hydraulic pump	CM-Hydraulic pump degraded, replace
2MS001A	10/23/1997	Limit switch	PM-Limit switch inspection
2MS001A	02/03/1998	Hydraulic pump	CM-Hydraulic pump replace due to sluggish operation
2MS001A	08/06/1998	Directional control valve	CM-Replaced 4-way due to sluggish response during partial stroke
2MS001A	08/06/1998	Hydraulic leak	CM-Hydraulic leak at cylinder relief valve assembly, replaced o-ring
2MS001A	05/14/1999	Hydraulic leak	CM-Hydraulic leak at cylinder relief valve assembly, replaced o-ring
2MS001A	05/19/1999	Limit switch	CM-Limit switch damaged during actuator overhaul, replace

MSIV	DATE/ FREQUENCY	COMPONENT	ACTIVITY
2MS001A	09/14/1999	Air Regulator, Pump	CM-Regulator degraded, replace
2MS001A	02/11/2000	"B" Solenoid	CM-Active train solenoid failure during partial stroke, replace
2MS001A	03/16/2000	Hydraulic Leak	CM-Hydraulic leak at cylinder relief valve assembly. Submanifold block defective, replaced
2MS001A	11/02/2000	MSIV Accumulator relief valves	Install relief valve modification
2MS001A	11/02/2000	Reservoir sight gauge	Install sight gauge modification
2MS001A	02/02/2001	Hydraulic pump	CM-Hydraulic pump degraded, replace
2MS001B	10/24/1997	Limit switch	PM-Limit switch inspection
2MS001B	06/29/1998	Reservoir sight gauge	CM-Sight gauge leak, replace
2MS001B	05/08/1999	MSIV Accumulator relief valves	Install relief valve modification
2MS001B	04/27/2000	Air oiler	CM-Oiler replaced due to air leak
2MS001B	04/27/2000	Air regulator, pump	CM-Regulator degraded, replace
2MS001B	11/02/2000	Reservoir sight gauge	Install sight gauge modification
2MS001C	10/24/1997	Limit switch	PM-Limit switch inspection
2MS001C	11/01/1997	Pilot air regulator	CM-Regulator degraded, replace
2MS001C	11/13/1999	Reservoir sight gauge	Sight gauge leak, replace
2MS001C	11/24/1999	Reservoir sight gauge	CM-Sight gauge leak, replace
2MS001C	05/19/2000	Reservoir sight gauge	Install sight gauge modification
2MS001C	5/88/99	MSIV Accumulator relief valves	Install relief valve modification
2MS001D	07/15/1997	Limit switch	CM-Partial stroke failure-contacts corroded
2MS001D	10/23/1997	Limit switch	PM-Limit switch inspection
2MS001D	11/02/2000	MSIV Accumulator relief valves	Install relief valve modification
2MS001D	11/02/2000	Reservoir sight gauge	Install sight gauge modification

Question 3

"Please describe any modifications to the hydraulic actuators and/or SOVs including any 'like-for-like' sub-component replacements."

Response

The following design change added automatic and manual pressure relief capabilities to each of the MSIV accumulators. The relief devices limit accumulator pressures to less than 5400 psi. Automatic pressure relief valves have been installed on all MSIV actuators in the last four years.

- Byron: Design change package DCP#9700177 on Unit 1 MSIVs during B1R09 (04/1999).
- Byron: Design change package DCP#9700178 on Unit 2 MSIVs during B2R08 (11/1999).
- Braidwood: Design change package DCP#9600268 on Unit 1 A&D MSIVs during A1R08 (3/2000). Design change package DCP#9600269 on Unit 1 B and C MSIVs during A1R08 (3/2000).
- Braidwood: Design change package DCP#9600271 on Unit 2 A&D MSIVs during A2R08 (10/2000). Design change package DCP#9600270 on Unit 2 B and C MSIVs during A2R07 (5/1999).

The following design change to add terminal blocks in the existing junction boxes near the MSIVs for ease of solenoid valve change outs has been installed on two MSIVs out of four on each unit in the last four years.

- Byron: Design change package DCP#9800311 (EC#78462) on Unit 1 to install EQ terminal blocks in the existing junction boxes near the MSIVs. This change has been installed on the 1A and 1D MSIVs during B1R09, but is a contingency design change for 1B and 1C MSIVs due to the solenoid valves being re-qualified for 19+ year EQ life.
- Byron: Design change package DCP#9800312 (EC#78463) on Unit 2 to install EQ terminal blocks in the existing junction boxes near the MSIVs. This change has been installed on the 2B and 2C MSIVs during B2R08, but is a contingency design change for 2A and 2D MSIVs due to the solenoid valves being re-qualified for 19+ year EQ life.

The following design change removed one of the two sight gauges from the MSIV reservoirs and also added a stiffener at the location of the remaining sight gauge to prevent flexing of the sight glass.

- Braidwood: Design change package DCP#9900271 installed on Unit 1 MSIV reservoirs during A1R08 and Unit 2 Reservoirs during A2R08.

Question 4

"On page 4, the submittal implied that there were no functional failures between 1993 and 2001 for B&B. Please specify if any failures did occur between 1993 and 2001 and what was the nature of the failures? Do not include re-tests following maintenance, only as-found failures."

Response

On page 4 of our submittal, we stated, "Byron valves had stroke times ranging from 1.1 to 3.2 seconds for the time period between 1993 and 2001. Braidwood valves had stroke times ranging from 2.1 to 4.5 seconds from the time period between 1993 and 2001."

The Maintenance Rule database was utilized to review functional failures of the MSIVs. The following is a complete list of MSIV Maintenance Rule Functional Failures (MRFFs) since the implementation of the Maintenance Rule Program in 1994.

- Byron: 2D MSIV MRFF (07/24/94) - Air/oil pump regulator failed causing the air/oil pump to charge the nitrogen accumulators to > 5700psig, which resulted in an o-ring failure on top of the standby train accumulator and resultant hydraulic fluid leak.
- Byron: 1B MSIV MRFF (09/09/97) - Both active and standby accumulator pressure were discovered to be less than the minimum 4850psig operability limit due to improper air/oil pump regulator setting.
- Braidwood: 2A MSIV MRFF (1/28/98) - Both active and standby accumulator pressures were discovered below the operability limit due to improper air/oil pump regulator setting.

Question 5

"The submittal indicates a review of Operating Experience information was performed including several NRC information notices. There are several other NRC Information Notices related to MSIV failures that were not noted. Please review IN-88-43 and other notices referenced in the IN-88-43 for applicability to Byron/Braidwood MSIVs. (On the surface it did not appear they did; however, we have few technical details on the MSIVs at B&B)."

Response

NRC Information Notice (IN)-88-43 was reviewed for applicability to Byron and Braidwood Stations. The following are differences between the Byron and Braidwood solenoid valves and those referenced in the Information Notice.

- The IN references ASCO solenoid valves. Byron and Braidwood Stations utilize Skinner solenoid valves on the MSIV actuators.
- The IN implies that the referenced events were failure of solenoid valves that are in a normally energized state and are required to de-energize for valve closure. Byron and Braidwood MSIV solenoids are in the normally de-energized state and are energized for valve closure.
- The cause of solenoid failures was the result of heat degradation of the solenoid valve elastomers. The high temperatures referenced in the IN are the result of normally energized solenoid valve coils and not ambient conditions alone.

Question 6

"Provide supporting information for the statement that the risk associated with the continued power operation in this condition to be less than that associated with an immediate controlled shutdown of three operating reactors. Specify recent historical

B&B operational challenges that have occurred during power reduction/plant shutdown from Mode 1 to Mode 3 that have resulted in significant transients (e.g., RCS overcooling/SG overfeeding, challenges to ESF SSCs)."

Response

Attachment A of our submittal provided our rationale (i.e., a qualitative risk assessment) for concluding that the MSIVs are fully capable of achieving the 5-second closure criteria at normal operating pressure and temperature. Performing the surveillance under less limiting test conditions will not affect the failure frequency assumed for the MSIVs. Therefore, since the failure frequency is unaffected, there is assumed to be no risk increase associated with continued operation. Although neither Byron nor Braidwood Station have quantitative shutdown PRAs, other plants having shutdown PRAs have demonstrated a non-zero transition risk due to forced equipment challenges required for the controlled shutdown. Furthermore, a shutdown could initiate unnecessary challenges, unexpected transients and place an unnecessary thermal cycle on the primary and secondary systems.

In addition, there have been no recent Byron or Braidwood Station operational challenges that have occurred during power reduction/plant shutdown from Mode 1 to Mode 3 that have resulted in significant transients.