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SUBJECT: Provides revised response to request for addl info re Suppl
 3 to Generic Ltr 89-10, "Consideration of Results of
 NRC-Sponsored Tests of Motor-Operated Valves."

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July 29, 1991
NMP1L 0598

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Re: Nine Mile Point Unit 2
Docket No. 50-410
NPF-69

Gentlemen:

Niagara Mohawk's letters dated March 7, 1991, and March 12, 1991, provided our 120 day response to Generic Letter 89-10, Supplement 3, for Nine Mile Point Unit 2 and Unit 1, respectively. Subsequent to our March 7, 1991 submittal, the determination was made that the degraded voltage used (88.27% of rated) when calculating the available actuator thrust for NMP2 motor-operated valves was non-conservative. A more accurate value for degraded voltage refers to 80% of rated. Enclosure 1 provides Unit 2's revised 120 day response assuming a degraded voltage of 80%. Marginal markings have been used to indicate where changes have been made.

The Commission's letter dated June 24, 1991, indicated additional information would be required to make a safety determination regarding both our March 7, 1991, and March 12, 1991, submittals. Enclosures 2 and 3 provide this additional information.

Very truly yours,



C. D. Terry
Vice President
Nuclear Engineering

JT/mls

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Enclosures

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ENCLOSURE 1
REVISION 1 TO NMP2'S 120 DAY RESPONSE
TO SUPPLEMENT 3 OF GL 89-10

The following presents Niagara Mohawk's evaluation of Nine Mile Point Unit 2's (NMP2) Reactor Water Cleanup System and Reactor Core Isolation Cooling System containment isolation valves as requested in Generic Letter 89-10, Supplement 3 (NMP2 does not have a High Pressure Coolant Injection or Isolation Condenser system). In addition, the isolation valves of two other high pressure systems, High Pressure Core Spray (HPCS) and Feedwater (FWS) have been evaluated. The results of the evaluation indicate that the valves will perform their safety function to close/open. For the evaluated gate valves, the available thrust was found to be greater than the design thrust calculated using the industry standard 0.3 valve factor. The thrust available during 95% of valve travel (torque switch bypassed) was found to be greater than the thrust calculated using a more conservative 0.5 valve factor. The remaining valves are globe valves and are not specifically addressed in Supplement 3. Therefore, no deficiencies exist.

1. High Pressure Core Spray Isolation Valve 2CSH*MOV107

2CSH*MOV107 is an Anchor Darling 12" gate valve designed for a differential pressure of 1575 psid. It is located on the HPCS pump discharge line outside of containment and its safety function is to open and close. At dead headed conditions, the HPCS pump delivers water at approximately 1430 psig. The valve's torque switch is bypassed for 95% of valve travel in both the open and close directions. Using a 0.3 valve factor, the design thrust required is calculated to be 52,332 lbs. The present torque switch setpoint allows the actuator to develop 64,000 lbs. of thrust as determined by diagnostic testing. However, the actuator is capable of providing 123,692 lbs. of thrust (stall) at a degraded voltage condition. Using a 0.5 valve factor, the design thrust required was calculated to be 82,257 lbs. Therefore, the thrust available during 95% of valve travel (torque switch bypassed) is greater than the thrust calculated to close the valve using a 0.5 valve factor. Also, the inside containment isolation check valve will prevent high differential pressure across 2CSH*MOV107 in the event of a line break outside of containment.

In summary, the available actuator thrust, as determined by the torque switch setting, is greater than the required thrust calculated using the industry standard 0.3 valve factor. The stall thrust available during 95% of valve travel (torque switch bypassed) is greater than the required thrust calculated using a more conservative 0.5 valve factor. Therefore, no deficiencies exist.

2. Reactor Core Isolation Cooling Isolation Valve 2ICS*MOV121

2ICS*MOV121 is a Velan 10" gate valve designed for a differential pressure of 1158 psid. It is located outside of containment on the steam supply piping of the Reactor Core Isolation Cooling (RCIC) turbine. 2ICS*MOV121's safety function is to open and close. This valve's torque switch is bypassed for 95% of valve travel in the open and close direction. Using a 0.3 valve factor, the required design thrust is calculated to be 31,075 lbs. The present torque switch setpoint allows the actuator to develop 35,773 lbs. of thrust as interpolated from vendor test data. However, the actuator is capable of



providing 68,924 lbs. of thrust (stall) at a degraded voltage condition. Using a 0.5 valve factor, the required design thrust is calculated to be 42,349 lbs. Therefore, the thrust available during 95% of valve travel (torque switch bypassed) is greater than the thrust calculated to close the valve using a 0.5 friction factor.

In summary, the available actuator thrust, as determined by the torque switch setting, is greater than the required thrust calculated using the industry standard 0.3 valve factor. The stall thrust available during 95% of valve travel (torque switch bypassed) is greater than the required thrust calculated using a more conservative 0.5 valve factor. Therefore, no deficiencies exist.

3. Reactor Core Isolation Cooling Isolation Valve 2ICS*MOV128

2ICS*MOV128 is a Velan 10" gate valve designed for a differential pressure of 1158 psid. It is located inside the containment on the steam supply piping of the RCIC turbine. The valve's safety function is to open and close. The valve's torque switch is bypassed for 95% of valve travel in both the open and close directions. Using a 0.3 valve factor, the design thrust required is calculated to be 31,075 lbs. The actuator is capable of providing 68,924 lbs. of thrust (stall) at a degraded voltage condition. Using a 0.5 valve factor, the design thrust required is calculated to be 42,349 lbs. Therefore, the thrust available during 95% of valve travel (torque switch bypassed) is greater than the thrust calculated to close the valve using a 0.5 valve factor.

In summary, the available actuator thrust, as determined by the torque switch setting, is greater than the required thrust calculated using the industry standard 0.3 valve factor. The stall thrust available during 95% of valve travel (torque switch bypassed) is greater than the required thrust calculated using a more conservative 0.5 valve factor. Therefore, no deficiencies exist.

4. Reactor Core Isolation Cooling Isolation Valve 2ICS*MOV170

2ICS*MOV170 is a Velan 1" globe valve designed for a differential pressure of 1158 psid. 2ICS*MOV170 serves as the bypass valve around the RCIC inboard isolation valve and is used to equalize the line pressure across this valve. It is also used to warm the downstream piping. The valve's safety function is to open and close. A 1.1 valve factor was used when determining the required thrust values. The torque switch is bypassed for 95% of valve travel in both the open and close directions. 2ICS*MOV170 is not similar in size or type to those valves tested by Idaho National Engineering Laboratory (INEL). Therefore, the INEL test data is inapplicable.

5. Reactor Water Cleanup Isolation Valve 2WCS*MOV102

2WCS*MOV102 is a Velan 8" globe valve designed for a differential pressure of 1050 psid. It is located inside containment on the Reactor Water Cleanup supply line. The valve's safety function is to close and its torque switch is bypassed 95% in the close direction. A 1.1 valve factor was used when



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determining the required thrust values. This valve is normally open. 2WCS*MOV102 is not similar in type to those valves tested by INEL. Therefore, the INEL test data is inapplicable.

6. Reactor Water Cleanup Isolation Valve 2WCS*MOV112

2WCS*MOV112 is a Velan 8" globe valve designed for a differential pressure of 1050 psid. It is located outside of containment in the Reactor Water Cleanup supply line. The valve's safety function is to close and its torque switch is bypassed 95% in the closed direction. A 1.1 valve factor was used when determining the required thrust values. This valve is normally open. 2WCS*MOV112 is not similar in type to those valves tested by INEL. Therefore, the INEL test data is inapplicable.

7. Feedwater System Isolation Valves 2FWS*MOV21A/B

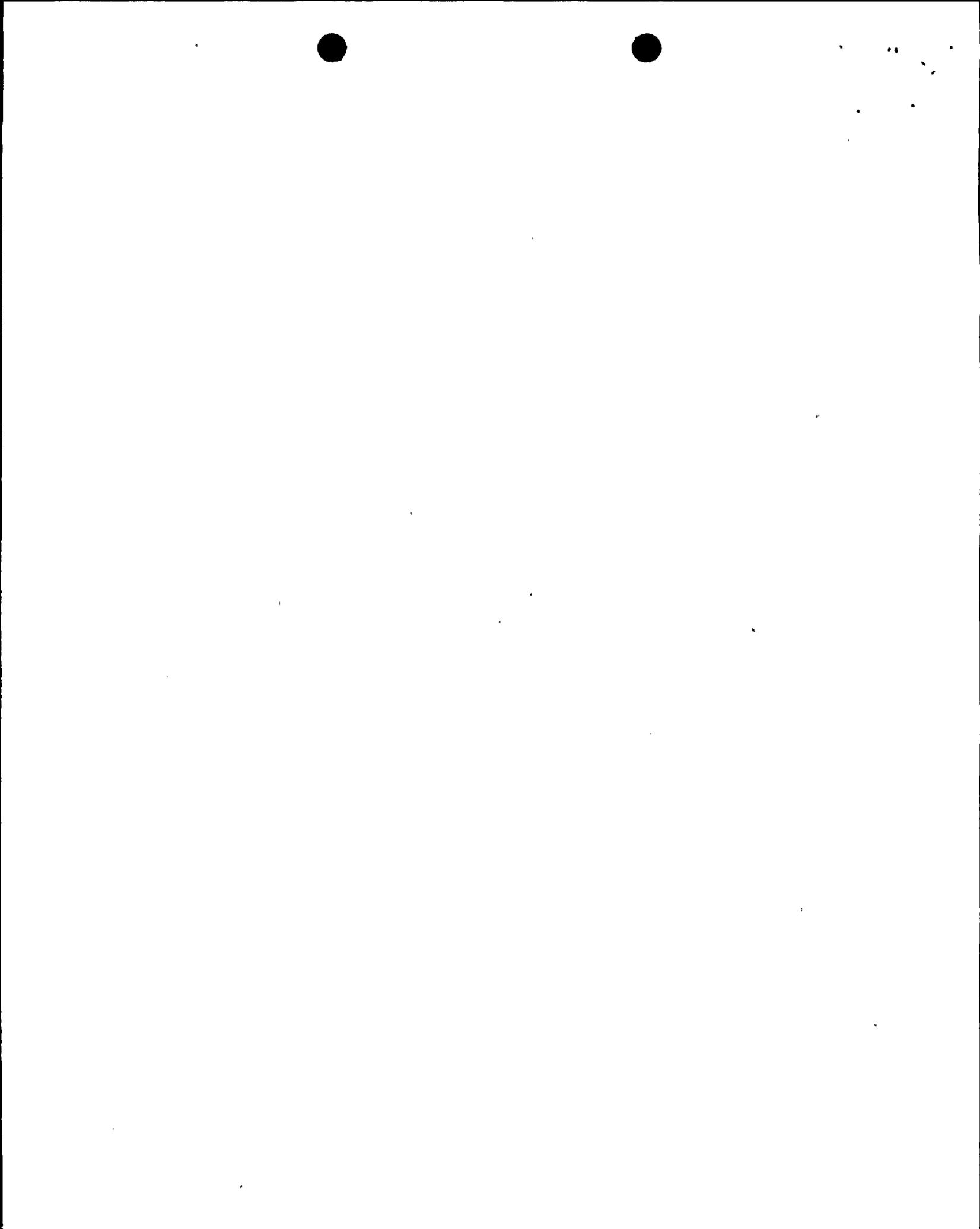
2FWS*MOV21A and 2FWS*MOV21B are Velan 24" gate valves. These valves were designed for a differential pressure of 1380 psid. However, during safety operation the differential pressure is essentially zero. Two downstream containment isolation check valves will prevent high differential pressure across either 2FWS*MOV21A or 2FWS*MOV21B in the event of a line break outside of containment. Both valves are remote manually operated outside containment isolation valves and their safety function is to close. The valve's torque switch is bypassed 95% in the closed direction. Using a 0.3 valve factor and a conservative differential pressure of 100 psid, the required thrust is calculated to be 24,339 lbs. The present torque switch setpoint allows the actuators to develop 137,825 lbs. of thrust. Using a 0.5 valve factor, the design thrust required is calculated to be 30,007 lbs.

In summary, the available actuator thrust is greater than the thrust calculated using the industry standard 0.3 or a more conservative 0.5 valve factor.

Torque Switch Bypass

As indicated earlier, all safety-related MOVs at NMP2 have their torque switches bypassed for 95% of travel in the safety direction.

For a valve required to open after a Double Ended Guillotine Break (DEGB), as in the case of an Emergency Core Cooling System (ECCS) injection valve, if the valve fails to open for the last 5% of travel (when the torque switch is not bypassed), it will not significantly restrict the flow or affect the safety function of the system. Allowing a portion of the gate disk to impinge on the flow stream when the valve is 95% open will not restrict flow significantly.



If a valve is required to close after a DEGB, as in the case of the RCIC steam supply line valve, and the valve fails to close for the last 5% of travel, it will still significantly reduce the flow. Since two valves are provided in series for containment isolation, the other isolation valve will not be exposed to the high differential pressure condition until it reaches the same degree of closure and would most likely close completely. This will allow the first isolation valve to close due to the balanced pressure condition across the valve.

Degraded Voltage

Degraded Voltage refers to 80% of motor rated voltage, which is the lowest voltage to be seen during a degraded voltage condition. This corresponds to approximately 460 volts at the motor terminals of the 575 volt MOVs.



ENCLOSURE 2

NMP1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING SUPPLEMENT 3 TO GENERIC LETTER 89-10, "CONSIDERATION
OF THE RESULTS OF NRC-SPONSORED TESTS OF MOTOR-OPERATED VALVES"

NRC QUESTION 1 - Identify any modifications (e.g., torque switch setting adjustments, gearing changes, or motor/actuator replacement) for each MOV within the scope of Supplement 3 to GL 89-10 since June 1990 or planned for the future.

Response - No physical changes have been made to the motor-operated valves (MOV) within the scope of Supplement 3 to GL 89-10 since June of 1990. The following changes are planned for Reactor Water Cleanup Isolation Valve 33-04:

- 1) The torque switch setting for the closing direction will be increased. This is a conservative action which will allow the actuator to provide additional thrust when the torque switch is not bypassed.
- 2) The bypass limit switch for the torque switch in the closing direction will be adjusted. This is a corrective action.

No other physical changes are planned for the MOV's within the scope of Supplement 3 to GL 89-10.

NRC QUESTION 2 - Provide the actuator and motor sizes, and information necessary to confirm motor adequacy for each MOV within the scope of Supplement 3 to GL 89-10.

PARAMETER	33-01R 33-02R	33-04	39-07R 39-08R	39-09R 39-10R
SIZE	6"	6"	10"	10"
TYPE	PARALLEL DISK GATE VALVE	FLEX WEDGE GATE VALVE	EQUI-WEDGE GATE VALVE	EQUI-WEDGE GATE VALVE
ACTUATOR	SMB-0-10	SB-1-40	SMB-1-25	SMB-0-25
MOTOR VOLT	575 VAC	125 VDC	125 VDC	575 VAC
MOTOR RPM	3600	1900	1900	1800
LINE PRESS	1200 PSIG	1030 PSIG	1050 PSIG	1050 PSIG
DIFF PRESS	1200 PSID	1200 PSID	1250 PSID	1250 PSID
VALVE ORIFICE DIA	5.125"	5.375"	5.250"	5.250"

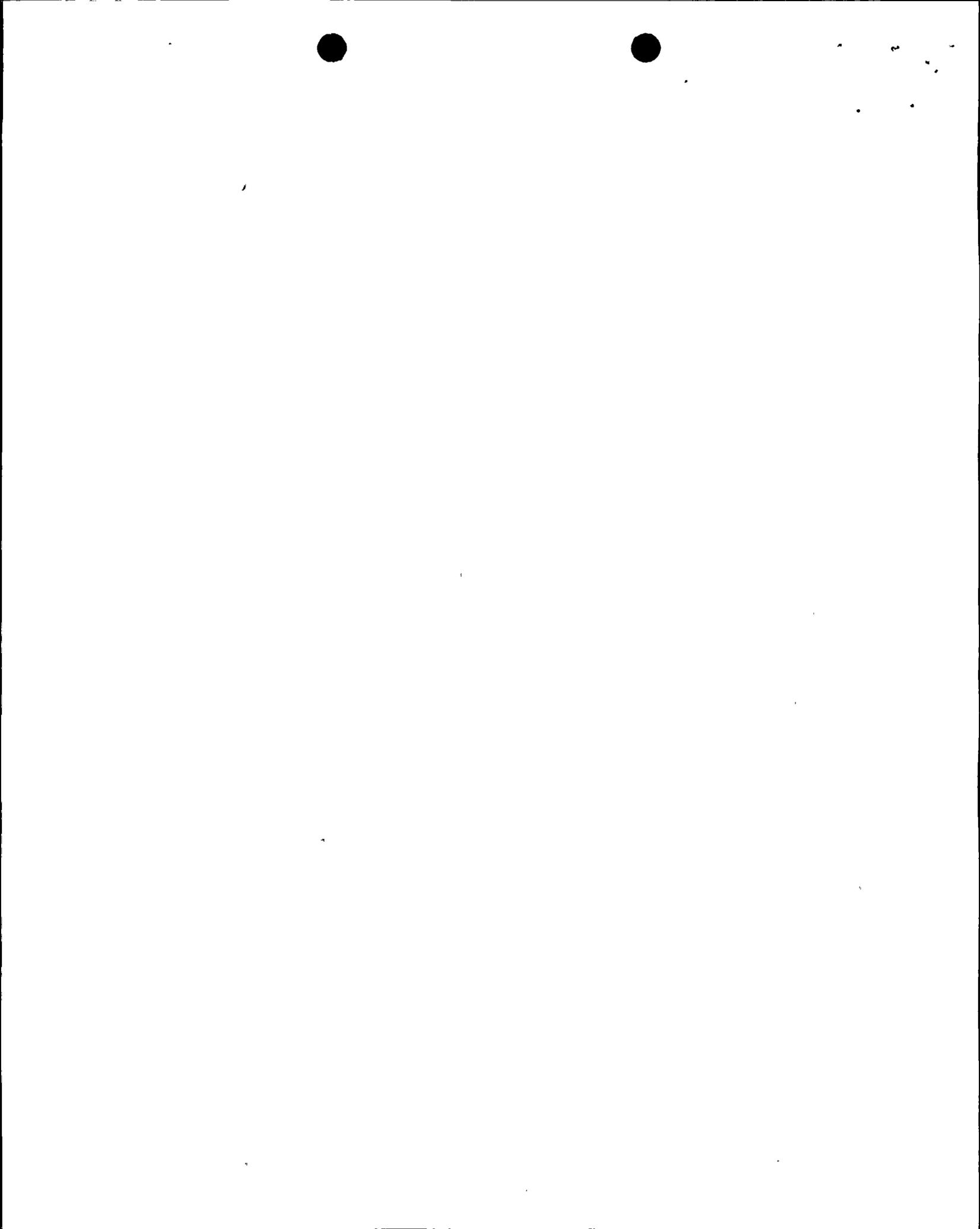


PULLOUT EFFICIENCY	0.4	0.4	0.4	0.4
RUNNING EFFICIENCY	0.5	0.5	0.5	0.5
STEM DIAMETER	1.5"	1.75"	1.875"	1.875"
THREAD PITCH	0.33"	0.33"	0.25"	0.25"
THREAD LEAD	0.67"	0.33"	0.50"	0.5"
OVERALL GEAR RATIO	84:1	32.13:1	72.42:1	54.83:1
APPARENT STEM FACTOR	0.0185	0.0190	0.0182	0.0202
VALVE FACTOR	0.2	0.3	0.3	0.3
MINIMUM (DEGRADED) VOLTAGE	86.1%	77.4%	67.4%	87.7%

NRC QUESTION 3 - In Information Notice 90-72 (November 28, 1990), "Testing of Parallel Disc Gate Valves in Europe", the NRC Staff indicates that foreign utilities are using a valve factor of 0.4 for a new German design of parallel disc gate valves. What is your justification for using a valve factor of 0.2 for parallel disc gate valves? How do you plan to confirm the sizing of the motor operator and its torque switch settings for the parallel disc design in your valves?

RESPONSE - The use of a 0.2 valve factor for NMP1 double disc gate valves is consistent with industry practice as evidenced by Limitorque SEL-3. Niagara Mohawk has reviewed the report entitled, "Pipeline Dynamics and Valves - 1989", that formed the basis for NRC Information Notice 90-72 and determined that the report is inadequate to form any conclusions relating to NMP1. This determination is based on the following:

- 1) There is no discussion of the model and manufacturer of the valves tested to allow comparison to valves used at NMP1.
- 2) There are no details regarding the age, lubricant, and surface type of the valves tested to allow comparison to valves used at NMP1.
- 3) The hot water testing described in Information Notice 90-72 was conducted at pressures up to 1740 psig. NMP1 valves operate at pressures less than 1300 psig.



Niagara Mohawk hopes to gain additional information regarding parallel disc valves from EPRI motor-operated valve performance prediction program, Anchor Darling valve testing, and testing required by GL 89-10. Any future actions may be based on the evaluation of this information.

It should be noted that for the parallel disc valves discussed in our 120 day response, the thrust available during 95% of valve travel is greater than the thrust calculated using a more conservative 0.5 valve factor.

NRC QUESTION 4 - Has the leakage rate with an MOV 95% closed been evaluated? Will the Appendix J or ASME Code leakage limits be met at that percent closure?

RESPONSE - No, the leakage rate with the valve 95% closed has not been evaluated. As indicated in our 120 day response to GL 89-10, Supplement 3, the available thrust for the evaluated gate valves was found to be greater than the design thrust calculated using the industry standard 0.3 valve factor. Therefore, the available thrust is greater than the calculated design thrust during 100% of valve travel. The thrust available during 95% of valve travel (torque switch bypassed) was found to be greater than the thrust calculated using a more conservative 0.5 valve factor. This statement was not to imply the valve would only go to 95% closed, but to show that additional conservatism existed for the greater part of valve travel in the safety direction.

NRC QUESTION 5 - How have you addressed the rate of loading phenomenon in MOV sizing and torque switch settings?

RESPONSE - The Rate of Loading (ROL) phenomenon was not recognized and, therefore, was not considered when sizing the motor-operated valves used at NMP1. Niagara Mohawk is continually monitoring industry advances in this area, but does not believe any conclusions have been made concerning ROL.



ENCLOSURE 3

NMP2

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING SUPPLEMENT 3 TO GENERIC LETTER 89-10, "CONSIDERATION
OF THE RESULTS OF NRC-SPONSORED TESTS OF MOTOR-OPERATED VALVES"

NRC QUESTION 1 - Identify any modifications (e.g., torque switch setting adjustments, gearing changes, or motor/actuator replacement) for each MOV within the scope of Supplement 3 to GL 89-10 since June 1990 or planned for the future.

RESPONSE - No physical changes have been made to the motor-operated valves within the scope of Supplement 3 since June 1990 nor are any planned.

NRC QUESTION 2 - Has the leakage rate with an MOV 95% closed been evaluated? Will the leakage limits of Appendix J or ASME Code be met with this percent MOV closure?

RESPONSE - No, the leakage rate with the valve 95% closed has not been evaluated. As indicated in our 120 day response to GL 89-10, Supplement 3, the available thrust for the evaluated gate valves was found to be greater than the design thrust calculated using the industry standard 0.3 valve factor. Therefore the available thrust is greater than the calculated design thrust during 100% of valve travel. The thrust available during 95% of valve travel (torque switch bypassed) was found to be greater than the thrust calculated using a more conservative 0.5 valve factor. This statement was not to imply that the valve would only go to 95% closed, but to show that additional conservatism existed for the greater part of valve travel in the safety direction.

NRC QUESTION 3 - Provide the actuator and motor type/size, and information necessary to confirm motor adequacy for each MOV within the scope of Supplement 3 to GL 89-10.

PARAMETER	2ICS*MOV121 2ICS*MOV128	2ICS*MOV170	2FWS*MOV21A 2FWS*MOV21B	2CSH*MOV107	2WCS*MOV102 2WCS*MOV112
SIZE	10"	1"	24"	12"	8"
TYPE	GATE	GLOBE	GATE	GATE	GLOBE
ACTUATOR	SB-2-60	SMB-000-2	SMB-4-200	SB-3-150	SB-2-80
MOTOR VOLT	575 VAC	575 VAC	575 VAC	575 VAC	575 VAC
MOTOR RPM	3400	1700	3400	3400	1700
LINE PRESS	1158 PSI	1158 PSI	1380 PSI	1575 PSI	1050 PSI



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DIFF PRESS	1158 PSID	1158 PSID	1380 PSID	1575 PSID	1050 PSID
VALVE ORIFICE DIA	7.875"	.833"	19"	11"	5.0"
PULLOUT EFFICIENCY	0.4	0.4	0.4	.45	0.4
RUNNING EFFICIENCY	0.55	0.5	0.6	0.6	0.55
STEM DIAMETER	2.5"	.875"	4.25"	2"	2.25"
THREAD PITCH	1/3	1/6	1/2	1/3	1/4
THREAD LEAD	2/3	1/3	1/2	1.0	1/2
OVERALL GEAR RATIO	55.84	47.55	72.62	50.02	33.69
APPLI-CATION FACTOR	0.9	0.9	0.9	0.9	0.9
VALVE FACTOR	0.3	1.1	0.3	0.3	1.1
MINIMUM (DEGRADED) VOLTAGE	80%	80%	80%	80%	80%
STALL EFFICIENCY	0.55	0.5	0.6	0.6	0.55
STEM FACTOR	0.02424	0.00973	0.03265	0.026	0.02059

NRC QUESTION 4 - What are the current torque switch settings for RCIC MOV (2ICS*MOV128) in pounds thrust?

RESPONSE - MOVATS test of 2ICS*MOV128 at rated voltage (575v) indicated a torque switch setting of 3 5/8 provided a measured 45,000 lbs. of thrust with an additional 14,800 lbs. of inertial thrust.



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NRC QUESTION 5 - How have you addressed the rate of loading phenomenon in MOV sizing and torque switch settings?

RESPONSE - The Rate of Loading (ROL) phenomenon was not recognized and, therefore, was not considered when sizing the motor-operated valves used at NMP2. Niagara Mohawk is continually monitoring industry advances in this area, but does not believe any conclusions have been made concerning ROL.

