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 PARRISH, J.V. Washington Public Power Supply System
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SUBJECT: Forwards response to Generic Ltr 89-10 & suppl, "Safety-Related Motor-Operated Valve Testing & Surveillance."

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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August 31, 1993
G02-93-217

Docket No. 50-397

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

Gentlemen:

Subject: **WNP-2, OPERATING LICENSE NPF-21
GENERIC LETTER 89-10 AND SUPPLEMENTS**

- References:
- 1) Letter G02-89-230 dated December 22, 1989, GC Sorensen (SS) to NRC, "Response to Generic Letter 89-10, 'Safety Related Motor-Operated Valve Testing and Surveillance,' dated June 28, 1989"
 - 2) NRC Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," dated June 28, 1989, including Supplements 1, 2, 3, and 4
 - 3) Letter dated August 16, 1991, RP Zimmerman (NRC) to GC Sorensen (SS), "NRC Inspection of Washington Nuclear Plant, No. 2 (Inspection Report 91-16)"
 - 4) Letter G02-91-050 dated March 12, 1991, GC Sorensen (SS) to NRC, "Response to Generic Letter 89-10, Supplement 3"
 - 5) NRC Generic Letter 89-10, Supplement 5, "Inaccuracy of Motor-Operated Valve Diagnostic Equipment," dated June 28, 1993
 - 6) Letter G02-93-205 dated August 9, 1993, JV Parrish (SS) to NRC, same subject

This letter was transmitted to the NRC as Reference 6. Because of errors made in assembling the attachments it is being resubmitted in its entirety.

Generic Letter (GL) 89-10 and its supplements outline the recommendations for testing and evaluating motor operated valves (MOVs). In Reference 1, the Supply System committed to complete the recommended actions within a five year time frame. However, the Supply System finds it necessary to revise the scope of the program and the five year schedule. This letter describes and explains the changes in the Supply System MOV Program and schedule, and outlines how the recommendations of the Generic Letter are being applied to the valves at WNP-2. With these changes, the Supply System will be able to focus resources on the valves which are most significant to plant safety and on those which may have lower performance margins.

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GENERIC LETTER 89-10 AND SUPPLEMENTS.

This letter also provides a revised response to Supplement 3 (Reference 4). The additional information regarding this revision is included as Attachment A.

The NRC issued a fifth supplement to GL 89-10 (Ref 5) requesting licensees reexamine their MOV programs regarding inaccuracies of MOV diagnostic equipment. The response is required within 90 days of the receipt of the supplement. Attachment B contains the Supply System response to Supplement 5.

In May and June of 1991 the NRC conducted an inspection of the WNP-2 MOV Program and identified a number of concerns (Reference 3). In response to the inspection, the Supply System placed additional emphasis and resources on this program, resulting in a stronger program for valve engineering, testing, and analysis. A summary of the activities initiated and completed since the NRC inspection has been included as Attachment C.

During this time we have learned some difficult lessons, leading to greater insight, and ultimately, significant retesting. For example, due to the shortcomings identified with the MOVATS diagnostic system used at WNP-2, much of the early MOVATS testing was inadequate. An open vs close analysis was performed by ITI MOVATS engineers to evaluate valves previously tested with Thrust Measuring Device (TMD) methodology. Most valves were shown to be acceptable. Some valves required further engineering analysis or were retested. Further, many baseline tests must be redone since improved calculation methods include additional margin for increased valve factor, stem factor degradation and load sensitive behavior effects. Additionally, thirteen differential pressure (dP) tests may need to be redone because they were initially performed using the MOVATS TMD methodology. Hence, for a variety of reasons, much previous testing is no longer considered complete with respect to GL 89-10.

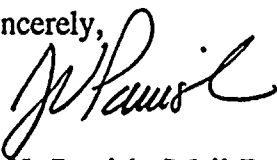
The Supply System is modifying the MOV Program to implement a 'graded approach' to MOV testing. We believe that not all of the recommendations in GL 89-10 need be applied equally to each MOV to ensure operability and reliability. For example, the recommended actions for testing and evaluating a large flex wedge gate valve used for ECCS injection are the same as those for a two-inch globe valve used for low pressure system isolation. The MOV Program is being modified so that the extent of valve testing will be related to valve and actuator configuration, service condition, performance margin, and relative importance to safety. Table 1 lists the valves designated for the graded approach. These valves will not be required to be insitu differential pressure tested. Table 1 also includes the specific criteria and the basis for this designation. The Supply System believes it is appropriate to more critically examine the valves included in the MOV Program in order to prioritize the available resources. The Supply System also believes this approach is consistent with 10 CFR 50, Appendix B which requires that "the Quality Assurance Program shall provide control over activities affecting the quality of the identified structures, systems and components, to an extent consistent with their importance to safety."

GENERIC LETTER 89-10 AND SUPPLEMENTS.

All of the GL 89-10 valves will have been baseline tested, at least once, by the completion of the R9 (Spring, 1994) refueling outage, consistent with the original schedule commitment. However, the initial commitment for the completion of all GL 89-10 testing during the 1994 spring refueling outage will not be met. A one year extension to the schedule, as shown in Table 2, will be used to repeat baseline tests of the valves listed in Table 1. The additional year will also be used to complete dP tests of those MOVs where the MOVATS TMD methodology was used to gather the initial data. The completion status of the GL 89-10 Program is shown on Attachment D.

The Supply System is in the process of revising the MOV Program to reflect the changes described in this letter. We believe these changes will strengthen the overall MOV Program at WNP-2 by focusing attention on critical valves while ensuring all MOVs will operate reliably. The Supply System is continuing to review its position on Stage II valves (valves which cannot be tested at maximum expected differential pressure (MEDP)) against industry progress. This is not a change in commitment from our earlier response to GL 89-10.

Sincerely,



J. V. Parrish (Mail Drop 1023)
Assistant Managing Director, Operations

TFH/MGE/bk
Attachments

- 1) Attachment A, Revision to Response to Supplement 3
- 2) Attachment B, Response to Supplement 5
- 3) Attachment C, Program Activities
- 4) Attachment D, Completion Status of GL 89-10 Program
- 5) Table 1, GL 89-10 Program Valve Graded Approach
- 6) Table 2, Schedule

cc: BH Faulkenberry - NRC RV
NS Reynolds - Winston & Strawn
JW Clifford - NRC
DL Williams - BPA/399
NRC Site Inspector - 901A
EJ Sullivan - NRC NRR

STATE OF WASHINGTON)
)
COUNTY OF BENTON)

Subject: WNP-2 Operating License NPF-21
Generic Letter 89-10 and Supplements

I, J. V. PARRISH, being duly sworn, subscribe to and say that I am the Assistant Managing Director, Operations for the WASHINGTON PUBLIC POWER SUPPLY SYSTEM, the applicant herein; that I have the full authority to execute this oath; that I have reviewed the foregoing; and that to the best of my knowledge, information, and belief the statements made in it are true.


DATE 31 August, 1993



J. V. Parrish, Assistant Managing Director
Operations

On this date personally appeared before me J. V. PARRISH, to me known to be the individual who executed the foregoing instrument, and acknowledged that he signed the same as his free act and deed for the uses and purposes herein mentioned.

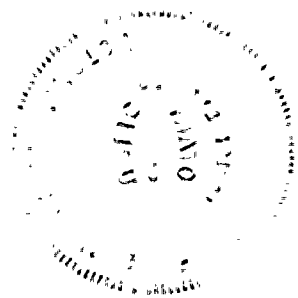
GIVEN under my hand and seal this 31 day of August 1993.



Notary Public in and for the
STATE OF WASHINGTON

Residing at Kennewick, Washington

My Commission Expires 4-29-95



ATTACHMENT A

REVISION TO RESPONSE TO SUPPLEMENT 3

Provided below is additional information for the Supplement 3 MOVs at WNP-2. Additional conservatism has been included in the motor operator thrust calculations. The applicable MOVs within the scope of Supplement 3 are RCIC-V-63, RCIC-V-8, RWCU-V-1, and RWCU-V-4.

Revised thrust calculations for RCIC-V-63 and RWCU-V-4 have been issued which now include an increased valve factor and consideration of rate of loading effects. Both of the valves were baseline tested during the R8 refueling outage and have been set up to meet the increased thrust requirements of the new calculations.

The existing thrust calculation for RWCU-V-1 was reviewed and it was determined that a larger operator would be required to provide additional margin due to an increased valve factor and to account for rate of loading effects. A design change was initiated for this modification (PMR 93-0067-0). The implementation is scheduled for the R9 refueling outage (Spring 1994).

The RCIC-V-8 and its associated operator are scheduled to be replaced during the R9 outage because of stroke time concern. The design change will also provide additional performance margin to account for an increased valve factor and to account for rate of loading effects.

ATTACHMENT B

RESPONSE TO SUPPLEMENT 5

- (1) Within 90 days of receipt of this letter, all licensees are required to notify the NRC staff of the diagnostic equipment used to confirm the proper size, or to establish settings, for MOVs within the scope of GL 89-10.

Supply System Response

At WNP-2, ITI MOVATS diagnostics systems are used to establish switch settings for MOVs within the scope of GL 89-10. Thrust and torque are measured with ITI MOVATS provided torque thrust cells and with commercially available stem mounted strain gages. In addition, thrust is measured, in some cases, with yoke mounted strain gages or with ITI MOVATS provided stem strain rings or stem strain transducers.

- (2) Within 90 days of receipt of this letter, licensees are required to report whether they have taken actions or plan to take actions (including schedule and summary of actions taken or planned) to address the information on the accuracy of MOV diagnostic equipment.

Supply System Response

- a) *In March and April of 1992, all (115) MOVs which were set up with the ITI MOVATS equipment were evaluated to determine MOV operability. This evaluation was completed by ITI MOVATS engineers in accordance with the ITI MOVATS Engineering Report 5.2. This evaluation met the requirements of the NUMARC guidance published May 18, 1992. Retesting of some MOVs was necessary as a result of the evaluation. The testing was completed prior to start up from the R7 refueling outage (Spring 1992).*
- b) *The Supply System has also noted that yoke mounted strain gages, when calibrated in the closed direction, over predict thrust when using the same calibration for the open direction. This testing methodology is still being reviewed. The testing results using this technique are conservative.*

ATTACHMENT C

PROGRAM ACTIVITIES

Activities accomplished since the NRC inspection (IR 91-16):

- o Completed weak link analysis of all 143 GL 89-10 MOVs.
- o Completed a review of all safety related systems to verify the scope of GL 89-10 valves.
- o Completed a review to determine those MOVs used in Emergency Operating Procedures (EOPs). The MOVs used in EOPs for mitigating events which are not beyond the plant design basis are included in the scope of the GL 89-10 Program.
- o Completed 100% of design basis reviews of GL 89-10 MOVs. An initial design review was performed at the start of the GL 89-10 Program. In February 1993, another review was completed to ensure an approach consistent with current GL 89-10 industry methods was applied to all of the valves in the GL 89-10 Program.
- o Completed switch setting calculations for MOVs. The MOV switch setting calculations use a higher valve factor (typically 0.5) for gate valves and add margin for rate of loading (30%) and stem factor degradation (15%).
- o Completed analysis of 115 valves which were calibrated in the open direction using the MOVATS TMD methodology and tested in the closed direction. These were evaluated and resolved prior to the issuance of the NUMARC guidance. However, the Supply System had reviewed and commented upon the draft guidelines and the evaluation was consistent with the NUMARC recommendations.
- o Retested or evaluated as acceptable those MOVs that failed the MOVAT open versus close analysis.
- o Revised and simplified testing procedures such that Program requirements and acceptance criteria are better understood by testing personnel.
- o Developed a dP test evaluation procedure which is to be completed prior to startup after an outage. The procedure includes the methodology to be used in evaluating MOV operability. A straight-line extrapolation is used to ensure the valve will perform its intended function at MEDP when the valve is tested at less than MEDP. The evaluation methodology also assumes that the stem factor will degrade over time.

- o Baseline tested 121 valves.
- o Tested 58 valves at differential pressure conditions.
- o Tested 44 valves at degraded voltage conditions.
- o Refurbished 125 safety related MOVs and 240 non safety related MOVs.
- o Completed a PRA ranking of the GL 89-10 MOVs. This ranking is used to prioritize MOV activities by providing a graded approach to the implementation of GL 89-10 recommended actions.

ATTACHMENT D

COMPLETION STATUS OF GL 89-10 PROGRAM

No. of GL 89-10 MOV	143
Baseline Tests Completed ^{1,3}	45
To Go	66-98 ²
High PRA Non GL 89-10	3
DP Test Completed ⁴	37
To Go	39

1. A total of 121 of 143 MOVs have been diagnostically tested. 77 tests have been done using direct thrust measuring sensors. Of the 77 completed baseline tests, 45 MOVs have been set up to the revised engineering standards.
2. It is expected that most of the 32 valves set up to the old engineering criteria with direct thrust measuring sensors are adequately set based on:
 - a) A dp test having been done which verifies the MOV will operate at design basis conditions or...
 - b) The MOV is set high enough in the thrust window such that it meets the current engineering standard requirements.

An evaluation of each of the 32 tests will be conducted in the near future.

3. These numbers do not include any retests which have to be done due to the results of the high ambient temperature evaluation of AC motors which is currently ongoing.
4. A total of 58 of the 143 MOVs have been dp tested. Some tests were inconclusive due to low dp or test data using the MOVATS TMD methodology.

MOV activity to date:

ORIGINAL GL 89-10 COMMITMENTS							1 YR
Actual					Total	Sched	EXT
	1990	1991	1992	1993		1994	1995
Baseline Tests	43	64	57	45	209	40 ⁶	29
DP Tests	0	22	26	25	73	31 ⁵	8

5. Some dp procedures have not been written for these MOVs, therefore some MOVs may prove impracticable to test.
6. Includes three non GL 89-10 MOVs with a high PRA ranking.

TABLE 1

**GL 89-10 PROGRAM VALVES
GRADED APPROACH**

EPN	MEDP	VLV SIZE/RT	VLV TYPE	MANUFAC
CAC-V-2	35	4",150#	FWG	Velan
CAC-V-4	35	4",150#	FWG	Hirata
CAC-V-6	35	4",150#	FWG	Velan
CAC-V-8	35	4",150#	FWG	Velan
CAC-V-11	35	4",150#	FWG	Velan
CAC-V-13	35	4",150#	FWG	Velan
CAC-V-15	35	4",150#	FWG	Velan
CAC-V-17	35	4",150#	FWG	Velan
CIA-V-30A	0	0.75",1500#	Y-GLOBE	BW
CIA-V-30B	0	0.75",1500#	Y-GLOBE	BW
FPC-V-149	0	6",150#	FWG	Hirata
FPC-V-153	0	6",150#	FWG	Velan
FPC-V-154	0	6",150#	FWG	Velan
FPC-V-156	0	6",150#	FWG	Velan
MSLC-V-1A	54	1.5",1500#	SWG	BW
MSLC-V-1B	54	1.5",1500#	SWG	BW
MSLC-V-1C	54	1.5",1500#	SWG	BW
MSLC-V-1D	54	1.5",1500#	SWG	BW
MSLC-V-2A	57	1.5",1500#	SWG	BW
MSLC-V-2B	57	1.5",1500#	SWG	BW
MSLC-V-2C	57	1.5",1500#	SWG	BW
MSLC-V-2D	57	1.5",1500#	SWG	BW
MSLC-V-3A	57	1.5",1500#	SWG	BW
MSLC-V-3B	57	1.5",1500#	SWG	BW
MSLC-V-3C	57	1.5",1500#	SWG	BW
MSLC-V-3D	57	1.5",1500#	SWG	BW

EPN	MEDP	VLV SIZE/RT	VLV TYPE	MANUFAC
MSLC-V-4	43	1.5",1500#	SWG	BW
MSLC-V-5	43	1.5",1500#	SWG	BW
MSLC-V-9	43	1.5",1500#	SWG	BW
MSLC-V-10	14.7	1.5",1500#	SWG	BW
RCIC-V-50	54	2", 1500#	Y-GLOBE	BW
RCIC-V-69	36.7	1.5",1500#	SWG	BW
RCIC-V-110	28	2",1500#	SWG	BW
RCIC-V-113	28	2",1500#	SWG	BW
RHR-V-134A	28	2",600#	Y-GLOBE	BW
RHR-V-134B	28	2",600#	Y-GLOBE	BW
SGT-V-3A1	0.04	18"	BUTTERFLY	BIF
SGT-V-3A2	0.63	18"	BUTTERFLY	BIF
SGT-V-3B1	0.63	18"	BUTTERFLY	BIF
SGT-V-3B2	0.04	18"	BUTTERFLY	BIF
SGT-V-4A1	0	18"	BUTTERFLY	BIF
SGT-V-4A2	0	18"	BUTTERFLY	BIF
SGT-V-4B1	0	18"	BUTTERFLY	BIF
SGT-V-4B2	0	18"	BUTTERFLY	BIF
SGT-V-5A1	0.62	18"	BUTTERFLY	BIF
SGT-V-5A2	0.62	18"	BUTTERFLY	BIF
SGT-V-5B2	0.62	18"	BUTTERFLY	BIF
SGT-V-5B2	0.62	18"	BUTTERFLY	BIF

DEFINITIONS

FWG - flexible wedge gate

SWG - solid wedge gate

BW - Borg Warner

BIF - BIF (a unit of General Signal)

TABLE 1

NOTES

CRITERIA

A valve to be subjected to a graded approach in the implementation of the recommend actions of GL 89-10 must be able to satisfy the following screening criteria:

Gate and Globe Valves

- o Set up statically to a valve factor of 0.8 for gate valves and 1.1 for globe valves.
- o Add 30% margin for rate of loading.
- o The effect of differential pressure on the valve is less than the calculated packing load.

Butterfly Valves

- o Butterfly valves shall have a differential pressure of less than one psid.

All Valves

- o Have a PRA sensitivity effect on a core melt frequency of less than 1.89×10^{-6} events/year.

BASIS

A PRA ranking was prepared for those MOVs with a Fussell-Vesely importance greater than 2×10^{-6} . This list provides a quantitative assessment of WNP-2's MOVs based on plant specific PRA results. As the NRC staff presented at the public workshop held in Phoenix in February 1993, MOV testing should be prioritized based on plant PRA results.

The PRA was used to identify those MOVs to be further evaluated. Industry and plant specific experience shows that valves set up in accordance with the criteria described will operate reliably. This is primarily due to the low differential pressure across the valve and the small valve size. The decision as to which valves are not tested insitu under design conditions is based on available adequate margin and not PRA results. However, the PRA results do support the selection of the valves.

Table 2

SCHEDULE

	NO.	STAGE I TESTING	STAGE II EVALUATION
GL 89-10 MOVs	87	Testing complete by 6/94 (end of R-9)	As industry information becomes available (original commitment to GL 89-10).
GL 89-10 MOVs Graded Approach (Table 1 MOVs)	48	Baseline Testing only, complete by 6/95 (end of R-10)	NA
Retest GL 89-10 MOVs	8	Baseline and DP Testing by 6/95 (end of R-10)	As industry information becomes available
Non GL 89-10 MOVs important to safety (RFW-V-112A, RFW-V-112B, RFW-V-118)	3	Baseline Test by 6/94 (end of R-9)	NA

