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Reference: 1. Request for Additional Information, Letter dated March 17, 1999,
Fields (NRC) to Levine (APS)

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Docket Nos. STN 50-528/529/530
Reponse to Request for Additional Information
Regarding Generic Letter 96-05

Reference 1 requested APS to provide additional information to complete the GL 96-05, Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves, review for the Palo Verde Nuclear Generating Station. Enclosed is APS' response to your request for additional information. No commitments are being made to the NRC by this letter.

If you have any questions, please contact Scott A. Bauer at (623) 393-5421.

Sincerely,

AD73

JML/SAB/JAP/mah

Enclosure

cc: E. W. Merschoff
M. B. Fields
J. H. Moorman

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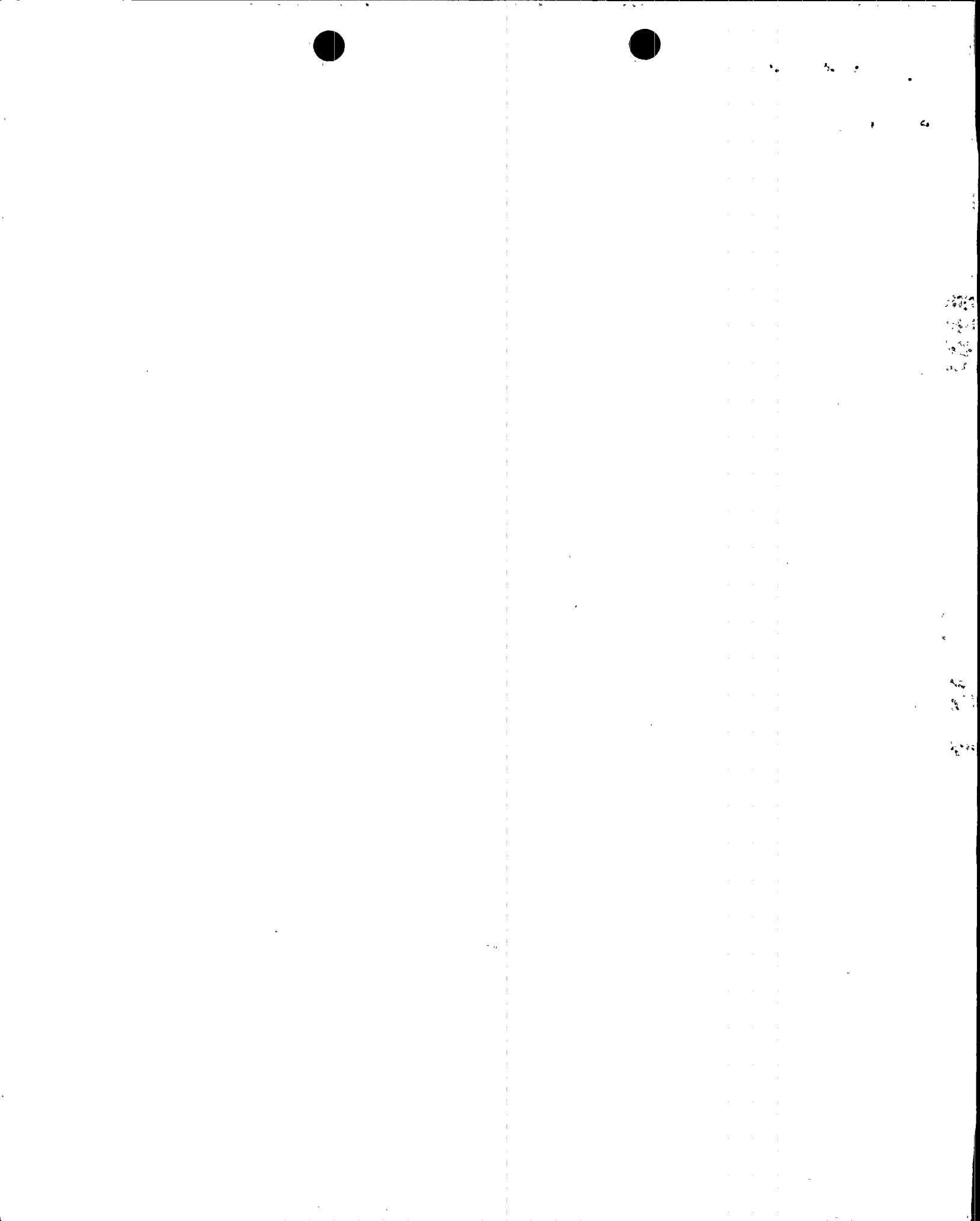
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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REGARDING GENERIC LETTER 96-05, PERIODIC

VERIFICATION OF DESIGN-BASIS CAPABILITY OF SAFETY-

RELATED MOTOR-OPERATED VALVES



• Each of the questions from the RAI is repeated below, followed by the APS response:

1. In NRC Inspection Report No. 50-528, 529, & 530/96-15, the NRC staff closed its review of the motor-operated valve (MOV) program implemented at the Palo Verde Nuclear Generating Station (Palo Verde) in response to Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." In the inspection report, the NRC staff noted certain aspects of the licensee's MOV program that would be addressed over the long term. For example, the NRC staff noted that the licensee (1) had not completed its documentation of the final data reconciliation that forms the basis for GL 89-10 program completion; (2) intended to justify its use of hydrostatic testing to determine valve-specific performance in the final program documentation; and (3) intended to revise the diagnostic test acceptance criteria to evaluate unwedging capability, extrapolated to design-basis conditions. The licensee should describe the actions taken to address the specific long-term aspects of the MOV program at Palo Verde that were noted in the NRC inspection report.

APS Response:

(1) The final data reconciliation is documented in Engineering Study 13-MS-B07. The purpose of this study was to validate the design basis performance parameter bounding values used as inputs to Calculation 13-JC-ZZ-201, "MOV Thrust, Torque, and Actuator Sizing Calculation" for calculating the Generic Letter 89-10 MOVs' thrust/torque requirements to operate under design basis conditions. This study documents the test data used as the basis to validate the performance parameter bounding value.

(2) Valve Factor assumptions in some cases utilize test data acquired under hydrostatic differential pressure (DP) test conditions. In this type of test, the valve is positioned closed and the upstream side of the disc is pressurized relative to the downstream of the disc. Diagnostic test results show a dynamic loading region, following unwedging, during which time the disc is stroking against the differential pressure. From this dynamic loading region a Valve Factor value is determined, and in some cases, applied to flowing dynamic conditions for determining the minimum thrust requirement to overcome the DP. Figure 2-18 of EPRI Report TR-103229-V1 compares the friction coefficients determined under hydrostatic DP conditions to those determined under flowing conditions. A best-fit line of the data illustrates the close similarity between the results using the two different test methods for determining friction coefficients. Based upon this comparison, use of hydrostatic data as the test basis for the opening Valve Factor is justified.

(3) A design allowable unwedging thrust limit has been developed and applied to GL 89-10 gate valves. The design allowable unwedging thrust limit is based on the limiting thrust/torque rating of the Motor Operated Valve (MOV) valve, actuator or motor. The

- valve and actuator torque limits are based on the vendor stress/weak link reports. By adjusting the design allowable unwedging thrust limit for test equipment and transducer error, a controlled static unwedging setpoint is established to check against the unwedging thrust during static testing of MOVs.

2. In a letter dated March 18, 1997, in response to GL 96-05, the licensee reported that (1) actuator output degradation margin would not be included for MOVs that use the Electric Power Research Institute's (EPRI) MOV Performance Prediction Model (PPM); and (2) that MOVs with large calculated margins would not be dynamically tested in the future and would not have any additional valve degradation margin added to the design-basis requirements. The Joint Owners Group (JOG) MOV Periodic Verification Program consists of three phases: (1) the interim MOV static diagnostic testing program; (2) an MOV dynamic testing program over the next 5 years; and (3) the long-term periodic test program. The NRC staff considers a licensee's commitment to the JOG program to include all three phases unless otherwise specified. Where a licensee that has committed to implement the JOG program proposes to implement a different approach, the licensee will be expected to notify the NRC and to provide justification for the proposed alternative approach. Arizona Public Service Company's letter of March 18, 1997, implies that the JOG long-term program might not be followed for some MOVs. The licensee should clarify its commitment to the JOG program or justify its long-term periodic verification program for those MOVs that will not follow the JOG program recommendations.

APS Response:

PVNGS intends to fully implement the recommendations of the JOG program, as explained in the letter dated July 19, 1998, "Response to Safety Evaluation for Joint Owners' Group Program on Periodic Verification of Motor-Operated Valves."

3. In a letter dated July 19, 1998, the licensee updated its commitment to implement the JOG MOV Periodic Verification Program and stated that the interim MOV static diagnostic test program differs in some respects from the program described in Revision 2 of Combustion Engineering Owners Group (CEOG) Topical Report MPR-1807. For example, the licensee's interim MOV static diagnostic test program allows all valves to be tested only once every two refueling outages as compared to the every outage frequency recommended by the JOG interim MOV static diagnostic test program for high-risk valves with low margins. The licensee also noted that the two-cycle frequency could be extended based on valve performance and available margins. In the NRC safety evaluation dated October 30, 1997, on CEOG Topical Report MPR-1807 describing the JOG program, the NRC staff stated that MOVs with scheduled

test frequencies beyond 5 years will need to be grouped with other MOVs that will be tested on frequencies less than 5 years in order to validate assumptions for the longer test intervals. The NRC staff stated that this review must include both valve thrust (or torque) requirements and actuator output capability. The licensee should describe how its MOV static diagnostic testing program will satisfy this condition of the NRC safety evaluation on the CEOG topical report.

APS Response:

Static diagnostic testing remains on a 2 cycle (36 month) frequency. There are a few exceptions, which are justified and documented in accordance with station procedures and meet the existing Generic Letter 89-10 guidelines. None of these exceptions extend the testing frequency beyond 5 years. A proceduralized program for extending frequencies has not been implemented and is awaiting the completion of a risk ranking and the availability of sufficient supporting trend data. PVNGS has stated that the JOG program will be implemented, which includes the requirements from the NRC safety evaluation for extending test frequencies.

4. The JOG program specifies that the methodology and discrimination criteria for ranking MOVs according to their safety significance are the responsibility of each participating licensee. In a letter dated March 18, 1997, the licensee stated that it was developing a new risk ranking study that uses a blend of probabilistic and deterministic methods that will be used to adjust test frequencies, test methods, and maintenance schedules. As Palo Verde's units are pressurized water reactors (PWRs) designed by Combustion Engineering (CE), the licensee should describe the methodologies used for risk ranking MOVs at Palo Verde in detail, and provide a list of the high-risk MOVs at Palo Verde, if any. In responding to this request, the licensee might apply insights from the guidance provided in the Westinghouse Owners Group (WOG) Engineering Report V-EC-1658-A (Revision 2, dated August 13, 1998), "Risk Ranking Approach for Motor-Operated Valves in Response to Generic Letter 96-05," and the NRC safety evaluation dated April 14, 1998, on the WOG methodology for risk ranking MOVs at Westinghouse-designed PWR nuclear plants. The licensee could also obtain insights from an MOV risk-ranking methodology developed by the Boiling Water Reactor Owners Group.

APS Response:

As described in APS' letter dated July 19, 1998, "Response to Safety Evaluation for Joint Owner's Group Program on Periodic Verification of Motor-Operated Valves (in response to Generic Letter 96-05)," PVNGS does not currently use risk ranking criteria in establishing static test frequencies. PVNGS is in the early stages of developing a



formal risk ranking of GL 89-10 MOVs, which takes advantage of recent improvements in the PVNGS PRA model as well as industry experience in this area. For GL 89-10 motor operated valves modeled in the PVNGS PRA model, contribution to risk will be calculated using both the Level 1 and Level 2 PRA models. An expert panel will review these results along with additional appropriate input (such as fire and shutdown risk studies) to develop a final risk ranking. The PVNGS methodology will be similar to the methodology used by the Westinghouse Owners Group, with the exception of the cross-comparison of results. The CEOG is currently considering whether to perform a cross-comparison of GL 89-10 MOV risk ranking between CE plants. The availability of cross-comparison information for PVNGS is dependent on the outcome of CEOG's decision. When the process is complete and the results have been reviewed and approved by the expert panel, PVNGS would be able to supply a list of high risk valves to the NRC.

5. The licensee should briefly describe its plans for the use of test data from the motor control center (MCC) including (1) correlation of new MCC test data to existing direct force measurements; (2) interpretation of changes in MCC test data to changes in MOV thrust and torque performance; (3) consideration of system accuracy's and sensitivities to MOV degradation for both output and operating performance requirements; and (4) validation of MOV operability using MCC testing.

APS Response:

PVNGS currently does not use MCC testing, and there are no current plans to buy test equipment or implement a MCC test program.

6. The JOG program focuses on the potential age-related increase in the thrust or torque required to operate valves under their design-basis conditions. In the NRC safety evaluation dated October 30, 1997, on the JOG program, the NRC staff specified that licensees are responsible for addressing the thrust or torque delivered by the MOV motor actuator and its potential degradation. The licensee should describe the plan at Palo Verde for ensuring adequate ac and dc MOV motor actuator output capability, including consideration of recent guidance in Limitorque Technical Update 98-01 and its Supplement 1.

APS Response:

The guidance from Limitorque Technical Update 98-01 and Supplement 1 have been incorporated into the calculation for establishing MOV thrust setpoints, and the GL 89-10 MOVs have been evaluated for continued operability.

To ensure the safety-related MOVs will remain operable until the next scheduled static test, any MOVs that are found outside the expected thrust/torque setpoint range are



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- 2 • evaluated in accordance with station procedures. In addition, the MOV trending program will monitor the results of static testing to identify long term trends and the results of these trends will be incorporated into the MOV thrust/torque setpoints and/or maintenance practices as appropriate.

