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ILLINOIS POWER COMPANY



CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

August 15, 1986

Docket No. 50-461

Mr. James G. Keppler  
Regional Administrator  
Region III  
U. S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Subject: Reportable 10CFR50.55(e) Deficiency 55-86-04:  
Modification of Limiter Plates on Limitorque  
Valve Operators

Dear Mr. Keppler:

On July 15, 1986, Illinois Power Company (IP) notified Mr. F. Jablonski, NRC Region III (Ref: IP Record of Coordination Y-202787, dated July 15, 1986) of a potentially reportable deficiency identified during motor operated valve analysis and testing system (MOVATS) involving safety-related Limitorque valve system operators that could not achieve the required thrust as recommended by the valve manufacturer. To achieve the recommended thrust, the limiter plates were modified (shaved), with vendor concurrence, to allow the torque switch to be set above the maximum vendor recommended range. This action invalidated the equipment qualification of the subject Limitorque valve operators. The equipment qualification requires that the operators not stall down to 90% of rated voltage. Testing performed subsequent to the plate modifications determined that this requirement could not be met.

Our investigation of this matter is continuing. Illinois Power has reviewed and evaluated the findings associated with this investigation to date, and has determined that the failure of these motor operated valves to perform as qualified could have adversely affected the operability of three (3) emergency core cooling systems plus shutdown service water and fire protection systems. Additionally, a review was performed by Illinois Power's Independent Safety Engineering Group's (ISEG) Report which documents their review of problems identified during MOVATS. This report states that, "If MOVATS testing had not been performed, it is likely that operational reliability of the affected systems would have been adversely impacted." An extensive engineering evaluation would be required to

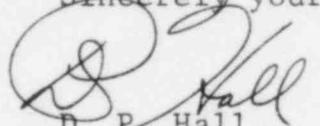
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determine the effect of these deficiencies on the associated systems to perform their required safety function, if uncorrected. On this basis, the subject deficiency, which considered the cumulative effects of the deficiencies identified during MOVATS testing is considered to be reportable under the provisions of 10CFR50.55(e). Illinois Power is continuing to review and evaluate the cumulative impact of the deficiencies identified during MOVATS testing and adequacy of corrective actions taken, to determine if additional corrective actions are needed. This letter represents an interim report in accordance with the requirements of 10CFR50.55(e). Attachment A provides the details of our investigation to date.

We trust that this interim report provides you sufficient background information to perform a general assessment of this reportable deficiency and adequately describes our overall approach to resolve this issue.

Sincerely yours,



D. P. Hall  
Vice President

RLC/kaf

Attachment

cc: NRC Resident Office  
Illinois Department of Nuclear Safety  
INPO Records Center

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Interim Report

Statement of Reportable Deficiency/Background

On July 1, 1986, the Nuclear Station Engineering Department (NSED) initiated Condition Report (CR) No. 1-86-07-004 which documented that during the performance of motor operated valve analysis and testing system (MOVATS), several motor operated valves could not meet the manufacturer's recommended thrust values. Based on discussions between NSED and Limitorque, the limiter plates for the operators were modified (shaved) to permit increasing the torque switch setting such that the valve manufacturer's recommended thrust values could be achieved. Limitorque provided concurrence for shaving of the limiter plates with the stipulation that the operators be tested at the higher torque switch setting to ensure that the operator did not stall. Although this testing was performed by Illinois Power, it was performed at 100% of rated operator voltage, rather than 90% of rated operator voltage as required by the FSAR and equipment qualification.

Investigation Results/Corrective Action

To determine the extent of the problem, NSED conducted a review of the safety-related MOVATS data sheets. Based on this review, a total of 36 valves were identified with modified (shaved) limiter plates which could potentially stall at 90% of rated voltage.

Limitorque Corporation conducted field testing on approximately 40% of the 36 valves and projected that approximately 90% of the valves to be tested would stall at the increased torque switch settings. Consultations were held with Anchor/Darling Valve Company, Yarway Valve Company and Limitorque Corporation to determine the cause of the 36 valves which could not develop the design thrust without exceeding the recommended limiter plate range. During NSED's explanation of how the Thrust Measuring Device (TMD) functions, it was noted by the engineers representing the valve manufacturers that the design thrust which the TMD measured, already accounted for the valve stem packing load losses because the packing glands had previously been adjusted. This is based on the total thrust the valve imparts to the TMD which is diminished by the drag imparted

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on the valve stem by the valve packing. Therefore, the valve packing load losses should not have been included as part of the required thrust when performing this test. On this basis the thrust values being used by MOVATS were reduced by an amount equivalent to the packing load losses. Following adjustments to the thrust values, 25 of the 36 valves' torque switch settings fell back within the recommended limiter plate range. An additional 2 valves were previously set back into the limiter plate range, one because of maintenance rework and the other was determined to be an error in reading the torque switch setting. The remaining 9 valves were tested at 90% of their rated voltage using a variac transformer. The results of the variac test confirmed that the valves would not stall down to 90% of rated voltage. The above action restored the qualification of the 36 valves such that the requirements of the FSAR are met.

In addition to the above actions, the following remedial actions were taken to assure all consequences of the 50.55(e) were addressed:

1. During Limitorque's field tests, a concern was expressed regarding the 9 operators which were left with the torque switch settings above the normal recommended range. Limitorque has stated that although the 90% voltage tests were satisfactory the operator worm gears may be subject to increased wear due to the higher torque switch settings, and recommended that the worm gears be inspected at the first refueling outage. Maintenance Work Requests (MWRs) have been initiated to implement this action at the first refueling outage. The nine (9) affected valves and associated MWRs are listed below.

	<u>Valve No.</u>	<u>MWR</u>
1.	1CC054	C-10240
2.	1E12F042C	C-10233
3.	1VP005B	C-10236
4.	1VP015B	C-10237
5.	1VP014A	C-10238
6.	1VP014B	C-10239
7.	1E12F074A	C-10234
8.	1E12F074B	C-10235
9.	1SX173B	C-10241

2. Plant Modification M-9 was issued to evaluate the design change for the 9 valves which were left above their maximum limiter plate range.
3. NSED's "Safety Related Motor Operated Valve Data" list will be revised for the 9 valves which have as-left torque switch settings above their limiter plate and

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have passed the variac test. In these cases the maximum torque switch will be changed to reflect the as-left condition. This action will be performed on Rev. 18 of the list.

Root Cause(s)

The root cause investigation associated with this issue identified the root causes to be:

1. Bases for establishing the valve manufacturer's recommended thrust values were not initially recognized.
2. NSED incorrectly identified the Limiter Plate Modification as an internal adjustment to equipment instead of a design change. This breakdown in design control resulted in changes to Procedure 8451.02 to allow modification of limiter plates without testing at 90% undervoltage. To prevent this practice from recurring, the following actions were taken:
  - ° All NSED personnel were trained on the importance of evaluating vendor supplied equipment under the Plant Modification Program which provides Clinton's design control as required by 10CFR50, Appendix B, Criterion III.
  - ° CPS Procedure 8451.02 was revised to delete Sections 8.7.3.12.1 through 8.7.3.12.4 and add Section 8.7.3.12.1 to prohibit raising the torque switch above the limiter plate without NSED evaluation and approval.

Safety Implications/Significance

Illinois Power has reviewed and evaluated the findings associated with this investigation and has determined that the failure of these motor operated valves to perform as qualified could have adversely affected the operability of three (3) emergency core cooling systems as well the shut down service water and fire protection systems. Additionally, a review was performed of Illinois Power's Independent Safety Engineering Group's (ISEG) Report which documents their review of problems discovered during MOVATS testing. This report states that, "If MOVATS testing had not been performed it is likely that operational reliability of the affected safety-related systems would have been adversely impacted." An extensive engineering evaluation would be required to determine the effect of these deficiencies on the associated systems to perform their required safety function, if uncorrected. On this basis,

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the subject deficiency which considered the cumulative effects of the deficiencies identified during MOVATS testing is evaluated to be reportable under the provisions of 10CFR50.55(e).

Other deficiencies/defects identified during the course of MOVATS which were evaluated to be potentially reportable were referred and investigated. The reportability and required corrective actions associated with these deficiencies/defects were addressed by the following issues:

<u>ISSUE</u>	<u>SUBJECT</u>
21-85-02	Missing Space Heaters in Limitorque Operators (Not Reportable).
21-85-05	Loose Anti-Rotational Devices on Anchor/Darling Globe Valves (Reportable).
21-85-15	Defective 1/2" and 3/4" Valve Stems on Yarway Valves. (Not Reportable)
21-85-18	410 S.S. Valve Stem Corrosion Failures (Reportable).
55-86-02	Lugs Installed on Limitorque Operators (Reportable).

Illinois Power is continuing to review and evaluate the cumulative impact of the deficiencies identified during MOVATS testing and adequacy of corrective actions taken to determine if additional corrective actions are needed. It is anticipated that approximately 10 additional days will be required to complete our review and evaluation and submit a final report on the matter.