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March 3, 1994

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

Gentlemen:

Subject: Docket No. 50-362
Supplemental Response to a Notice of Violation
San Onofre Nuclear Generating Station, Unit 3

References: (1) Letter from Mr. L. Miller (USNRC) to Mr. Harold B. Ray (SCE), dated September 23, 1993

(2) Letter from Mr. L. Miller (USNRC) to Mr. Harold B. Ray (SCE), dated November 22, 1993

Reference (1) forwarded a Notice of Violation resulting from the NRC inspection conducted August 16 - 20, 1993, and documented in NRC Inspection Report No. 50-362/93-17. Reference (2) forwarded a request for additional information to support Edison's conclusion that the failure of Motor Operated Valve (MOV) 3HV4705 was an isolated occurrence, and did not imply programmatic maintenance deficiencies. The purpose of this letter is to provide the requested additional information.

A conference call was held between Edison and the NRC, on December 20, 1993, and Edison agreed to: (1) formally evaluate the valve traces previously identified with unusual trace characteristics; (2) review the specific valve failures that occurred on 3HV4705 and 3HV6371, and determine whether the GL 89-10 program should have predicted the failures; and (3) perform a material condition evaluation of valves tested under the GL 89-10 program which have undergone maintenance, to see if correlations can be made regarding valve as-found material conditions and MOV test results.

These evaluations, as discussed below, indicate that the overall reliability of the MOVs included in Edison's GL 89-10 program is sufficient for them to perform their required safety function. Notwithstanding this conclusion, Edison recognizes that our MOV

diagnostic effort must be a living program which constantly seeks out lessons learned and incorporates improvements into our program as they are identified.

The NRC's issuance of multiple supplements to the original Generic Letter 89-10 underscores that significant evolution has occurred as a result of the industry-wide lessons learned to date in this effort. A similar continual improvement has occurred and will continue to occur in Edison's program. Edison is committed to maintaining a comprehensive and effective MOV diagnostic program, based on the latest information available.

CYCLE 6 TRACE REVIEW

Edison conducted a formal qualitative review and evaluation of all 75 Cycle 6 MOV traces, and concluded that the MOVs are operable. With the exception of valves 3HV4705 and 3HV6371 which are addressed below, the review revealed that the unusual trace characteristics noted during the Cycle 6 evaluation were relatively minor in nature and represented no operability concerns.

To ensure MOV traces are promptly and properly assessed, Edison enhanced the program during the Cycle 7 outage to require the performance and documentation of qualitative trace analyses. These program enhancements require unusual trace characteristics to be evaluated and documented prior to returning the valves to service. A detailed discussion of this evaluation is provided in Attachment 1.

3HV4705 and 3HV6371

Edison reviewed the information associated with the failures of 3HV4705 and 3HV6371 to determine if they should have been predicted by the GL 89-10 program. The review determined that the failure of 3HV4705 to stroke in May 1993 was not related to the unusual trace characteristic seen in the valve signature, and the failure of the valve to stroke in May 1993 could not have been predicted. The trace anomaly was apparently due to the influence of an anti-rotation device, which did not affect the operability of the valve. The actual failure of 3HV4705 was due to a deterioration in the material condition of the valve (i.e., damage housing, water intrusion, worn gear, etc.) which is believed to have occurred or accelerated after the GL 89-10 testing. The foregoing notwithstanding, the evaluation of the valve failure identified the need for maintenance program enhancements, which have been incorporated to address the conditions found in this valve.

On the other hand, the failure of 3HV6371 to stroke in January 1993 could have been predicted under our previous program and would have been predicted under today's program. The high running loads in 3HV6371 were observed and acted upon based on the best knowledge available at the time, but were not aggressively pursued to identify a potential problem and avoid the eventual failure of the valve. Improvements in the program have been implemented to address this experience.

A detailed discussion of the evaluation of the performance of these valves is presented in Attachment 2.

MAINTENANCE CONDITION EVALUATION

To determine if the GL 89-10 program is appropriately maintaining applicable MOVs, Edison reviewed the as-found conditions of MOVs in the GL 89-10 Program for which Edison performed maintenance subsequent to design basis testing. The review checked to see if maintenance deficiencies found were consistent with the trace indications. The maintenance deficiencies found are believed to be consistent with the observed traces.

Edison has concluded that minor material condition deficiencies are typically found and corrected during MOV test preparatory work and the actual testing. As evidenced by the MOV diagnostic data recently obtained in the Cycle 7 outage, the maintenance performed as a result of MOVATs testing appears to be effective in correcting unusual trace characteristics. The details of this assessment are included as Attachment 3.

ASSESSMENT OF MOV CONDITIONS AND PROGRAM ELEMENTS

Edison performed an assessment of the MOV material conditions by: (1) a review of maintenance records; and (2) a Quality Assurance review of the program elements of the MOV program controls. The maintenance review was to determine if diagnostic test evaluations are effective in identifying equipment deficiencies and whether potential failures were identified and addressed.

The assessment results concluded that our current, upgraded program provides adequate controls to reasonably assure that material condition deficiencies are appropriately detected and corrected. The assessment also concluded that trace evaluations are performed in accordance with procedures, and are successful in identifying significant unusual trace characteristics.

The assessment showed: (1) a good correlation exists between the diagnostic evaluations and the as-found equipment conditions; and (2) corrective maintenance has generally been effective in correcting these unusual trace characteristics. The assessment

determined that there is currently no known degradation which could jeopardize valve operability. We are, however, aware that with continued industry and site experience, and management and supervisory involvement, it is likely that further information will be gained which can make our program more effective in identifying MOV problems through diagnostic testing. Edison is committed to incorporating this information as it becomes available.

CONCLUSION

Edison's GL 89-10 MOV program is continuing to be improved based upon industry, San Onofre, and regulatory experience. Edison has increased attention to the condition of motor operated valves within the GL 89-10 program, and is confident that the material condition of valves in the program is adequate to reasonably ensure the required performance of the valves upon demand.

If you have any questions or require additional information, please call me.

Sincerely,

R M Rosenblum

Enclosure

cc: K. E. Perkins, Jr., Acting Regional Administrator, NRC Region V
M. B. Fields, NRC Project Manager, San Onofre Units 2 & 3
J. Sloan, Senior Resident Inspector, San Onofre Units 1, 2&3

ATTACHMENT 1

SUBJECT: Final Assessment of Cycle 6 Motor Operated Valve Design Basis Traces.

BACKGROUND

During the July 1993 NRC Generic Letter (GL) 89-10 inspection, No. 93-17, the NRC questioned whether unusual trace characteristics existed in the previously design basis tested MOVs, and if these anomalies affected the operability of the respective MOV. In an attempt to promptly answer the NRC concerns, a preliminary informal review of the Cycle 6 MOVATS traces was performed and given to the NRC.

The review noted every instance where a trace deviated from the ideal diagnostic test response without taking specific design characteristics of the valve into consideration, or formally evaluating if the operability of the valve was impacted. In a conference call between SCE management and Region V, on December 20, 1993, SCE committed to perform a more thorough review of the Cycle 6 data to determine if the previously tested MOVs had anomalies sufficient to affect operability.

DISCUSSION

This review evaluated all Cycle 6 traces, including the 53 with unusual trace characteristics previously provided to the NRC. The reviewers examined valve drawings, vendor manuals, maintenance orders, nonconformance reports, previous diagnostic data, and Cycle 7 traces to evaluate the Cycle 6 traces with unusual trace characteristics. If maintenance or testing was performed during Cycle 7, that data was used to determine if the condition(s) noted in Cycle 6 had been corrected or improved. The valve groupings were looked at to verify consistent behavior and system performance in valves of similar design. In addition, the assessment was performed to reverify that no operability concerns existed.

The Station Procedure SO23-V-3.50 "Technical Guidelines for Evaluating MOV Data" was used, in part, for performing this assessment. The following common anomalies were identified in one or more valves during the review and additional assessments performed:

1) Cyclic Loading (TMD and MC) - An evaluation was performed to identify the location of the mating components that correlated to the cycling frequency. A determination was made as to whether the magnitude was detrimental to valve operability. No operability concerns were identified.

2) Unusual trace characteristics at Seating or Unseating - Vendor drawings, valve groupings and system conditions

were reviewed to assess the unusual trace characteristics identified in order to determine if these unusual trace characteristics were a result of a degradation mechanism or an expected response due to the valve design. A quantitative assessment that no operability concerns existed was performed and verified.

3) Running load (increasing/decreasing/high) - All running loads were quantitatively evaluated for all Cycle 6 MOVs to verify that no operability concerns existed. No operability concerns were identified.

4) Hitting mechanical stops (butterfly valves) - Vendor drawings, valve groupings and system conditions were reviewed to assess the anomaly identified. A quantitative assessment that no operability concerns existed was performed and verified.

5) Spring pack gap - The quantitative evaluation (MDRF) performed by the MOVATS technician accounts for spring pack gap when establishing the "zero" reference point. In addition, procedural changes were instituted for Cycle 7 to reduce the occurrence of this anomaly by incorporating guidelines for the amount of spring pack gap.

6) Loose worm bearing locknut or stem rotation - An evaluation was performed to determine the severity of the condition. This condition is only seen in the opening direction on the load cell trace during calibration. The effect was small in magnitude and in a portion of the calibration which did not impact test results. It was concluded the event has no bearing on valve operability.

7) Signal noise (TMD and MC) - All noise was identified as existing following motor shut off.

8) Increased loads seen at end of opening stroke - An evaluation was performed to determine the severity of the condition. A quantitative assessment was performed to see if any weak link setpoints would be challenged and no operability concerns existed. No weak link or operability concerns were identified.

9) Bent stem or valve misalignment - An evaluation was performed to determine the severity of the condition. A quantitative assessment was performed and verified that no operability concerns existed.

10) Hammering - An evaluation was performed to determine the severity of the condition. A quantitative assessment was performed and verified that no operability concerns existed.

The review established four groups to categorize the results of the trace signatures evaluation. The following defines the trace categories and number of occurrences that fell in each:

1) No unusual trace characteristics identified. No other actions required except to monitor and trend at next PM interval. Number in this Category = 17.

2) Minor unusual trace characteristics identified. Evaluated as being minor and do not affect valve operability. No further action required. Trend for degradation in our trending program and monitor at next PM interval. Number in this Category = 50.

3) Minor unusual trace characteristics identified. Evaluated as being minor and do not affect operability. MOs written to correct problem. Number in this Category = 8.

4) Serious trace anomalies identified. Valve is inoperable. Number in this Category = 0.

CONCLUSION

All Cycle 6 MOV traces have been qualitatively reviewed and evaluated with the conclusion that the MOVs are operable. The review found that the unusual trace characteristics noted during the Cycle 6 evaluation were relatively minor in nature and represented no operability concerns or nonconformances.

During the course of this more formal evaluation, maintenance orders were written for any MOV with signatures exhibiting an indication which required follow up action (Category 3 above). To ensure trace assessments are promptly and properly assessed, program enhancements requiring the performance and documentation of qualitative trace analyses were placed in effect during the Cycle 7 outages. These program enhancements require unusual trace characteristics to be addressed prior to returning valves to service.

ATTACHMENT 2

SUBJECT: Evaluation of 3HV4705 and 3HV6371

BACKGROUND

In May 1993, Auxiliary Feedwater valve 3HV4705 failed to stroke open during testing of the plant protection system. In January 1993, Containment Emergency Cooler valve 3HV6371 failed in mid-closing stroke during normal realignment of the component cooling water system. Both of these valves had been setup and tested in accordance with the then existing Generic Letter 89-10 program during the Unit 3 Cycle 6 refueling outage. The in-service failure of these valves was unexpected and raised questions pertaining to the Generic Letter 89-10 program.

This evaluation is to examine the failures of the two valves and determine whether their failures should have been predicted by the 89-10 MOV program.

DISCUSSION

Auxiliary Feedwater (AFW) Valve 3HV4705

3HV4705 is a 4 inch, WKM globe valve. The valve was design basis tested in the Cycle 6 (March 22, 1992) refueling outage. Since that time, the valve had been regularly, and successfully, surveillance tested with no maintenance performed until the documented failure to stroke during surveillance testing in May 1993. An investigation revealed that the valve was stuck in the closed position. The valve was opened with the use of a leverage device and subsequent operation exhibited no problems. NCR 93050059 was generated to document the failure to stroke and specify corrective action. Examination of the valve, stems, actuator, and yoke assemblies revealed the following:

1) the yoke nut was loose.

2) the anti-rotation locknut was loose.

3) the top bearing cover was warped.

4) the actuator grease was contaminated with water.

5) the upper and lower bearings and races, along with the worm, were worn/pitted.

6) the worm gear was worn.

The worn or damaged parts were replaced and the loose nuts were tightened. The valve was statically tested and placed back in service on May 23, 1993. The static MOVATS test indicated cyclic loading during both the open and close stroke. Examination of past traces revealed the observed loading had previously existed.

As directed by NCR 93070165, the valve was scheduled for static testing to ensure that the mechanism causing the cyclic loading was not affecting the ability of the valve to perform its safety function. During the setting of the valve in August 1993, in preparation for the test, a portion of the anti-rotation device was broken. A new anti-rotation device was built and installed. Testing conducted following replacement of the anti-rotation device, revealed the cyclic loading had been eliminated.

The design of the anti-rotation device is such that a striker arm connected to the valve stem travels between, and in contact with, guide rails. This contact can, and does, have an influence on the MOVATS trace.

The unusual trace characteristic was apparently due to the influence of the anti-rotation device, though this device had no bearing on the failure of the valve to stroke. There are a number of valves identical to 3HV4705 in size and service and yet a larger number of valves of different sizes and service which incorporate an anti-rotation device. Comparing available test data from this population of valves reveals other instances of where the anti-rotation device exerts a cyclic type loading on the valve. Although most valves with anti-rotation devices do not exhibit a valve signature of the characteristic and magnitude seen on 3HV4705, the interaction of the device can affect the signature without unduly affecting the capability of the valve to perform its design function.

During the Cycle 7 refueling outages, a number of the anti-rotation devices were lubricated. The results have been a decrease in the occurrence and magnitude of the loading related to the anti-rotation device.

A single precise cause of 3HV4705 failing to open could not be determined despite completing a thorough investigation. The contamination of the grease, by water, and the warped upper bearing housing are believed to have been contributing factors to the failure. Review of the maintenance and operating history of similar valves in the AFW system indicate that this event is an isolated occurrence. Nonetheless, Edison has captured this unique experience and the following program enhancements have been implemented:

1) A stem lubrication will be performed on each valve in the 89-10 program each refueling outage.

2) The spring pack will be removed to inspect the condition of the actuator grease at the worm/worm gear interface during the periodic diagnostic test.

In addition, a requirement to inspect SMB-000 upper bearing housing covers for flexing/warping while the valve is closed will be implemented prior to Cycle 8.

An in-depth review of the maintenance history indicates the existence of the unusual trace characteristic in the MOVATS traces for 3HV4705 was an observed and accepted phenomenon. Its continued existence did not pose a risk to valve operability nor contribute to the failure to stroke. It is concluded that the failure of the valve to stroke in May 1993 was not related to the unusual characteristics seen on the valve signature. Based upon signature analysis, the failure of the valve to stroke in May could not have been predicted.

Emergency Cooler Unit (ECU) valve 3HV6371

3HV6371 is a 10x8x10 WKM gate-segment style gate valve. The valve is installed in the component cooling water return line from a containment Emergency Cooling Unit. There are 8 valves in identical service to this valve in each unit. Numerous other valves of this type exist throughout the units, though of different size and service.

3HV6371 has a history of MOVATS test anomalies (principally high running loads) and maintenance in an effort to resolve these anomalies. In February 1987, the supply breaker to the valve opened and a subsequent investigation revealed a failed motor. The motor was replaced and the valve returned to service. Post maintenance diagnostic testing concluded the valve had a bent stem and maintenance orders were prepared to rework the valve stem. In June of 1988, the valve was reworked and the stem was replaced. However, the removed stem was found to be acceptable and running indications, which could be interpreted as indicative of a bent stem, continued to be seen. Maintenance orders were prepared to perform work on the actuator to improve valve performance. The maintenance orders were subsequently canceled when further evaluations concluded the actuator was not the likely source of the indications.

The valve had MOVATS diagnostics testing performed in April 1992 (combined DBT MOVATS and EQ) and unusual running load traces were observed. Based on the high running loads observed, Maintenance order 92091984 was generated. Prior to this MO being scheduled and worked, in mid-January 1993, and during a routine re-alignment of the CCW system, the valve failed in mid-stroke. In accordance with the Technical Specifications, the valve was placed in its safety position (open) and power removed.

In April 1993, the motor was replaced. During the performance of the motor replacement (MO 93012262), an actuator inspection

revealed a void in the grease at the worm/worm gear interface. The void was caused by the high speed of the worm, approximately 5000 RPM, slinging the grease away and the grease not returning quickly. This void caused excessive friction and damage to both gears. MO 93040485 was initiated to rebuild the actuator.

In addition, procedures were revised to replace EP-1 grease with EP-0 to reduce the chances of grease voids. Subsequent MOVATS testing still indicated high running loads. Testing was suspended and MOs were initiated to inspect the valve internals during the Cycle 7 outage. The valve was declared inoperable, placed in its safety position (thereby restoring operability for the system) and left in that configuration until the Cycle 7 refueling outage when the valve internals could be inspected.

3HV6371 was disassembled and inspected during the Unit 3 Cycle 7 outage. The inspection revealed that a shoe was missing, the gate and segment were installed reversed, a skirt was installed upside down, the upstream and downstream skirts were reversed and one locking arm was damaged. NCR 93110055 documents the condition and repair of the valve. Upon repair, post maintenance MOVATS testing indicated the running anomalies seen previously had been eliminated.

Due to its unusual and complicated construction, a WKM gate and segment valve provides a MOVATS signature trace quite unlike solid or flexible wedge gate valves. This complicates the interpretation of test data for this population of valves. As noted previously, there are a large number of valves of this construction in service in Units 2 and 3 and quite a large body of test data has been accumulated. Comparing the data for 3HV6371 with other valves of its type, indicates 3HV6371 had a signature significantly different from the others. As noted in the introduction, the program had not been developed enough, prior to the Cycle 7 outages, to methodically and aggressively pursue this type of indication to satisfactory resolution.

With the MOV program as it presently exists, the anomalies noted in the traces for 3HV6371 would be pursued until the cause was determined and corrected. Procedural requirements established prior to the Unit 3 Cycle 7 refueling outage now require a formal qualitative trace evaluation and an operability assessment--compared to acceptance criteria--be performed prior to a valve being returned to service following testing. Such an evaluation is now required for all valves within the GL 89-10 population following any diagnostic testing.

SUMMARY

The non-standard characteristics in the 3HV4705 trace were not related to the failure of the valve to stroke. As such, no program deficiency at the time led to the failure of this valve. The failure of 3HV4705 to stroke in May of 1993 was not related to the loading seen on the valve signature. Based upon signature analysis, the failure of the valve to stroke in May 1993 could not have been predicted.

Improvements in the program implemented since Cycle 6 would have caused the following to happen today:

1) The qualitative trace review would have resulted in an immediate investigation into the cyclic loading.

2) The anti-rotation device phenomenon has been recognized and corrective measures identified. Both the characteristics and the corrective actions will be procedurally captured in Edison's MOV program.

The failure of 3HV6371 to stroke in January 1993 could have been predicted, had the program, at that time, been developed to today's standards. The high running loads in 3HV6371 were observed and acted upon based on the best knowledge available at the time, but were not aggressively pursued to identify and avoid it's eventual failure.

It was decided to place the valve back in service after disassembly and maintenance had failed to identify and correct the problem. There were no programmatic restrictions, at the time, which prevented the valve from being placed back into service. These efforts did not correct the problem and the valve failed. Improvements in the program have been implemented to prevent this from recurring. Specifically:

1) There is now a running load acceptance criteria. An NCR and a formal engineering evaluation is now required before the valve is returned to service with running loads above the acceptance criteria.

2) The unique MOV characteristics of a WKM valve have been captured in the trace evaluation procedures.

With the MOV program as it presently exists, the anomalies noted in the traces for 3HV6371 would have been pursued until the cause was determined and corrected.

Additionally, the following program improvements have been incorporated into Edison's GL 89-10 program to prevent recurrence of events like 3HV4705 and 3HV6371:

1) The performance and documentation of a qualitative trace review.

2) The anti-rotation device phenomenon has been embedded into the plant experience knowledge bank of MOV characteristics.

3) A running load acceptance criteria is currently in use which will be replaced in the future with a value for minimum available seating thrust. If either of these specified criteria are not met, a formal engineering evaluation is required.

4) Unique MOV characteristics of a WKM valve have been captured in the trace evaluation procedures.

5) Stem lubrication is performed each refueling outage.

6) Spring packs are removed to inspect the condition of the actuator grease at the worm/worm gear interface.

7) A requirement to inspect SMB-000 valve upper bearing housing covers for flexing/warping while the valve is closed will be implemented prior to Cycle 8.

ATTACHMENT 3

SUBJECT: Material Condition Evaluation of MOVs

BACKGROUND

Diagnostic testing of motor operated valves (MOV) within the SONGS Generic Letter 89-10 program began with the Cycle 6 refueling outages. The maintenance history for valves within the GL 89-10 program has been reviewed from the Cycle 6 refueling outage to present, including all maintenance orders for these valves generated from test diagnostics being evaluated. The objective of this review was to determine if diagnostic test evaluations are effective in identifying equipment deficiencies and whether potential failures were able to be predicted.

DISCUSSION

Of the 186 valves within the generic letter valve population at SONGS Units 2 & 3, 89 valves in Unit 2 and 87 valves in Unit 3 have been statically or dynamically tested since inception of San Onofre's generic letter 89-10 test program. Dynamic tests are conducted to demonstrate the design basis capability of the valve while static tests are conducted in support of the dynamic basis tests or as a post maintenance verification of operability. Of the valves tested, signature trace evaluations have resulted in maintenance on 20 valves with maintenance scheduled for seven additional valves. In general, the signature trace indications can be grouped into the following categories:

1) Unexpected running or seating loadings

   Investigation revealed wear on valve internal components. The majority of these instances were observed on WKM gate-segment model gate valves with wear noted on interfacing surfaces of the gate and segment and on the guide rails or inconel springs. Replacement of the components or reworking of the components generally eliminated the indication or reduced its severity to a level where no operability concerns existed. An exception to this is 3HV6371 where the signature indications were erroneously interpreted as a bent stem rather than improper valve assembly. (Refer to Attachment 2)

2) Higher than expected pullout torques

   The pullout torque for a rising-rotating stem valve was found higher than expected. The valve stem was cleaned and the valve re-packed. Subsequent testing indicated little change in the pullout torque. Comparison of the valve's behavior with similar valves revealed the

observed pullout torque is characteristic of this style of valve. This characteristic of rising rotating type valves has been included in Site procedures.

3) Higher than expected motor current

The motor current was observed to be higher than expected. The motor was found to be degraded. It was replaced and proper running currents were subsequently obtained.

4) Re-closure of the torque switch

Several instances of torque switch re-closure (hammering) were observed. The gear train was examined for looseness which would have permitted relaxation of the gear train permitting torque switch re-closure. No such looseness was found; however, the spring packs in these valves were noted to be very stiff resulting in very little inertial compression. Thus, any relaxation of the spring pack permitted the torque switch to re-close. An evaluation was performed to determine the severity of these conditions. A quantitative assessment was performed and verified that no operability concerns existed.

In one case where sufficient inertial compression could not be obtained, the effect of the hammering was evaluated and the valve determined operable. A replacement of the spring pack with a lighter model is scheduled.

5) Seating/unseating interaction

Several instances of seating or unseating interactions have been noted where the phenomenon is higher than expected, but does not represent an operability concern. These instances have been scheduled for rework in subsequent outages for those valves where the condition has been evaluated to be potentially correctable and not a normal characteristic of the valve.

6) Cyclic loading

Cyclic loading has been noted in the traces of several valves. In most cases, the cause of the observed loading involves the actuator gear train. In a few instances, the cause is due to the interaction of the valve's anti-rotation device with the valve yoke. The loading seen with 3HV4705 was eliminated by replacing

the anti-rotation device (see Attachment 2). In other instances, lubrication of the device reduced or eliminated the loading. Where the cyclic loading has not been eliminated, the extent of the loading has been evaluated to not represent an operability concern and the cyclic loading will be trended.

CONCLUSION

Valve diagnostic traces are currently evaluated quantitatively and qualitatively in accordance with existing Site procedures. The evaluations, performed in accordance with these procedures, are successful in identifying significant anomalies, and an excellent correlation exists between the diagnostic evaluation and the as-found equipment conditions. Corrective maintenance has generally been effective in correcting these anomalies. As Edison gains more knowledge of MOV problems and unique characteristics through site and industry experience, we will continue to incorporate these lessons learned into our MOV program.