

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Mr. B. D. Withers
Executive Officer

November 30, 1988

WM 88-0312

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Reference: Letter dated October 19, 1988 from L. J. Callan, NRC to
B. D. Withers, WCNOG
Subject: Docket No. 50-482: Response to Violations 482/88200-01,
03, 04, 05 and 06

Gentlemen:

This letter provides Wolf Creek Nuclear Operating Corporation's (WCNOG) response to the five violations documented in the Reference. The violations involved failure to take adequate corrective actions (482/88200-01) inadequate procedures (-03), failure to establish procedures (-04), failure to provide inspection (-05) and failure to follow procedures (-06). The Reference provided the NRC's enforcement assessment of the findings from the Quality Verification Function Inspection (QVFI) conducted in June 1988. The QVFI findings covered activities that were performed between 1984 and 1988. It should be noted that some of these findings had been documented in previous NRC Inspection Reports and corrective actions were taken or initiated in 1987.

Attachment I provides WCNOG's response to the violations and Attachment II provides detailed information on the examples associated with the violation involving failure to take adequate corrective action (482/88200-01). Although WCNOG does not agree with all of the violations and examples, Attachments I and II documents the corrective actions and/or program enhancements for all of the identified concerns.

On November 18, 1988, in a telephone discussion between Mr. G. L. Constable, NRC Region IV, and Mr. O. L. Maynard, WCNOG, the submittal response time was extended until November 30, 1988.

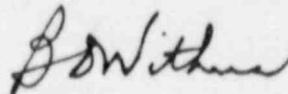
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If you have any questions concerning this matter, please contact me or Mr. O. L. Maynard of my staff.

Very truly yours,



Bart D. Withers
President and
Chief Executive Officer

BDW/jad

Attachments (2)

cc: B. L. Bartlett (NRC), w/a
D. D. Chamberlain (NRC), w/a
R. D. Martin (NRC), w/a
D. V. Pickett (NRC), w/a

Violation (482/88200-01): Failure to Take Adequate Corrective Actions

Finding:

Appendix B, 10 CFR 50, Criterion XVI, requires that conditions adverse to quality, such as equipment failure and malfunctions, are promptly identified and corrected. It also states that the causes of significant conditions adverse to quality be determined and corrective actions taken to preclude their repetition. The licensee's Updated Safety Analysis Report, Revision 0, paragraph 17.2.16.1, states in part that corrective action measures have been established to ensure that conditions adverse to quality are promptly identified, reported, and corrected to preclude recurrence. Significant conditions adverse to quality may include a recurring condition for which past corrective action has been ineffective. Contrary to these requirements:

1. The licensee had not taken the corrective actions specified in engineering evaluation request EER 85-GK-08 (completed November 27, 1985) to resolve the electrical breaker malfunctions of the heating, ventilating, and air conditioning (HVAC) system in the control building.
2. The licensee had not fully investigated the underlying causes of the multiple HVAC damper failures in the control building.
3. The licensee had not promptly taken action to resolve a large number of actuations in the control room ventilation isolation signal (CRVIS) system that were attributed to the control room habitability system chlorine monitor malfunctions that began in 1985.
4. The licensee had not taken actions to correct multiple fire protection system failures that resulted from the apparent misapplication of valve microswitches.
5. The licensee has not aggressively pursued the cause and taken action to resolve malfunctions in the emergency diesel engine's jacket water pressure sensing system that began in 1986.

Reason for Violation:

Although WCNOC does not agree that all of the examples cited above represent a violation of Appendix B, 10 CFR 50, Criterion XVI, WCNOC does agree that some of the identified problems could have been resolved more expeditiously. The reason that some equipment failures and malfunctions have not been corrected as promptly as desired is lack of overall programmatic guidance to define and control a root cause evaluation process for hardware deficiencies.

Corrective Steps Which Have Been Taken and Results Achieved:

Specific responses and corrective actions for the examples of this violation are discussed in Attachment II. Overall corrective actions taken which address this violation include a restructuring of the daily planning meetings to focus management attention on problems and corrective actions rather than on work status. This forum allows work groups to identify specific problems and get appropriate management attention. In addition, selected personnel have been trained in root cause analysis. Another step which has been taken is the addition of a person from Nuclear Plant Engineering as a member of the on-site Plant Safety Review Committee. Again, this provides a forum in which various issues can be discussed from both the Engineering and Operations perspective relative to safety significance and priorities. These steps have resulted in improvements in the identification of problem areas and in the cooperation and coordination among work groups.

Corrective Steps Which Will Be Taken to Avoid Further Violations:

WCNOC Senior Management continues to stress the need to identify the root cause as problems arise. To strengthen this approach, WCNOC is developing a formalized root cause analysis program for hardware deficiencies. This program will include a detailed methodology for root cause analysis as well as requirements for training, documentation, and program interfaces. WCNOC believes that integration of this root cause analysis program with existing programs will result in a more effective and efficient process for identifying and correcting conditions adverse to quality.

Date When Full Compliance Will Be Achieved:

The root cause analysis program will be initially implemented in March, 1989. The required training will be complete by the end of 1989.

Violation (482/88200-03): Inadequate Procedure

Finding:

Appendix B, of 10 CFR 50, Criterion V, requires that activities affecting quality be accomplished in accordance with documented instructions, procedures, or drawings of a type appropriate to the circumstances. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, NRC inspectors observed during a component cooling water pump maintenance activity that the licensee's procedures and instructions provided to the maintenance personnel did not include appropriate cautions or details for removal of the bearing.

Reason for Violation:

Although WCNOG does not agree that this specific event represents a violation of Appendix B, 10 CFR 50, Criterion V, WCNOG does agree with the factual information provided in the Inspection Report and acknowledges that some work procedures could provide more detail to the crafts. However, WCNOG craft workers do possess and are expected to utilize certain skills and judgement in their work activities. This bearing removal activity falls well within the range of ANSI N18.7, 1976 Section 5.2.7 as skills normally possessed by qualified maintenance personnel. Procedures can never be written in such detail that the crafts are relieved from recognizing potential problem areas not identified in the procedure.

The reason the procedure did not contain the level of detail desired by the NRC inspector is that WCNOG Maintenance work procedure writers rely on the skill-of-the-craft in many cases and do not put a high level of detail in the work procedure.

Corrective Steps Which Have Been Taken And Results Achieved:

Subsequent to concerns voiced by the NRC inspector, work was stopped, the vendor was contacted, and heating limitations were added to the governing work request by revision. It should be noted that after the limitations were added to this work request and the work resumed, the shaft coupling hub released at approximately 400 degrees F which is well below the 750 degree F limit identified by the manufacturer. Therefore, for this particular work activity, the reliance on skill-of-the-craft would have resulted in an acceptable bearing removal.

WCNOG Maintenance supervision have discussed this event with the maintenance work instruction writers and craft supervisors. Work instruction writers have been instructed to not rely too heavily on skill-of-the-craft and use "cautions" where appropriate. It has also been emphasized to the crafts to request technical assistance when a work activity is not going as planned.

Corrective Steps Which Will Be Taken To Avoid Further Violations:

WCNOG believes the corrective actions discussed above should prevent recurrence. It should be noted, however, that the degree of detail needed in work procedures to comply with Appendix B, 10 CFR 50, Criterion V, is very subjective and perceived compliance will vary between individuals assessing specific situations. WCNOG strives to meet the regulations as we interpret them and as we get additional guidance.

Date When Full Compliance Will Be Achieved.

Full compliance has been achieved.

Violation (482/88200) to Establish Procedures

Finding:

Appendix B, 10 CFR Criterion V, requires that activities affecting quality be accomplished in accordance with documented instructions, procedures, or drawings.

Wolf Creek licensing condition 2.C(13) describes the licensee's vendor interface program as part of their response to NRC Generic Letter 83-28. Wolf Creek Nuclear Operating Corporation Procedure, KGP-1311, Revision 1, specifies the function of the Industry Technical Information Program (ITIP). Part of the ITIP requires that vendor reports be reviewed to determine their applicability to Wolf Creek Generating Station (WCGS) and, if necessary, a detailed evaluation is to be performed to determine the effects on WCGS.

Contrary to the above, the licensee had not obtained three of the SILs that were potentially applicable to the EDGs supplied to Wolf Creek. It was further determined that the five EDG SILs that the licensee had received had not been formally reviewed or evaluated.

Reason For Violation:

Although procedure KGP-1311, "Industry Technical Information Program" (ITIP) requires vendor reports be reviewed for applicability, it does not require WCNOC to establish a program for obtaining vendor information. This procedure is consistent with WCNOC's letter to the NRC dated December 10, 1986 and the March, 1984 Nuclear Utility Task Action Committee response to Generic Letter 83-28, Item 2.2.2. Therefore, the statement in the finding: "Contrary to the above, the licensee had not obtained three of the SILs that were potentially applicable to the EDG's supplied to Wolf Creek", appears to be inappropriate and WCNOC does not agree that this item is a violation of Appendix B, 10 CFR 50, Criterion V.

Prior to November 1986, the emergency diesel generator (EDG) Service Information Letters (SILs) were being received by an individual employed by Wolf Creek's architect/engineering firm. Upon leaving the Wolf Creek project in November, 1986, the individual contacted the vendor and had his name removed from the list of receivers. It is believed the above individual assumed other personnel on site were receiving the SILs. This resulted in no SILs being received by WCGS.

This deficiency was discovered in November, 1987, at which time the vendor was contacted and requested to provide all previous SILs that pertained to WCGS. The vendor indicated that five SILs pertained to WCGS's model of diesel engines. Numerous delays were encountered in receiving the SILs and the vendor was contacted four additional times in an attempt to obtain the SILs. The vendor indicated they were reluctant to provide the SILs because the SILs were out of date and were in the process of being revised. After emphasizing to the vendor WCNO's strong desire to obtain the SILs due to the potential safety significance of such information, five SILs were received in March, 1988, with the understanding from the vendor that up-to-date revisions would be received in approximately four to six weeks.

Since it was believed that the SILs would soon be revised, the ITIP Coordinator sent the SILs to the appropriate organizations for an informal review. The review determined that the SILs had no immediate affect on the operability of the diesel engines. Therefore it was determined that the detailed evaluation required by procedure KGP-1311 could be delayed pending the receipt of revisions to the SILs.

Corrective Steps Which Have Been Taken and Results Achieved:

The five SILs received from the vendor and three additional SILs received from the NRC inspector were reviewed in accordance with procedure KGP-1311 on June 16, 1988 after discussions with the NRC inspector. The evaluation of the SILs did not identify any substantial safety concerns. However, additional preventative maintenance activities have been incorporated into the Preventative Maintenance Data Base as a result of the SILs.

A Programmatic Deficiency Report was initiated to determine if additional EDG SILs applicable to WCGS were not provided by the vendor. The Supplier Quality organization performed a surveillance at the vendor's offices on July 21, 1988, and identified two additional SILs which had not been provided by the vendor. These two SILs were subsequently reviewed and evaluated in accordance with procedure KGP-1311. Additionally, the surveillance verified the appropriate contacts were in place on the vendor's list of receiver's for SILs and that an adequate system exists for transmittal of future SILs.

Corrective Steps Which Will Be Taken To Avoid Further Violations:

The vendor EDG SIL program will be audited on a regular frequency to verify that an adequate system exists for transmittal of SILs. Although, as explained above, WCNO's vendor interface program is currently in compliance with commitments associated with NRC Generic Letter 83-28, a program is currently under development to enhance the vendor interface process at WCGS. A procedure is being developed to provide a method for contacting certain hardware suppliers to determine if they have issued letters or bulletins which could impact components or systems at WCGS. This program will be implemented by July 31, 1989.

Date When Full Compliance Will Be Achieved:

WCNOC believes that the decision not to perform the detailed evaluation of the SILs was appropriate based on the informal review and because the vendor had indicated that these SILs were in the process of being revised. Full compliance has been achieved.

Violation (482/88200-05): Failure to Provide Inspection

Finding:

Criterion X of Appendix B to 10 CFR 50 requires that a program for inspection of activities affecting quality be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity.

Contrary to the above, NRC inspectors found that during construction of the EDGs, the licensee had not verified that the safety-related seismic and vibration control emergency diesel turbocharger cooling water pipe supports had been installed as required by the vendor's design drawing.

Reason For Violation:

WCNOC recognizes that it has the ultimate responsibility for assuring that the installed systems are capable of performing its safety function. Although it is true that Wolf Creek Generating Station (WCGS) had not verified that the safety-related seismic and vibration control supports were installed, Wolf Creek Nuclear Operating Corporation (WCNOC) believes that this is not a violation of 10 CFR 50, Appendix B, Criterion X requirements. As explained below, the receipt inspection program which was in place when the Emergency Diesel Generators (EDG) were shipped to WCGS complied with 10 CFR 50 Appendix B, Criterion X requirements and did not require inspection of these supports. Rather, verification of the installation of the required components was the responsibility of the vendor. WCNOC believes that it is not appropriate to cite activities under the control of a vendor's quality program as a violation of WCNOC's Criterion X requirements unless this results in a degradation of the ability of the EDG to perform its safety function. WCNOC believes that the Quality programs in place were adequate for providing assurance of EDG functionality. The vendor activities identified in this particular case did not invalidate the EDG's ability to perform its safety function during the design basis accidents.

The EDGs were originally furnished by Colt Industries during the construction phase of WCGS as skid mounted subcomponent systems due to the size and complexity of the EDGs. Each EDG was manufactured and furnished under Colt's Quality Program. This program was reviewed and accepted by three separate organizations, the ASME, the organization procuring the EDGs (Bechtel Power Corporation), and Wolf Creek.

In addition, Bechtel established and executed a program which encompassed the review of EDG documents (e.g., drawings, procedures, reports, etc.), surveillance of manufacturing processes and final shop inspection of the EDGs including skid mounted subsystems prior to their release for shipment. These activities were in addition to those performed by the Authorized Nuclear Inspection agency engaged by Colt.

At WCGS, a receipt inspection program, QCP-I-01, "Receipt, Storage, and Preservation of Quality Related Material and Items" was established and executed by the constructor acting on behalf of KG&E. Under this program, for the material/items which were procured by another organization, such as Bechtel, and also had a final ship inspection report (or equivalent release document) indicating that the procuring organization had performed a final shop inspection, receipt inspection was restricted to the following elements:

- a) review of documents submitted with the material/items for completeness, legibility, and the correct number and type of documents.
- b) inspection for evidence of shipping/handling damage.
- c) an accountability review for correct material/items and number of material/items.
- d) a general configuration review, as appropriate, to verify size, length, finish, etc.

Inspection to the level of detail necessary to verify each and every component, subcomponent, and sub subcomponent on a complex piece of vendor furnished equipment, such as the EDGs, was the responsibility of the vendor and their ANI as applicable under the vendor's Quality Program.

Corrective Steps Which Have Been Taken and Results Achieved:

When it was discovered that the seismic and vibration control supports were missing, WCNOC contacted Colt to determine if the turbocharger cooling pipe could perform its intended function without the supports and whether the turbocharger cooling pipe would experience cracking or the flange bolts would loosen as a result of excessive vibration.

Colt referred to Colt Industries' Engineering Report No. M-018-0367-02, "Seismic Calculations for Skid Mounted Piping." A table in this report indicated that the support bracket would be required for the turbocharger cooling piping in a seismic event if the length of the piping was greater than 60.7 inches.

The subject piping was measured and found to be 56 inches in length; thus it was concluded that the turbocharger cooling pipe would perform its intended function during a seismic event without the support brackets. WCNOG also performed a confirmatory seismic calculation, which also indicated that the pipe did not require the support to withstand seismic loading.

Even though the available engineering data did not support installation of the supports for seismic reasons, Colt recommended WCNOG install the four missing supports to ensure that vibrations from the operating diesel engine would not cause degradation of engine components. In addition, Colt recommended that WCNOG visually inspect the pipes for cracking and a loss of jacket cooling water and perform a torque inspection for all associated pipe flange bolts.

WCNOG took immediate actions to fabricate and install the four pipe supports and performed the inspections recommended by Colt. In addition WCNOG performed nondestructive examinations on all four turbocharger cooling water pipes and a vibration test and analysis to determine if there were any additional adverse effects on the cooling pipe caused by operating the EDGs without the supports. No adverse effects of the missing supports were revealed.

Following these immediate corrective actions, the investigation focused on the reasons that the "as installed" configuration was different than the configuration depicted in the Colt Instruction Manual M-018-00309. Working with Colt, it has been determined that while the drawings contained in the instruction manual may show the installation of components such as supports, the drawings are included for the purpose of identifying parts, and are not intended as the final as built configuration drawings. Thus the fact that the parts drawings in Manual M-018-00309 may show the vibration control supports does not mean that these supports are required in order for the EDGs to fulfill their design function.

In early September 1988 WCNOG performed a walkdown of tubing and pipe supports on the Lube Oil, Fuel Oil, Injection Cooling and Air Start systems of both EDGs. This walkdown involved personnel from NPE, Maintenance and Quality Control utilizing Colt Manual M-018-00309. As a result of the walkdown, deviations from the vendor manual were discovered on both EDGs. Appropriate documentation has been issued for evaluation and updating of the applicable drawings in M-018-00309 to more accurately reflect the existing configuration of the EDGs. NPE is currently working with Maintenance and Colt in response to these items. No adverse affects on the proper functioning of the EDGs has been identified to date.

Corrective Steps Which Will Be Taken To Avoid Further Violations:

The actions discussed above should avoid further instances of vendor nonconformances relative to seismic and vibration control supports on the EDGs. In addition, actions discussed in response to violation 482/88200-04 relative to the vendor interface program should help reduce further problems in this area.

Date When Full Compliance Will Be Achieved:

Evaluation of the deviations identified during the September 1988 walkdown of the EDGs will be complete by 12/31/88.

Violation (482/88200-06): Failure to Follow Procedures

Finding:

Technical Specification 6.8.1 requires that written procedures be established, implemented, and maintained for the fire protection program. Procedure ADM 13-103, Revision 5, "Fire Protection: Impairment Control," implements procedures for impaired fire protection equipment.

Wolf Creek Updated Safety Analysis Report, Section 9.5, Table 9.5.1-3 (sheet 4), requires that all fire barriers and their penetrations separating safety-related areas from those that are not safety-related or separating portions of redundant systems important to safe shutdown shall be operable at all times. Should one or more be found to be inoperable, within one hour a continuous fire watch must be established on one side of the affected barrier or an hourly fire watch patrol must be established.

Contrary to the above, the licensee failed to establish the required fire watch for penetration OP 142S1099 after an engineering disposition, did not establish that the penetration would meet fire protection requirements. The engineering disposition was completed on May 3, 1988; the licensee posted the fire watch on June 14, 1988.

Reason for Violation:

The engineering disposition for Corrective Work Request (CWR) 00688-88 was approved on May 16, 1988. The disposition could not establish that penetration OP 142S1099 would meet the fire qualification testing requirements. Procedure KPN E-314, "Disposition of Field Change Documents", requires notification of Operations when the disposition of special-scope nonconformances result in an inability to accept an unconditional "USE-AS-IS" request. For those nonconformances where the impact should not be allowed to exist without compensatory provisions, verbal notification to the Control Room Shift Supervisor is made. The engineering personnel involved did not recognize that compensatory measures were required based upon the results of the disposition, therefore no priority was placed on dissemination of the disposition.

Similarly, procedure ADM 13-103, "Fire Protection: Impairment Control", Section 4.3 requires the reporting of emergency impairments (equipment degradation or failure) to the Fire Protection Coordinator as soon as possible after discovery. When the disposition was received by Maintenance personnel, it was not recognized that a fire impairment was required. Therefore the Fire Protection Coordinator was not notified and the work request was not handled in an expeditious manner.

Corrective Steps Which Have Been Taken And Results Achieved:

On June 14, 1988, Fire Protection Impairment Control Permit No. 88-244 was issued and an hourly firewatch patrol established. The existing type RB-9 penetration closure material (Radflex) was replaced with an M-9 penetration closure material (RTV foam) on June 17, 1988.

Corrective Steps Which Will Be Taken To Avoid Further Violations:

This violation will be discussed with the Nuclear Plant Engineering personnel involved and placed in Maintenance required reading. Additionally, strict adherence to procedures will be stressed to Nuclear Plant Engineering and Maintenance personnel.

Date When Full Compliance Will Be Achieved:

Full compliance will be achieved by December 30, 1988.

Responses to Examples Cited In Violation 482/88200-01

Example:

1. The licensee had not taken the corrective actions specified in engineering evaluation request EER 85-GK-08 (completed November 27, 1985) to resolve the electrical breaker malfunctions of the heating, ventilating, and air conditioning (HVAC) system in the control building.

Response:

A review of maintenance history for the circuit breakers for control room air conditioning unit SGK05B identified that nuisance tripping of the breakers was occurring between December 31, 1984 and February 10, 1985. This review identified that this same problem was not occurring on the opposite train, SGK05A. During this time frame, WCGS was in pre-licensing start-ups and system testing. As part of the system testing phase, adjustments were made to the operation of the HVAC system such that the nuisance tripping of the breakers was no longer occurring.

Engineering Evaluation Request (EER) 85-GK-08 was initiated on July 22, 1985, as a precautionary measure in the event the adjustments had not corrected the problem and nuisance tripping reoccurred. The engineering disposition to the EER was issued on December 3, 1985 recommending the installation of new breakers with higher instantaneous trip characteristics. Subsequently, Plant Modification Request (PMR) 1441 was initiated to replace the breakers if needed. During the period of February 10, 1985 to December 3, 1985, no problems were experienced with the breaker for SGK05B tripping. Additionally, maintenance history indicates no further problems with nuisance tripping of the breaker. Therefore, the actions taken during plant start-up and system testing had resolved the problem and implementation of the PMR was not appropriate.

WCNOC has initiated the actions necessary to cancel the PMR. Additionally, WCNOC will evaluate existing engineering evaluation request tracking system relative to this issue.

Example:

2. The licensee had not fully investigated the underlying causes of the multiple HVAC damper failures in the control building.

Response:

During November 1987, a Safety Systems Outage Modifications Inspection (SSOMI) identified that appropriate corrective action in preventing repeated damper failures was not taken when five CRVIS damper failures were experienced during the period of June 25 to November 3, 1987. As a result of the SSOMI finding, a review of the maintenance work requests for dampers/actuators GK-D-085/GK-HZ-29A, GK-D-081/GK-HZ-029B, GK-D-084/GK-HZ-40A, GK-D-085/GK-HZ-40B was conducted. This review identified that the actuators were reworked during 1984 with some machining being conducted on the couplings. In 1985, GK-HZ-40A and B were replaced due to the actuators being jammed. In 1987, failures of GK-HZ-29A, 40A and 40B, occurred which required replacement of the actuators. During the previous refueling outage, the vendor was brought on site to assist in identifying the cause of the failures. Discussions with the vendor indicated that these failures, could be attributed to a misalignment of the coupling and the saddle because of previous maintenance and the method of clamping the dampers when blocking them open or closed. It was then determined that WCGS did not have the appropriate vendor shop drawings identifying strict coupling tolerances and clearances.

The appropriate tolerances and coupling clearances were obtained from the vendor and an alignment jig was fabricated to assist in alignment of the saddle and the coupling. The vendor shop drawings were obtained and issued as controlled drawings. Three of the above dampers were realigned. The fourth damper was inspected and determined to be within the tolerances provided.

Example:

3. The licensee had not promptly taken action to resolve a large number of actuations in the control room ventilation isolation signal (CRVIS) system that were attributed to the control room habitability system chlorine monitor malfunctions that began in 1985.

Response:

While WCNOG agrees that resolution of the chlorine monitor malfunctions has taken longer than desired, the actions that have been taken have been extensive and thorough. The root cause of the monitor malfunctions has been determined to be poor design of the monitors. The poor design has caused tape breakage, bunching, and spurious spikes, which has resulted in high maintenance required to keep the monitors operational.

As a result of the frequent actuations of CRVISs due to apparent chlorine monitor malfunctions, plant staff personnel surveyed the equipment on a daily shift basis for indications of possible malfunctions. Plant Modification Request (PMR) 1207 was issued on June 12, 1985 to confirm that the monitors were the source of the erroneous CRVISs.

In January, 1986 a study was undertaken to add additional chlorine monitors in order to implement a 2 out of 3 CRVIS logic. In March, 1986, a letter was sent to MDA Scientific, manufacturer of the monitors, which pointed out the various problems WCGS was having and requested them to evaluate the situation and respond. Approximately one week later, MDA did respond with the steps they were going to undertake.

On May 21, 1986, a second letter was sent to MDA requesting additional actions. MDA again responded with suggested improvements. During this time frame, Requests for Quotation were sent to MDA, Consolidated Controls Corporation (CCC), and Anacon to support a study being performed by engineering to either add additional MDA monitors to allow a 2/3 logic or replace the monitors with Anacon or CCC monitors. The study, which was submitted on December 9, 1986 recommended replacing the MDA monitors with Anacon monitors.

During the latter part of 1986, WCNOC began investigating the change from our present chlorination system (liquid) to a solid sodium hypochloride system, thereby eliminating the accident scenario which necessitated having chlorine monitors. Since the results of this study could eliminate the need for chlorine monitors, the replacement study was directly impacted and subsequently placed on hold.

By late 1987, the sodium hypochloride proposal had been rejected and the monitor replacement study had been reinitiated. Monitors with a 2/2 logic configuration manufactured by Anacon were chosen to replace the MDA monitors.

In the meantime, a representative of the WCGS Supplier Quality organization visited MDA and an MDA representative in turn came to Wolf Creek and inspected the existing chlorine monitors. The MDA representative made several recommendations which have been carried out as an interim measure until new monitors can be installed.

Unfortunately, the very week that Anacon was being recommended, they went out of business (May 2, 1988). As a result, Sensidyne chlorine monitors were selected pending investigation on their suitability. This selection was based partially on conversations with other utilities. In conjunction with the Sensidyne investigation, WCNOC also began the task of looking at other available monitors. This review identified Delta as another possible supplier.

WCNOC decided that due to the importance of resolving the chlorine monitor issue, monitors from both Delta and Sensidyne would be purchased and processed through a program which included seismic and environmental qualifications.

On October 10, 1988, NPE issued PMR 2068 to replace the existing MDA monitors with qualified monitors. WCNOG is implementing PMR 2068 during the current refueling outage.

While WCNOG agrees that resolution of the chlorine monitor malfunction took longer than desired, WCNOG feels that resolution of the chlorine monitor issue was pursued with perseverance and in a manner which reflected sound engineering and management judgement. It became increasingly apparent to Wolf Creek during 1985 as a result of 15 LERs associated with CRVIS that the chlorine monitor issue required not only the attention of plant operating groups but also that of plant support groups and management.

Wolf Creek pursued resolution of the chlorine monitor issue in a logical sequence, first working with MDA, manufacturer of the monitors, to determine the root cause of the monitor malfunctions and a resolution, and second, the effort undertaken to determine the feasibility of using an alternate method of chlorination and thereby eliminating the need for chlorine monitors, and finally, supplementing or replacing the existing chlorine monitoring system through a program which included seismic and environmental qualification of needed equipment.

In retrospect, while this approach may have been somewhat time consuming, it does represent what Wolf Creek feels was the best approach based on available data, suitable equipment capable of meeting the stringent environmental and seismic qualification requirements. The inability of MDA to provide a satisfactory resolution and CRVIS related LERs is being experienced by the industry on whole.

A primary strength identified during the investigation of this issue was the fact that the plant staff, engineering, and management worked together to resolve this issue. No single Wolf Creek organization or group acted independently, but each performed independent functions to support one another. Function group meetings were held as a part of the decision process and key decisions were made based on input from the responsible groups.

Example:

4. The licensee had not taken actions to correct multiple fire protection system failures that resulted from the apparent misapplication of valve microswitches.

Response:

Wolf Creek has experienced a high instance of alarms activating as a result of the malfunction of a specific type of microswitch used in the fire protection system. These microswitches are installed on various outdoor valves that are located above and below grade level. EER 87-FP-06 was issued on May 8, 1987, which stated that the present microswitches, Type PIVS-B, are routinely found corroded and appear being used in applications for which they were not designed.

Nuclear Plant Engineering (NPE) reviewed vendor catalog information but was unable to find an Underwriters Laboratory (UL) listed and Factory Mutual (FM) approved replacement limit switch. The vendor, Fotter Electric Signal Company, was contacted to find out if there was a replacement switch for the UL listed and FM approved PIVS-B limit switch presently in use. The vendor indicated that the only waterproof supervisory switch they carried was a "Plug Magnetic Switch" which can be used on a valve with a hand wheel; however, this switch would not work on the valves installed at WCGS. Another vendor, Federal Signal, was contacted to see if they offered a waterproof limit switch. However, they also used Potter for limit switch applications. They indicated that they had some success in delaying moisture problems by treating the switches with a coating.

Maintenance and NPE representatives met to resolve the limit switch problem. The mutually agreeable solution was to seal the switch openings with a clear flexible silicon sealer which is commonly available, such as G.E. clear silicon sealer. The purpose of the sealer is to prevent moisture from reaching the microswitch inside the limit switch housing. This in turn would prevent false alarm indication.

The prioritization for responding to EER's is based on the following categories: mandatory, life/safety, ALARA, or discretionary. This EER was designated as discretionary during meetings between NPE and Maintenance personnel. Based upon the discretionary prioritization, the evaluation and subsequent disposition was not completed until July 29, 1988. As a result of the EER disposition, Plant Modification Request (PMR) 2659 will be issued by December 30, 1988 to identify the locations on the limit switch where the clear silicon sealer should be applied and to indicate which switches should be repaired. The information provided in PMR 2639 will allow for the sealing of existing switches as well as the sealing of new switches to eliminate moisture within the switch housing.

Example:

5. The licensee has not aggressively pursued the cause and taken action to resolve malfunctions in the emergency diesel engine's jacket water pressure sensing system that began in 1986.

Response:

The malfunctions in question deal with problems with the proper functioning of the pressure transmitters due to pulsations in process pressure. As a result of Engineering Evaluation Request (EER) 87-KJ-01 which described the pulsation problem, Plant Modification Request (PMR) 2183 was issued on 6/9/87 to install snubbers in the process sensing lines to reduce pressure transmitter pulsations due to pulsations in the process pressure. WCNOC has determined that the cause of the pulsations is integral to system design and equipment characteristics. Pulsations to some extent are a natural phenomenon associated with pumps in general. The magnitude to which pulsations occur is dependent on the pump (size and type), its use, and the configuration of overall system associated with the pump.

The required parts were then ordered and the PMR was scheduled for installation during the current refueling outage. However, all the parts could not be shipped in time for installation during the outage. It was determined that the pressure transmitter pulsation problems did not affect the ability of the EDG to fulfill its safety function, therefore PMR 2183 will be implemented after the parts arrive and at the next available EDG outage of sufficient duration to accomplish the process line snubber installation, but in any case no later than the end of the next refueling outage.