U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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Facility:	Duane Arnold Energy Center
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EXECUTIVE SUMMARY

Duane Arnold Energy Center (DAEC)
NRC Inspection Report 50-331/99005(DRS)

This was an announced team inspection to review engineering and technical support and corrective actions. The inspection included a review of 50.59 safety evaluations and applicability reviews as well as a review of selected NRC issues from previous inspections. The following statements summarize the inspection results:

- The inspectors concluded that the methods used to control design changes were effective. In general, design changes were designed, installed and tested in an acceptable manner. Design configuration controls were maintained throughout the modification process. System Engineering Change Packages (ECPs) were complete and of good technical quality. (Section E1.1.b.1)

- Component level Engineering Maintenance Action (EMA) modifications were generally found acceptable, however, the inspectors concluded that several component level modifications contained inconsistent review documentation. One component level modification installed a 'B' recirculation pump motor snubber that contained the wrong oil. The installed snubber did not meet the current drywell radiation design basis. Based on the licensee's corrective actions, a Non-Cited Violation was assessed. (Section E1.1.b.2)

- 10 CFR 50.59 applicability reviews and safety evaluations were thorough and appropriate for the plant changes reviewed. However, the inspectors identified (Section E1.1.b.3) several EMA applicability reviews that inconsistently referenced the type of documents reviewed. The inspectors did not identify any unreviewed safety questions for the plant changes reviewed. (Section E1.2)

- Temporary modifications were being controlled in an acceptable manner. In addition, the temporary modifications were appropriately installed and tested. (Section E1.3)

- The methods used in performing and revising design calculations for recent design changes were found to be correct and appropriate. The inspectors concluded that, while the final numerical results were acceptable, calculations at times lacked documentation to support how the conclusions were reached. This was considered a calculation control weakness by the inspectors. (Section E1.4.b.1)

- The inspectors identified that the licensee did not include seven (7) updated UFSAR sections with the update letter submitted to the NRC on November 19, 1998. However, the licensee was within the 10 CFR 50.71(e)(4) 24 month window to complete the update. The current plant UFSAR was updated July 15,1999. This was considered a UFSAR update weakness by the inspectors. (Section E1.4.b.2)

- The inspectors concluded that acceptable engineering staff interface and support was provided during the modification process, and that final modification closeout packages were completed in a timely manner. (Section E2.1)

- The licensee's operability determination process was effective. The operability determinations and supporting evaluations were acceptable and contained sufficient detail. (Section E2.2)

- The inspectors concluded that the methods used to obtain and disposition industry operating experience were effective. The industry information reviewed had appropriate corrective actions initiated. (Section E2.3)

- The licensee did not take appropriate corrective actions to control scaffolding installed near safety related equipment. Based on the licensee's corrective actions, a non-cited violation was assessed. (Section E2.5)

- The inspectors concluded that the licensee was safety conscious in electing to shutdown the plant for the degraded electrical penetration condition and to restore the plant's design configuration. In addition, the troubleshooting plan was well thought out and the post modification testing was good. (Section 2.6)

- The inspectors concluded that the actions taken once a problem was identified were indicative of a good corrective action program. The majority of plant problems were identified, assessed, and had appropriate corrective actions assigned. (Section E7.1)

- Root cause investigations were accurate and thorough. In addition, the licensee's trending program and effectiveness reviews contributed to identifying repetitive problems. (Section 7.2)

- The inspectors concluded that the QA assessment process met 10 CFR 50, Appendix B, requirements. In addition, the quarterly assessments were identifying issues and the licensee was taking appropriate actions to correct these issues. (Section E7.3)

Report Details

III. Engineering

E1 Conduct of Engineering

E1.1 Design Changes and Modifications

a. Inspection Scope (37550)

The inspectors reviewed plant changes against the licensee's procedures and verified conformance with applicable installation and testing requirements. Accessible portions of the modifications were walked down and material condition of the surrounding areas were observed. The inspectors discussed the changes with the cognizant engineer when necessary to determine the rationale and extent of the change. The attached document list identifies the modifications that were reviewed.

b. Observations and Findings

The inspectors noted that the licensee used two methods for controlling plant modifications, Engineering Change Packages (ECPs) and Engineering Maintenance Actions (EMAs). The EMA process expedited and streamlined component level plant modifications, while the ECP process was used for major system modifications.

b.1 ECP Process - System and Plant Modifications

The ECP modifications reviewed by the inspectors were of good technical quality, were thoroughly documented and received cross-discipline second level reviews. Associated calculations developed to support the modifications reviewed were of good technical quality and were appropriate to support the design changes. In addition, the inspectors verified that the installation packages contained appropriate field instructions to ensure satisfactory installation, and found that the ECPs appropriately documented and dispositioned installation problems. Design configuration controls were maintained throughout the modification process and post modification testing (PMT) appeared effective in verifying that the modified system would perform it's design function. A sample of affected drawings were reviewed and were found to be appropriately revised.

The inspectors reviewed ECP No. 1590, "ECCS Minimum Flow Instrument Modifications," which installed crud collection blow down chambers for these instruments. During the review, the inspectors noted that the modification package did not identify a preventive maintenance activity or procedure that addressed periodic blow down chamber cleaning. In response, the licensee indicated that periodic blow down chamber cleaning had been overlooked. Action Request (AR) No. 15891 was initiated on June 16, 1999, to correct this oversight. The licensee's prompt corrective action was acceptable to the inspectors.

b.2 EMA Process - Component Modifications

Overall, the component level EMA modification packages reviewed by the inspectors were acceptable. The inspectors observed that the majority of the EMA engineering evaluations clearly described the proposed design change; the design checklists were appropriately completed; and post modification testing was completed in an acceptable manner. However, the inspectors identified that some EMAs were not consistent in quality. While some EMA's were well documented, others lacked such basics as the purpose of the component and it's safety significance. All of the EMAs met the EMA procedure requirements, however, the EMA procedure did not specifically describe the minimum expected EMA documentation requirements. The quality of each EMA modification package appeared to be driven by the particular staff member or supervisor responsible for the EMA rather than being driven by the component modification program or procedure.

The inspectors reviewed in detail EMA No. A40334 which replaced the 'B' recirculation pump motor snubber. Following Refueling Outage (RFO)15, the licensee identified that the installed 'B' snubber oil did not meet the Updated Final Safety Accident Report (UFSAR) stated drywell design radiation requirement. An AR had been initiated to address this installation discrepancy. The 'B' snubber will be replaced during RFO16. The inspectors reviewed the operability determination performed for continued operation to RFO16 and determined that the snubber was operable.

The inspectors determined that the preparer and reviewer failed to identify the appropriate snubber design basis requirement. The EMA described some of the appropriate UFSAR snubber related sections, however, the snubber radiation environment requirement was located in a UFSAR section that was not identified. 10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety related functions of the structures, systems and components and that design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design.

The licensee's EMA modification process failed to identify the correct snubber oil radiation design requirement that was stated in the UFSAR. As a result, a safety related snubber was installed with the incorrect snubber oil. This is considered a violation (50-331/99005-01(DRS)). Based on the licensee's corrective actions, this Severity Level IV violation is being treated as a Non-Cited Violation (NCV), consistent with Appendix C of the NRC Enforcement Policy.

b.3 Utilization of Current Licensing Basis for Modifications

The inspectors were concerned that EMA and 10 CFR 50.59 applicability reviews were not consistent in identifying Technical Specification (TS), UFSAR and other design basis documents that were applicable to the modification being performed. Seventy eight (78) percent of the EMA safety evaluation applicability reviews did not describe the TS sections that were applicable. A general statement that none of the plant TS sections were affected was typically used. As a result, a second level reviewer could not readily determine if all applicable licensing and design basis documents had been reviewed.

The inspectors determined that the current UFSAR was available for review as part of the plant's electronic database. The inspectors found that although the design information was available, it was not consistently used in preparing EMAs and their applicability reviews. In some cases, UFSAR sections described in the EMAs were not documented on the applicability reviews. This was identified in EMA No. A34261. In other cases, two (2) similar modifications identified different UFSAR sections. This occurred between EMA No. 40334 and ECP No. 1617.

The inspectors identified several modifications that used ASME III Code for the design changes where the UFSAR stated Code for component/piping was ANSI B31.1. This occurred when the safety relief valve accumulator flow control valves were replaced. The EMA applicability review for each of these modifications stated that this was not a change to the UFSAR. However, the inspectors were concerned that the licensee had deviated from a design commitment made in the UFSAR. In response, the licensee provided Code reconciliation documents for each of the EMAs. The inspectors determined that the Code reconciliation documents were acceptable. It did appear, however, that the EMAs should have identified the reconciliation documents. This documentation inconsistency was discussed with the licensee. The licensee acknowledged that the EMA procedure did not require this type of documentation, and that the EMAs and applicability reviews should have identified the Code reconciliation documents.

Several action requests were initiated to review the EMA process and to ensure consistent staff use of the UFSAR, use of the TSs and use of other design basis documents during plant modifications. This was acceptable to the inspectors.

b.4 Plant Walkdowns

The inspectors and appropriate system engineer walked down ECP No. 1590 in the RHR area and walked down the switchgear rooms, station batteries, and standby diesel generator rooms.

The inspectors observed that the safety related areas and equipment material conditions were good. However, the inspectors noted several birds nests in the 161kilo-volt disconnect switch holders in the switchyard. Licensee personnel informed the inspectors that the bird nests would be removed at the earliest opportunity when these buses were made available for maintenance. This was acceptable to the inspectors.

c. Conclusions

The inspectors concluded that the methods used to control design changes were effective. In general, design changes were designed, installed and tested in an acceptable manner. Design configuration controls were maintained throughout the modification process. System ECP modification packages were complete and of good technical quality.

The inspectors concluded that component level EMA modifications were generally found acceptable, however, the inspectors concluded that several component level modifications contained inconsistent review documentation. One component level

modification installed a 'B' recirculation pump motor snubber that contained the wrong oil. The installed snubber did not meet the current drywell radiation design basis. A Non-Cited Violation was assessed.

In addition, the inspectors concluded that plant housekeeping and material condition of safety related equipment observed was good.

E1.2 10 CFR 50.59 Evaluations and Screenings

a. Inspection Scope (37001)

The inspectors reviewed the methods and procedures used to control 10 CFR 50.59 safety evaluations and applicability reviews to verify adequacy, controls, and compliance with regulatory requirements. Emphasis in this review was on design changes and modifications. 10 CFR 50.59 applicability reviews and safety evaluations were discussed with cognizant licensee personnel and selected evaluations were reviewed in detail to verify implementation and compliance with 10 CFR 50.59 requirements. The attached document list identifies the safety evaluations that were reviewed.

b. Observations and Findings

b.1 Safety Evaluation Process

Implementing procedures appropriately described the methods for controlling and performing 10 CFR 50.59 applicability reviews. In addition, the inspectors verified that 10 CFR 50.59 safety evaluations had been submitted to the NRC under 10 CFR 50.59(b).

The inspectors verified that the licensee's safety evaluation training and qualification programs were consistent with commitments made to the NRC. This included a review of the 10 CFR 50.59 lesson plans and training materials. The training materials appropriately presented NRC requirements and industry 10 CFR 50.59 practices. In addition, the inspectors reviewed three (3) recent Quality Assurance (QA) quarterly engineering training program assessments and determined that QA observations had been factored back into the 10 CFR 50.59 training program.

b.2 Applicability Reviews and Safety Evaluations

For the most part, the 10 CFR 50.59 applicability reviews and safety evaluations reviewed were appropriately prepared, of good quality, and were consistent with licensee procedures and regulatory requirements. The inspectors independently reviewed applicability review and safety evaluation reference documents and determined that the evaluations appropriately addressed the review questions. However, as discussed in Section E1.1.b.3 of this report, several EMA applicability reviews were inconsistent in identifying the TS and UFSAR sections reviewed.

c. Conclusions

The inspectors concluded that the 10 CFR 50.59 applicability reviews and safety evaluations were thorough and appropriate for the plant changes reviewed. However, the inspectors identified in Section E1.1.b.3 that several EMA applicability reviews inconsistently referenced the type of documents reviewed. The inspectors did not identify any unreviewed safety questions for the plant changes reviewed.

E1.3 Temporary Modifications

a. Inspection Scope (37550)

The inspectors reviewed the methods used to control temporary modifications. This review included the controlling procedure, selected open temporary modification packages and their 10 CFR 50.59 safety evaluations or applicability reviews. Temporary modifications were discussed with cognizant licensee personnel. The attached document list identifies the temporary modifications that were reviewed.

b. Observations and Findings

The inspectors evaluated procedure No. 1410.6, Revision 23, "Temporary Modification Control," and determined that the temporary modification (TMOD) process provided acceptable controls for installing temporary materials and equipment. A 10 CFR 50.59 applicability review and safety evaluation, if applicable, were completed prior to TMOD installation. The inspectors determined that the applicability reviews appropriately addressed their plant change. The use of a TMOD for longer than one operating cycle was strongly discouraged and required plant manager approval to be extended. The inspectors verified that the twelve (12) open TMODs had not been installed longer than one operating cycle. In addition, the inspectors verified five (5) TMOD installations and determined that they had been correctly installed. Also, the TMODs reviewed specified appropriate installation and removal testing requirements.

During review of the Temporary Modification Index, the inspectors identified on control room electrical drawing No. APED-E11-007<04> that terminal point CC-76 had been incorrectly marked when TMOD No. 99-030, "Lift MO1908 leads routed through drywell penetration 1JX105A due to short circuits," was installed. The control room drawing and the work control center drawing reflected a lead lifted in junction box IJ1765A rather than terminal CC-76. Although the drawing incorrectly indicated the installed condition, it did not change the electrical function of the circuit. In addition, the inspectors verified that the correct lead had been lifted at terminal CC-76.

In response, the licensee promptly initiated AR No. 15558 to address this issue and corrected the affected drawings in the control room and the work control center. In addition, the inspectors reviewed additional drawings and verified that they reflected the current plant configuration.

c. Conclusions

The inspectors concluded that temporary modifications were being controlled in an acceptable manner. In addition, the temporary modifications were appropriately installed and tested.

E1.4 Calculations

a. Inspection Scope (37550)

The inspectors selected design calculations that were important to plant safety and risk significant issues. The review included the methods used in performing and revising design calculations. Also, the calculations were reviewed for accuracy and to verify that appropriate design inputs, assumptions, and calculation methods were used. The attached document list identifies the calculations that were reviewed.

b. Observations and Findings

b.1 CAL-VC1-032, Revision 2, "Steam Break Pipe Analysis - Steam Pipe Tunnel"

The inspectors noted that procedure No. ACP 1203.21, Revision 7, "Engineering Calculations," described the calculation program requirements. Calculations were to be sufficiently detailed as to the purpose, method, assumptions, design inputs, calculation methods, and conclusions such that a technically qualified individual could understand and verify a calculation conclusion without recourse to the originator.

The inspectors identified that calculation No. CAL-VC1-032 was missing relevant information regarding purpose, assumptions, list of applicable codes, special formulas and equation documentation. Further investigation into Revisions 0 and 1 also identified that this information was missing. The calculation was considered deficient by both the inspectors and the engineering staff even though the calculation conclusions appeared to be reasonable for this type of calculation. The licensee promptly initiated AR No. 15224 to update the calculation. This was acceptable to the inspectors.

The inspectors discovered that this calculation had been recently revised (Revision 2) and the licensee had missed an opportunity to identify and to correct this deficiency. Procedure No. ACP 1203.21 did not require calculations to be completely revised if the revision did not change the calculation results. This was considered a calculation control weakness by the inspectors. In response, the licensee initiated AR No. 15223 to review the calculation control and revision process. This was acceptable to the inspectors.

b.2 CAL-M97-015, Revision 1, "Re-assessment of Reactor Pressure Vessel Fatigue Usage"

The inspectors reviewed the Reactor Pressure Vessel Fatigue Usage calculation. This calculation limits plant life by bounding how many times the plant can start up and be shut down. The calculation was revised when the fatigue limit value was changed. This was accomplished by reducing the Code allowable allowance for the reactor vessel fatigue limit. Reduction of this safety margin was allowed by the American Society of

Mechanical Engineers (ASME) Code. The licensee updated the UFSAR, however, the inspectors identified that the licensee did not revise all pertinent UFSAR sections with the new reactor vessel fatigue limit value.

The inspectors identified that the licensee had updated two (2) UFSAR sections, but did not update seven (7) additional sections that pertained to the fatigue limit value. The two (2) UFSAR section updates had been submitted to the NRC by letter No. NG-98-1767, dated November 19, 1998, "Cyclic Report of Facility Changes, Tests and Experiments, Fire Plan Changes and Commitment Changes." The inspectors were concerned that the UFSAR did not contain the latest material developed as required by 10 CFR 50.71(e) since the new fatigue limit value was less conservative. The licensee promptly initiated AR No. 15752 and the affected plant UFSAR sections were updated July 15, 1999. Six (6) months following the 1999 Fall refueling outage, these UFSAR sections will be submitted to the NRC. Even though the licensee had not updated all UFSAR sections, 10 CFR 50.71(e)(4) requires that subsequent revisions be filled annually or six (6) months after each refueling outage provided the interval between does not exceed 24 months. The licensee was within the 24 month window and has taken prompt corrective actions to update the UFSAR. Therefore, this item is consider a weakness. In addition, the licensee did not identify to the inspectors any documents that would have been invalidated by using the incorrect fatigue limit value.

b.3 Other Engineering Calculations

The inspectors reviewed several electrical and instrument and control calculations for adequacy of assumptions, completeness, and conclusions. The inspectors observed good documentation practices, such as, clearly stating the calculation purpose, listing verifiable design inputs, applying reasonable assumptions, specifying the verification method, such as, use design review or alternate calculation, and resolving verifier comments.

c. Conclusions

The inspectors concluded that the methods used in performing and revising design calculations for recent design changes were correct and appropriate. However, while the final numerical results were acceptable, calculations at times lacked documentation to support how the conclusions were reached. This was considered a calculation control weakness by the inspectors.

The inspectors identified that the licensee did not include seven (7) updated UFSAR sections with the update letter submitted to the NRC on November 19, 1998. However, the licensee was within the 10 CFR 50.71(e)(4) 24 month window to complete the update. The current plant UFSAR was updated July 15,1999. This was considered a UFSAR update weakness by the inspectors.

E1.5 Surveillances

a. Inspection Scope (37550)

The inspectors evaluated selected technical specification surveillances to verify that the design basis values were correctly translated into the testing program. The inspectors also observed surveillance No. STP 3.3.2-11, "Torus Water Level Instrument Calibration," dated June 16, 1999, and maintenance work order No. 1108733, "161 KV East Bus to Startup Transformer Breaker (CB5560) Minor Maintenance", dated June 17, 1999.

b. Observations and Findings

Surveillance procedure No. STP 3.3.2-11 calibrated the torus water level instrument channels to partially satisfy the Remote Shutdown System TS surveillance requirements. The inspectors attended the pre-job briefing and observed the work during the calibration. The calibration was performed satisfactorily with the as-left readings within their acceptance criteria. In addition, the measuring and test equipment used were within their calibration interval. The inspectors noted that the instrumentation and control technicians were knowledgeable and qualified to perform the calibration. Also, the instrumentation and control supervisor was present during part of the surveillance.

The inspectors observed breaker No. CB5560 maintenance work in the switchyard. The electricians observed were knowledgeable and qualified for the work.

c. Conclusions

The inspectors concluded that the observed instrument surveillance and breaker maintenance activity were performed in an acceptable manner.

E2 Engineering Support of Facilities and Equipment

E2.1 Modification Support and Closeout

a. Inspection Scope (37550)

The inspectors reviewed the methods used by the engineering staff to support the modification process. This included modification final review and closeout controls. Relevant procedures and records were discussed with cognizant licensee personnel. The attached document list identifies the modifications that were reviewed.

b. Observations and Findings

A review of the completed modifications indicated that ample research was performed prior to preparing the design change. The inspectors noted that satisfactorily controls were evident in implementing the design changes and that acceptable post modification testing was performed with appropriate acceptance criteria. In addition, the inspectors

noted that the modifications reviewed ensured that relevant procedures and drawings were appropriately revised. Also, modification package final closeouts were completed in a timely manner.

c. Conclusions

The inspectors concluded that acceptable engineering staff interface and support was provided during the modification process, and that final modification closeout packages were completed in a timely manner.

E2.2 Operability Determinations

a. Inspection Scope (37550)

The inspectors reviewed procedure No. ACP 114.5, Revision 19, "Action Request System." The methods used to perform operability determinations were reviewed to verify operability determination adequacy, controls, and compliance with regulatory requirements. The attached document list identifies the operability determinations that were reviewed.

b. Observations and Findings

The inspectors determined that ACP No. 114.5 acceptably described the methods for controlling operability determinations. The Operations Shift Supervisor (OSS) made the initial operability determination on the AR form, if required. The OSS often requested evaluations from other organizations, such as, engineering. Engineering staff evaluations were usually completed within 24 hours. Plant manager approval was necessary for any evaluation that required longer than 24 hours to complete. The inspectors determined that the operability determinations reviewed contained an acceptable level of detail and emphasized conservative decision making. This was noted in AR No. 14186 which conservatively assumed that a three (3) pound box was modeled as a cantilever beam with all the mass concentrated at the end of the beam.

During this review, the inspectors noted that the Equipment Issue Resolution database did not track equipment degraded conditions associated with open operability determinations. In some cases, the associated AR may be closed to another tracking document, such as, the work order system. The potential existed for operability determinations to be closed prior to correcting the degraded condition. In response, the licensee initiated AR No. 15836 to correct this observation. This was acceptable to the inspectors.

c. Conclusions

The inspectors concluded that the licensee's operability determination process was effective. The operability determinations and supporting evaluations were acceptable and contained sufficient detail.

E2.3 Operating Experience Program

a. Inspection Scope (40500)

The inspectors reviewed the methods for obtaining and using industry operating experience. This included industry information obtained from outside the operating experience program. The reviews included procedure No. ACP 102.1, Revision 11, "Review of Industry-Related Documents," and selected operating experience program evaluations. The inspectors interviewed cognizant licensee personnel about the industry experience program.

b. Observations and Findings

The inspectors verified that the licensee effectively implemented the operating experience program as outlined in procedure No. ACP 102.1. The program assigned responsibilities for the receipt, assessment, dissemination, and the initiation of corrective actions for the information obtained.

The Fourth Quarter 1998, Industry Operating Experience Report, November 2-6, 1998, "Operating Experience Self Assessment," was reviewed. The inspectors noted that the licensee had responded and taken appropriate corrective actions to address industry information. For example, operating experience discussions were provided by maintenance workers to their supervisor prior to performing a job (reverse job brief). Operating experience binders were maintained in the maintenance shops. The maintenance workers would review applicable binders prior to performing work to ensure operating experience was factored into their maintenance activity. Another applicable operating experience example resulted in the licensee changing to 100 percent cotton anti-Cs for welding when it was learned that a welder was severely burned when his synthetic fiber anti-Cs caught fire.

c. Conclusions

The inspectors concluded that the methods used to obtain and disposition industry operating experience were effective. The industry information reviewed had appropriate corrective actions initiated.

E2.4 Preventive and Predictive Maintenance

a. Inspection Scope (37550)

The inspectors reviewed selected preventive and predictive maintenance practices.

b. Observations and Findings

The inspectors reviewed the licensee's programs and procedures in the area of preventive maintenance to determine engineering staff involvement in maintenance activities. The licensee extended the calibration interval for a number of non-safety instruments from once per year to once in five (5) or six (6) years. Engineering staff evaluations indicated that these instruments had "good calibration histories" as the reason

for the change. The rationale for extending the calibration interval was acceptable, however, no quantitative data were provided to support these conclusions. The licensee acknowledged the inspectors observation and indicated that additional supporting data would be provided in future calibration interval changes.

The inspectors also reviewed predictive maintenance programs, such as, thermography, oil analysis, and vibration analysis. The inspectors determined that these programs were effective in maintaining plant equipment. Periodic audits by the Quality Assurance group did not identify any program weaknesses. In addition, the licensee maintained an extensive list of equipment being monitored by various predictive maintenance programs.

c. Conclusions

The inspectors concluded that the preventative and predictive maintenance programs reviewed were effective.

E2.5 Seismic Controls for Scaffolding

a. Inspection Scope (40500)

The inspectors reviewed the scaffolding control corrective actions identified in AR No. 8013, "Management Guidelines for erecting scaffolds in seismic/safety related areas," dated October 1997. The review included procedures and records as well as discussions with cognizant licensee personnel.

b. Observations and Findings

The inspectors identified that the corrective actions stated in AR No. 8013 were not accurately incorporated into the affected scaffolding procedures. The AR stated the following: (1) it was mutually decided to not make scaffold seismic, but secure; (2) to ensure two trains of a redundant system do not have unanalyzed scaffold, controls will be established to allow scaffold erection on one train only; and (3) if both trains require scaffolding, engineering will evaluate one train for seismic adequacy. The as stated corrective actions appeared reasonable to the inspectors.

During a meeting on June 14, 1999, the licensee stated that procedure requirements were implemented to ensure that only one train of scaffolding was worked on at a time during scaffold assembly. This would prevent the loss of redundant (both) trains if scaffold materials were dropped. However, the inspectors determined that the AR stated corrective actions were different than those implemented by the licensee since the changes did not address installed scaffolding and its disassembly. In addition, the inspectors identified that as a result of inadequate corrective actions, procedure No. ACP1408.2, Revision 6, "Scaffold Control," and procedure No. GMP-CNST-09, Revision 6, "Scaffolding," did not have adequate scaffolding controls in place to ensure that redundant (both) trains would not be common mode damaged during a seismic event. Scaffolding could be installed adjacent to redundant (both) trains or adjacent to one train with the opposite train out-of-service. The procedures did not require that scaffolding be monitored from the time it was assembled until it was disassembled. In addition, the procedure did not require a structural engineering seismic evaluation if the

scaffolding was installed adjacent to redundant (both) trains. Also, the licensee did not have any bounding criteria to demonstrate that the scaffolding would remain standing during a design basis seismic event.

In response, the licensee initiated AR No. 15838 to establish procedure controls for scaffold assembly, installed scaffolding and scaffold disassembly near safety related equipment.

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The licensee did not take appropriate corrective actions to ensure that redundant (both) trains of plant equipment would not be damaged by scaffolding during a seismic event. Based on the corrective actions taken, this Severity Level IV violation is being treated as an Non-Cited Violation (NCV), consistent with Appendix C of the NRC Enforcement Policy (50-331/99005-02(DRS)).

c. Conclusions

The inspectors concluded that the licensee did not take appropriate corrective actions to control scaffolding installed near safety related equipment. A non-Cited violation was assessed.

E2.6 Electrical Penetrations

a. Inspection Scope (92903)

The inspectors evaluated the licensee's efforts to troubleshoot, repair and test shorted conductors in low voltage Electrical Penetration No. 1JX105A.

b. Observations and Findings

b.1 Background

In early May 1999, the licensee identified short circuits in electrical penetration conductors to residual heat removal (RHR) shutdown valve control relays E11-K15A and K16A, and reactor protection system (RPS) main steam line position control relay C71A-K3A. The RHR shutdown valve circuitry was required to be operable only during shutdown cooling. Relay K15A provided loss-of-suction protection for any running RHR pump. Closure of a shutdown cooling valve would energize the K15A relay to trip a running RHR pump. Relay K16A enabled the Group IV isolation function if the shutdown cooling valves were open and the reactor vessel pressure was below 135 psi. Relay C71A-K3A in combination with other main steam line valves less than 90 percent open would scram the reactor.

The licensee installed temporary modifications to eliminate the short circuit affects. A lead was lifted at terminal CC-76 in the shutdown cooling circuitry. This would prevent the K15A relay from tripping a running RHR pump if the shutdown suction source was lost.

The K16A Group IV isolation function was enabled with a jumper. The redundant train shutdown circuitry (K15B and K16B) was unaffected and capable of performing these functions.

For the RPS circuitry, the K3A relay was normally energized. A lead was lifted at terminal DD-48 placing this RPS channel in the tripped condition per Technical Specifications. De-energization of this relay did not initiate a half scram.

During this operating period, the licensee revised operating procedures to reflect the plant's temporary configuration, and issued shift memo No. NG-99-0789 to alert the operators to the plant configuration changes while operating with a degraded electrical penetration.

By May 20, 1999, additional shorts had occurred in the same penetration and penetration header hole Nos. 17 and 23. The number of conductors passing through each header hole varied according to the wire size with about 419 conductors passing through the whole penetration. Since the penetration was not a modular design, the whole penetration would have to be replaced. These failures did not affect the containment pressure boundary. Since the failure mechanism was unknown, the licensee proactively commenced a reactor shutdown to repair the affected circuitry. Spare penetration conductors were identified and tested for use to restore the plant to it's designed configuration. A new penetration was on order.

b.2 Troubleshooting, Repair and Testing

The licensee had initiated penetration No. 1JX105A troubleshooting, repair and testing packages prior to shutdown. In addition, discussions were conducted with other utilities and with General Electric about probable causes for the short circuits. Since the conductors were potted in epoxy and could not be observed, the only recourse at this time was to identify acceptable spare conductors. Because the root cause determination would be a destructive examination, the actual determination would have to wait until the penetration was replaced.

The inspectors reviewed the troubleshooting plan. The testing evaluated adjacent header hole conductors. About 90 field end conductors were de-terminated with about 79 of these conductors requiring re-termination. Overall, about 262 conductors were tested. The testing verified conductor resistance to ground (open circuit indication expected) and verified conductor insulation resistance (greater than 10,000 meg-ohms expected). Ten (10) conductors did not meet the acceptance criteria. In use circuits that passed the conductor tests but were within the area of influence near header hole Nos. 17 and 23 where re-terminated to other header holes.

The inspectors reviewed the post modification testing for three (3) circuits. This included the RHR shutdown cooling circuitry (K15A and K16A), the RPS main steam line circuitry (K3A), and the drywell fan speed control circuitry (95-K078A and 95-K074A). The functional tests which overlapped into unmodified portions of the circuitry were performed in an acceptable manner.

c. Conclusions

The inspectors concluded that the licensee was safety conscious in electing to shutdown the plant for the degraded electrical penetration condition and to restore the plant's design configuration. In addition, the troubleshooting plan was well thought out and the post modification testing was good.

E4 Staff Knowledge and Performance

a. Inspection Scope (37500; 40500)

The inspectors assessed the thoroughness of licensee staff knowledge and the effectiveness of engineering staff performance.

b. Observations and Findings

The AR Administrator and AR Quality Assurance Trend Administrator were significant contributors to the problem identification process. The inspectors determined that they had a high level of expertise in many plant areas which helped in understanding identified problems and ensuring that problems were properly presented to the screening and evaluation panels.

The inspectors interviewed several engineers (both system and design engineers) and other plant staff during modification and engineering document reviews, and during plant walkdowns. The system and design engineering staff were knowledgeable about their systems and system design issues. System engineers could readily provide the top five concerns for their system along with the corrective actions being taken. The design engineers were able to discuss the reason and effectiveness for each modification they were involved with. In addition, most of the engineering staff had eight years or more of plant experience.

c. Conclusions

The inspectors concluded that the system and design engineering staff interviewed were qualified and knowledgeable about their systems and system design issues.

E5 Engineering Training and Qualification

E5.1 Review of Engineering Training

a. Inspection Scope (37550)

The inspectors evaluated procedure No. ACP 1213.3, Revision 1, "Position/Task Specific Training Programs," and the methods used to verify and track engineering staff qualification and training. Engineering staff training records were reviewed and discussions were held with cognizant licensee personnel about the training program.

b. Observations and Findings

Procedure No. ACP 1213.3 described the methods for controlling engineering staff training. The training records were maintained at the onsite training center. The training records for five (5) engineers were reviewed and found to be up-to-date. The inspectors noted that once an operating cycle: (1) QA audited engineering staff training and qualification records; and (2) training personnel from other utilities independently assessed Duane Arnold staff training. In addition, the licensee controlled in an acceptable manner the plant staff trained to perform 10 CFR 50.59 evaluations, operability determinations and root cause evaluations. Only personnel that had been trained were allowed to perform these evaluations. The inspectors confirmed for several individuals that they had been properly trained and certified to perform and review operability determinations, applicability reviews and safety evaluations.

c. Conclusions

The inspectors concluded that the verification and tracking of engineering staff training was acceptable.

E6 Engineering Organization and Administration

E6.1 System Engineering Program

a. Inspection Scope (37550)

The inspectors reviewed the system engineering program to ensure the system engineers were maintaining their systems, and providing good support to other plant organizations. This included temporary modifications, open operability determinations, and the degraded equipment lists. In addition, the inspectors interviewed several system engineers.

b. Observations and Findings

The inspectors interviewed three (3) system engineers and walked down their systems. The system engineers were knowledgeable about their systems, were qualified for their assignment and exhibited ownership of their assigned systems. In addition, the system engineers were knowledgeable about the Maintenance Rule requirements. The inspectors noted that the system engineers maintained good communications with other departments, particularly maintenance.

c. Conclusions

The inspectors concluded that the system engineers were providing good plant technical support and were knowledgeable about Maintenance Rule requirements.

E6.2 Review Committee Activities

a. Inspection Scope (40500)

The inspectors reviewed the implementing procedures and records for the onsite and offsite review committees. This review evaluated committee minutes, audits, and followup actions of items identified by the review committees. The functions, findings and activities of these committees were discussed with cognizant licensee personnel.

b. Observations and Findings

The Safety Committee was established as described in UFSAR, Chapter 13, "Conduct of Operations," to review items that could affect nuclear safety. In addition, the UFSAR also described the plant's Operations Committee which made recommendations to the Plant Manager regarding plant operations.

The inspectors reviewed the current Safety Committee charter, dated July 17, 1998. Several Safety Committee members were from outside of DAEC. The inspectors could not attend a Safety Committee meeting during the inspection. However, the inspectors reviewed the Safety Committee meeting notes for several meetings held during the last two years. These notes indicated that this committee reviewed substantial safety issues, such as, Safety Evaluations, Level 1, 2 and 3 Action Requests, NRC Findings, LERs, and Technical Specification changes.

The inspectors reviewed the current Operations Committee charter, dated March 24, 1999, including committee member qualifications and experience. The Operations Committee was represented by different plant departments, such as, operations, maintenance, engineering, and quality assurance. The inspectors attended the Operations Committee meeting held on June 15, 1999. This meeting was conducted in a professional manner and had good individual member participation. The meeting primarily discussed the "Year 2000 Integrated Contingency Plan." Biennial QA audits of the Operations Committee were performed. The inspectors reviewed the QA audit conducted during the first quarter of 1999. This audit concluded that the Operations Committee was effectively performing its advisory function. The QA audit included several action requests for improving the committee. The inspectors determined that the corrective actions were appropriately implemented.

c. Conclusions

The inspectors concluded that the Safety and Operations committees were effective in performing their assigned reviews, investigations and evaluations.

E7 Quality Assurance in Engineering Activities

E7.1 Corrective Action Program

a. Inspection Scope (40500)

The inspectors assessed the corrective action program through AR reviews and by interviewing cognizant personnel about the corrective action and AR processes. The attached document list identifies the action requests that were reviewed.

b. Observations and Findings

A detailed review of twenty (20) ARs was performed. The inspectors determined that the ARs provided a clear problem description and, in most cases, corrective actions were appropriate for the problem significance. The most significant ARs had root cause determinations and the QA staff performed corrective action effectiveness reviews. Overall, the AR generation threshold level was low. The inspectors determined that AR problems were investigated and had corrective actions assigned in a timely manner, such as AR No. 14402. The engineering staff promptly and effectively evaluated emergency lighting unit battery testing problems.

A screening panel reviewed significant ARs. This was a three (3) level review process that progressed up the management chain to higher level managers. The panel identified the problems, evaluated the issues, selected the resolution methodology, allocated resources, established the expectations for resolution, identified milestones, and identified performance measures that could be monitored during corrective action implementation. The most significant issues were evaluated by senior plant staff.

c. Conclusions

The inspectors concluded that the actions taken once a problem was identified were indicative of a good corrective action program. The majority of plant problems were identified, assessed, and had appropriate corrective actions assigned.

E7.2 Root Cause Analysis and Trending

a. Inspection Scope (40500)

The inspectors assessed the program for trending plant problems and reviewed selected trend reports. The attached document list identifies the root cause analyses that were reviewed.

b. Observations and Findings

The QA trend coordinator coded and tracked ARs by the root or apparent causes using the AR historical database. This data could be searched and sorted by codes and key words to identify trends. Upon identification of an adverse trend, an adverse trend AR was issued to identify if additional corrective actions were necessary. The inspectors reviewed several trend reports and determined that the reports were of good quality. This

was due, in part, to having a QA trend coordinator that was knowledgeable about the plant. This contributed to making good trend assessments.

Root cause training was provided to a large number of plant staff. The licensee performed root cause determinations for the most significant problems. Good root cause evaluations and associated corrective actions helped prevent problem recurrence. The licensee stated that there had been a reduction in root cause investigations because significant plant problems were also decreasing. The inspectors did not identify any additional concerns during the trend report reviews.

The inspectors reviewed several QA effectiveness reviews. The licensee had identified several instances where corrective actions were ineffective. Additional corrective actions were assigned to these problems. The inspectors determined that the QA effective reviews were a good tool for identifying additional corrective actions that may be warranted.

c. Conclusions

The inspectors concluded that root cause investigations were accurate and thorough. In addition, the licensee's trending program and effectiveness reviews contributed to identifying repetitive problems.

E7.3 Audits and Surveillances

a. Inspection Scope (40500)

The inspectors reviewed the methods used to perform and control QA assessments (audits). Procedure QAP No. 1116.4, Revision 11, "Internal Assessment Program," described this methodology. In addition, the QA Engineering Assessment Team Cycle-16 Plan; and the Fourth Quarter 1998 and First Quarter 1999 QA assessments were reviewed. The attached document list identifies the quality assurance assessments that were reviewed.

b. Observations and Findings

Four (4) quarterly assessments were performed each year. The QA program divided plant activities into four major functional areas, such as, engineering. Each functional area was further divided into fourteen (14) audit areas. Several audit areas were assessed during each quarterly assessment. The audit plan ensured that all required audit areas were reviewed at least once per the 18-month fuel cycle.

The inspectors reviewed several engineering related QA quarterly assessments. The First Quarter 1999 assessment identified that a Residual Heat Removal check valve had not been entered in the Inservice Testing program. This item was entered in the corrective action system.

The offsite Safety Committee reviewed all QA Quarterly assessment plans and the resulting assessments. In addition, the Safety Committee performed an independent audit of selected QA programs once every two years. The inspectors noted that the

Safety Committee's 1998 and 1996 audits had identified a number of findings, however, appropriate corrective actions had been initiated.

c. Conclusions

The inspectors concluded that the QA assessment process met 10 CFR 50, Appendix B, requirements. In addition, the quarterly assessments were identifying issues and the licensee was taking appropriate actions to correct these issues.

E8 Miscellaneous Engineering Issues

E8.1 (Closed) Violation (50-331/97015-01(DRS)): Inappropriate use of Reliability and Plant Level Performance Criteria. The following four systems/components were identified with inappropriate performance criteria: standby gas treatment system; fuel handling system; reactor building sump system; and hydrogen-oxygen analyzers. The inspectors reviewed the licensee's corrective actions addressed in letter No. NG-97-2056. Corrective actions included the following: establishing appropriate unavailability and reliability criteria at the train level for the standby gas treatment system; establishing appropriate reliability and condition monitoring criteria for the fuel handling system; establishing appropriate reliability criteria for all of the reactor building sump system functions; and establishing appropriate system reliability and train condition monitoring criteria for the hydrogen-oxygen analyzers. The inspectors concluded that the licensee's corrective actions were acceptable. This item is considered closed.

E8.2 (Closed) Inspection Follow-up Item(50-331/97015-02(DRS)): Performance Criteria for Instrumentation used in Emergency Operating Procedures. This issue addressed the creation of specific performance criteria for control room indication instrumentation. The licensee identified control room instrumentation specifically used by the operators to make emergency operating procedure decisions. Condition monitoring performance criteria were established to monitor all instrument failures. Reliability criteria were established at a functional level that could monitor failures if the instrumentation associated with that function were lost. The scope of the instrumentation and the criteria established appeared appropriate. This item is considered closed.

E8.3 (Closed) Inspection Follow-up Item(50-331/94011-01DRS)): Relief Valve Testing May Not Be in Accordance with OM-1 (Use of Certified Correlations). The licensee was resolving this concern by having the relief valve manufacturer perform tests and to develop certified relief valve correlations. This testing, however, was not scheduled to be completed for several years. In the interim, the licensee continued to use the correlations from the vendor manual in relief valve test procedure STP-NS590006, "ASME/ANSI OM-1 Valve Testing." A note added to the procedure indicated that the correlation curves were under development by the vendor. The licensee was tracking this effort by AR No. 15962 and would incorporate any temperature correlation changes into the relief valve test procedure, as appropriate. Based on the actions taken and planned, this item is considered closed.

IV. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management in an exit meeting on June 18, 1999. Also, a telephone re-exit was conducted on July 1, 1999. The inspectors noted that no documents provided during the inspection were identified as proprietary. The licensee acknowledged the information presented and agreed that no proprietary information was provided to the inspectors.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Franz, Vice President, Nuclear
R. Anderson, Outage and Support Manager
M. McDermott, Engineering Manager
D. Lausar, System Engineering Manager
D. Jantosik, Quality Assurrance Manager
K. Putnam, Licensing Manager
R. Murrell, Regulatory Communication Supervisor
R. Portz, Support Systems Supervisor
J. Quimby, Project Engineering
B. Klotz, Action Request Administrator
B. Bernier, Systems Engineering Team Lead
S. McVay, System Engineer
C. Charlier, Engineering Assisstant
C. Bock, System Engineer
G. Holt, Project Engineer
K. Furman, Maintenance Support
M. Wood, Project Engineer
R. Howe, Project Engineer
S. Russell, Quality Assurance
L. Swenzinski, Licensing Engineer
C. Rushworth, Licensing Engineer
S. Presler, Program Engineer
D. Church, Program Engineer
C. Nelson, Engineer
J. Bjorseth, Maintenance
k. Morgan, Quality Assurance
W. Wertman, Quality Assurance
D. Peterson, System Engineer
M. Fairchild, Quality Assurance
G. Hawkins, Project Engineer Team Lead
A. Roderick, Mechanical Engineer

NRC

P. Prescott, Duane Arnold Senior Resident

INSPECTION PROCEDURES USED

IP 37001:	10 CFR 50.59 Safety Evaluation Program
IP 37550:	Engineering
IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving and Preventing Problems
IP 92903:	Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-331/99005-01(DRS)	NCV	Inadequate Design Controls
50-331/99005-02(DRS)	NCV	Inadequate Corrective Actions

Closed

50-331/99005-01(DRS)	NCV	Inadequate Design Controls
50-331/99005-02(DRS)	NCV	Inadequate Corrective Actions
50-331/97015-01(DRS)	VIO	Inappropriate use of Reliability and Plant Level Performance Criteria
50-331/97015-02(DRS)	IFI	Performance Criteria for Instrumentation used in Emergency Operating Procedures
50-331/94011-01(DRS)	IFI	Relief Valve Testing May Not Be in Accordance with OM-1 (Use of Certified Correlations)

Discussed

None

LIST OF ACRONYMS USED

ACP	Administrative Control Procedure
ANSI	American National Standards Institute
AR	Action Requests
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CNST	Construction
DAEC	Duane Arnold Energy Center
DRS	Division of Reactor Safety
ECCS	Emergency Core Cooling System
ECP	Engineering Change Package
ELU	Emergency Lighting Unit
EMA	Engineering Maintenance Action
EOP	Emergency Operating Procedure
FSAR	Final Safety Analysis Report
GMP	General Maintenance Procedure
IFI	Inspection Follow-up Item
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
OM	Operations and Maintenance
OSS	Operations Shift Supervisor
PMT	Post Modification Test
QA	Quality Assurance
RFO	Refueling Outage
RHR	Residual Heat Removal System
RPS	Reactor Protection System
SE	Safety Evaluation
SEAR	Safety Evaluation Applicability Review
STP	Surveillance Test Procedure
TMOD	Temporary Modification
TS	Technical Specification
VIO	Violation
UFSAR	Undated Final Safety Analysis Report

LIST OF DOCUMENTS REVIEWED

The following is a list of licensee documents reviewed during the inspection, including documents prepared by others for the licensee. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but, rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Nor does inclusion in this list imply NRC acceptance of the document, unless specifically so stated in the body of the inspection report.

Assessments and Audits

Surveillance Inspection Report No. DAEC-SIR-09
Surveillance Inspection Report No. DAEC-SIR-12
Surveillance Inspection Report No. DAEC-SIR-14
Surveillance Inspection Report No. DAEC-SIR-15
Surveillance Inspection Report No. DAEC-SIR-16
Surveillance Inspection Report No. DAEC-SIR-18

Calculations

CAL-M97-015, Revision 1, Re-assessment of DAEC RPV Fatigue Usage
CAL-M97-014, Revision 1, Feedwater Nozzle Fatigue & Fracture Mechanics Analysis - Pipe Stress & Pipe Support Evaluation for EMA A34261, A34263, A34264 and A34265
CAL-E94-014, Revision 2, ECCS Pump Start Time Delays, Core Spray, RHR (LPCI) Pumps
CAL-VC1-032, Revision 2, Compartment Press Following Steam Pipe Break RHR, HPCI, RCIC
CAL-E88-005, Revision 3, Limiting Power for DC MOVs - (AR 971034)
CAL-E98-001, Revision 1, 4.16 Kv Essential Bus Undervoltage Relay Setpoint CALC
CAL-E98-003, Revision 2, Temperature Rise and Effects on Target Rock and Valcor Solenoid Valves due to heat trace addition
CAL-IELP-M92-098, DAEC Battery Rooms Maximum Temperature
CAL-IELP-M92-099, DAEC Battery Rooms Exhaust Rates
CAL-M93-060, GL89-10 Maximum Thrust Analysis for Motor Operated Valves
CAL-0460-147-1461, Battery and Switchgear Room HVAC Duct Mod

Modifications

Engineering Maintenance Actions (EMAs)

A 35427C	Changing low flow trip setpoint and rewiring the 'A' control building chiller
A 36459	Replacement of ID22 battery charger filter capacitors
A 39221	Replace coil in CR 120A relay 95-042B with 120 Vac rated Coil
A 41331	Replacement of FT5829A from GE Model 554 to Gulton Statham Model DR3200
A 47721	Increase the size of overload heaters in 1B5319 from H54 to H55
A 49254	Lowering of setpoint on PS2040A
A 1099102	The existing 60 ft-lb motor MO4627-0 was replaced with a larger 80 ft-lb motor
A 41163A	During performance of STP NS13B009, the diesel engine 1P049-E over-heated BS3300 was found to be clogged
A 37682	The limit switch furnished with the valve and actuator combination is different from the Installed limit switch

A 38491	Installation of a pressure relief valve to alleviate high pressure buildup for sprinkler #5
A 32674	Silt Affecting Calibration of Transmitter
A 34261	Check Valves Nitrogen System for SRV Accumulators
A 34261	Design Verification Summary
A 34265	Check Valve Replacement Nitrogen System for SRV Accumulators
A 34265	Design Verification Summary Report
A 36292	Change Existing Reactor Vessel Recirculation O-Ring Materials in Flow Control Valves for Recirculation Pump Seal
A 36577	Manual Operator for V29-0037, River Water Supply System
A 38464	Replacement Valve for PS4929B-V-01, ESW System Pressure Boundary
A 40334	Snubber Replacement for A & B Recirculation Pump Motors
A 48127	Replace 1P002B with a new Pump and Motor Assembly (Feedwater System)

Engineering Change Packages (ECPs)

ECP 1582, Revision 0, Modification of Damper Isolation Logic
ECP 1590, Revision 0, ECCS minimum Flow Instruments Modifications
ECP 1602, Revision 0, Install two pressure switches in the control building chiller control circuits
ECP 1608, Revision 0, Replacement of heat tracing on sample lines to H2-O2 analyzers
ECP 1593, Revision 0, HPCI Keep Fill MOD
ECP 1595, Revision 0, MSIV Drain Line MOD
ECP 1596, Revision 0, Controller for Control Building Chillers
ECP 1608, Revision 0, H2O2 Common Sample Line Modification

Procedures

ACP 1203.225, Revision 9, "Environmental Qualification Assessment"
ACP 109.1, Revision 12, "Engineered Maintenance Action"
ACP 114.5, Revision 19, "Action Request System"
ACP 114.4, Revision 6, "Corrective Action Program"
ACP 1408.9, Revision 4, "Control of Transient Equipment"
ACP 1408.2, Revision 6, "Scaffold Control"
ACP 1203.70, Revision 4, "Setpoint Control"
ACP 1203.701, Revision 8, "Setpoint Control Applicability"
ACP 107.0, Revision 7, "Surveillance Tests, Special Tests and Experiments"
ACP 1203.21, Revision 7, "Engineering Calculations"
ACP 113.3, Revision 5, "Training and Qualification Programs"
ACP 102.1, Revision 11, "Review of Industry -Related Documents"
ACP 102.17, Revision 8, "Pre-Job Briefs and Infrequently Performed Tests and Evolutions"
ACP 102.10, Revision 8, "Preparation, Review and Processing of UFSAR Change Requests and UFSAR Revisions"
ACP 103.2, Revision 12, "Safety Evaluation Applicability Review Process"
ACP 103.3, Revision 10, "Safety Evaluation Process"
ACP 106.0, Revision 5, "Design Document Distribution and Use"
ACP 109.0, Revision 13, "Engineering Change Packages"
ACP 114.3, Revision 10, "LER Processing and Root Cause Analysis"
ACP 114.5, Revision 19, "Action Request System"
ACP 1206.7, Revision 11, "Control of Design Document Changes"

ACP 1213.3, Revision 1, "Position/Task Specific Training Programs"
ACP 1402.3, Revision 13, "Regulatory Reporting Activities"
ACP 1407.4, Revision 12, "Special Test Procedures"
ACP 1410.6, Revision 23, "Temporary Modification Control"
ACP 1203.21, Revision 7, "Engineering Calculations"
WPG-2, Revision 6, "On-Line Risk Management Guideline"
GMP-CNST-09, Revision 6, "Scaffolding"
QA 1101.1, Revision 18, "Corporate QA Department Organization"
STP 3.3.3.2-11, Revision 1, "Torus Water Level Instrument Calibration"
STP 3.7.4-03, Revision 1, "Control Room Positive Pressure Test"
STP 410A001-CY, December 1997 thru April 13, 1998, "Control Room Positive Pressure Test"
STP NS590006, Revision 0, "ASME/ANSI OM-1 Valve Testing"
STP 3.8.1-03, Revision 2, "Standby Diesel Generators Operability Test"
STP 3.8.1-05, Revision 4, "Standby Diesel Generators Operability Test (Slow Start From Emergency Start Air)"
STP 3.8.1-06, Revision 6, "Standby Diesel Generators Operability Test (Fast Start)"
STP 3.8.1-07, Revision 3, "LOOP-LOCA Test"

10 CFR 50.59 Evaluations

SE 97-49	Safety Evaluation for ECP 1590
SE 97-78	Safety Evaluation for ECP 1593
SE 98-052	Safety Evaluation for ECP 1608
SE 97-49	Safety Evaluation for ECP 1590
SE 97-116	Safety Evaluation for ECP 1602
SE 97-61	HPCI turbine exhaust high pressure turbine nominal trip setpoint
SE 98-067	Control, temperature, CB H&V, cable spreading room exhaust (EMA No. A28278)
SE 97-53	Temporary Modification (TM) to replace radwaste conductivity element
SE 97-055	TM for low level radwaste office area cooling unit
SE 97-75	Blank flange for condensate phase separator tanks
SE 97-76	T-seal replacement interval
SE 97-88	CRD pressure indicator location
SE 97-99	TM to measure well water flow to control building chillers
SE 97-118	TM to repair leak in drain line to main condenser
SE 98-012	TM for moisture separator reheaters drain and dump valves pneumatic jumper
SE 98-032	Temporary shielding on reactor water cleanup and residual heat removal piping
SE 98-036	Temporary shielding on reactor water cleanup discharge line
SE 98-037	TM to cross-tie service air to containment atmosphere control
SE 98-042	TM for maintenance on RHR loop 'A' torus suction isolation valve
SE 98-43	TM for monitoring residual heat removal service water/emergency service water pit level
SE 98-044	TM for CV3032 gagging device
SE 98-075	Removal of auto/manual stop switch for electric fire pump
SE 98-076	TM for inducing DP across LPC inject check valves
SE 98-115	Temporary pressure transmitter installation for feedwater
SE 98-0117	Provide shutdown cooling suction header bleedoff line
SE 99-001	Blank flange to maintain control building envelope during replacement of SFU charcoal
SE 99-003	Condenser air inleakage test

SE 99-022 Lifting RHR shutdown cooling leads (relays K15A and K16A) from MO1908
Safety Evaluation Applicability Review for EMA A32674
Safety Evaluation Applicability Review for EMA A34261
Safety Evaluation Applicability Review for EMA A34265
Safety Evaluation Applicability Review for EMA A40334
Safety Evaluation Applicability Review for ECP 1617, Revision 0, May 25, 1999

Operability Determinations

AR 10946	Control Room and Battery Room Damper
AR 11837	Bearing Insulating Washer not installed on 1G031
AR 13823	Seismic evaluations impacted by Velan valve weight discrepancies
AR 14048	Core Spray Motor top bearing showed increased vibration
AR 14186	An SFU power supply mounting bracket is missing
AR 14371	Missed weld inspections per UFSAR 6.3.4.2.4
AR 14656	DCA-004-SSB-004 Snubber fluid will not meet radiation requirements
AR 14484	Diesel Fire pump fuel supply shutoff valve found out of position
AR 14624	Offgas Stack Exhaust Fan Power Supply is missing brackets
AR 14877	Spurious MO2321 Alarms during post maintenance testing
AR 14896	Upgrade of Instrument AC Systems Components
AR 14982	Emergency Service Water Pump motor shaft rotated in reverse after pump shutdown
AR 15044	Rotometer out of calibration

Action Requests (ARs)

AR 10146	Replacement of PSA-100 Mechanical Snubber
AR 10713	UFSAR Table 3.2-1 Code Discrepancy
AR 98-0236	Review of UFSAR Table 3.2-1 Code Discrepancy
AR 14656	DCA-004-SSB-004 Does Not Meet BECH-MRS-M277-S, Revision 2 Specifications
AR 15223	Engineering Calculation CAL-VC1-032, Lacks Purpose, Assumptions & Other Required Content
AR 15224	Procedure ACP 1203.21, Engineering Calculations
AR 15752	Update UFSAR Reactor Vessel Fatigue Values
AR 972703	Replacement of PSA-100 Mechanical Snubber
AR 8013	Management Guidelines for Erecting Scaffolds in Seismic/Safety Related Areas
AR 9081	Removal of Valve Internals to CV3504B Violated Secondary Containment
AR 11506	CV4419 Failed its LLRT per STP 47A005-SP
AR 11769	Past Operability" of 1C218A&B (Primary Containment H2-O2 Analyzer Panels)
AR 101007	LCO for 125 VDC Battery 1D1
AR 10946	Switchgear and Battery Rooms Low Air Flow
AR 8230	ROR 97-035: Scaffolding Constructed in Wrong Place
AR 1168	Perform a Review of the "Scaffold Program"
AR 8231	Design Support for Torus Room Scaffolding
AR 8232	Generic Scaffold Support Brackets for Torus Room
AR 10781	Scaffolding Stacked Too High in Reactor Building Third Floor
AR 9655	NRC IN97-71: Inappropriate Use of 10 CFR 50.59 Regarding Reduced Seismic Criteria for Temporary Conditions

AR 9713	Work Performed on "Red Tagged" Scaffold
AR 980681	Scaffold Storage in Reactor Building
AR 9937	Error in SBO Core Cooling Water Inventory Evaluation
AR 981021	Retainer Ring" on the "Pole Handling System" Lost in Reactor Cavity
AR 11504	Lost Parts in Spent Fuel Pool
AR 12819	Failed Electrical Chemical Potential Electrodes (Loose Parts)
AR 13884	Foreign Object in 250VDC Battery Pilot Cell
AR 8992	Recommendations From Foreign Material Control Assessment
AR 14119	FME Found Inside Rebuilt Spare EDG Coolant Pump
AR 7525	Alternatives to the Use of Duct Tape and Ty-wrap in the "Power Block"
AR 10142	Tagout Procedures - QA Assessment
AR 13043	Inadequate Tagout Request
AR 9782	Tagging Errors - Lacking Verification
AR 10023	Missed Verifications on Tagouts
AR 13696	FIN process for Tech Spec and TRM Related Equipment Does Not Ensure Required Post-Maintenance Testing is Performed
AR 7523	Use of Hemp vs. Nylon Rope in the "Power Block"
AR 9778	1P049 (Diesel Driven Fire Pump) Found Inoperable During STP NS13B009 Due to High Jacket Temperature
AR 9780	Stainer Basket With Incorrect Mesh Size Found in (1P049 Cooling Water Supply Basket)
AR 962339	ACP 1410.5 Not Followed When a Tagout was Released by "Other than Initiator"
AR 980626	Multiple Occurrences of Improper Control of Transient Equipment
AR 11251	Temporary Transformers on Wheel Cart Not Secured
AR 10975	Wheeled Racks" on North Turbine Op Deck Not Secured
AR 15836	Operability Evaluation Tracking
AR 9559	FME Zone Sign Lost in Spent Fuel Pool
AR 11079	Refuel Floor FME Zone Material Logging and Use Problems
AR 14719	Root Cause Report - RWCU Out of Service Time Extended
AR 14402	Maintenance Rule Module 4 Section 6.A.2 Evaluation
AR 98-0488	Operability Determination
AR 13730	SEN 190-Pressurizer Spray Valve Bonnet Nuts Dissolved by Boric Acid Leak
AR 13964	Air entrapment and inappropriate valve operations
AR 14137	Rosemount 10CFR21 Report on Model 1153B transmitters
AR 14321	GE SIL-566, Supplement 1, Misaligned GE BWR Fuel Assemblies
AR 14423	Thomas and Betts Part 21 Letter re: Agastat E7000 Relays
AR 14830	GE SIL-614, Rev. 1, "Backup Pressure Regulator"
AR 14852	NRC IN 99-04: Unplanned Rad. Exposure to Radiographers
AR 15083	NRC IN 99-10: Degradation of Prestressing Tendon Systems in Prestressed Concrete Containments
AR 15558	Incorrect Drawing Mark-up (Control room) on Temp Mod

Root Cause Reports

AR 98-1200 - Adverse Trend in Significant RF015 Issues
Quality Assurance Trend Report - January 1998
Quality Assurance Trend Report - February 1998
Quality Assurance Trend Report - Second Quarter 1998
Quality Assurance Trend Report - Third Quarter 1998

Quality Assurance Trend Report - Fourth Quarter 1998
Quality Assurance Trend Report - First Quarter 1999
Quality Assurance Quarterly Assessment Report - First Quarter 1999

Temporary Modifications

98-043	Remove potential fire hazard in wvr 4000 by opening PT's and shorting CT's
98-071	Source of coolant for radwaste ozone generator skid
98-028	Recorders removed from service due to insulation degradation 98-072, Temporary power for ECP 1610 (UV/Ozone System) installation in LLRPSF
99-013	Attach valves and pipe fittings onto V-83-34 to provide Radwaste Operations with a supply of Demin Water to the Radwaste Sample System Instrument Rack for normal daily activities
99-030	Lift MO1908 leads routed through drywell penetration 1JX105A due to short circuits

Miscellaneous Documents

NRC IN 97-71: Inappropriate Use of 10 CFR 50.59 Regarding Reduced Seismic Criteria for Temporary Conditions
QA Manual, Chapter 2, Revision 14, "QA Program"
QA Manual, Chapter 16, Revision 13, "Audits"
Safety Evaluation Qualification Status For DAEC Personnel
Cyclic Report of Facility Changes, Tests, and Experiments, Fire Plan Changes and Commitment Changes, March 1, 1997 Through September 30, 1998
Operations Committee Charter, Revision 21
Fourth Quarter 1998 Report on Open and Follow-Up Industry Operating Experience Documents, January 20, 1999
Project Engineering 1999 Goals, January 12, 1999
Project Engineering 1999 Goal Area Expectations, January 12, 1999
Long-Standing Equipment Problems
Operator Workarounds
System Monitoring and Reporting Tool (SMART) Users Guide, April 1999
Engineering Information Center Users Guide, June 1999
Equipment Issue Resolution Database Users Guide, February 1999
DAEC Maintenance Rule Document:
Module 0, "Overview," Revision 2, September 16, 1997
DAEC Performance Criteria Basis Documents:
Secondary Containment/Standby Gas Treatment, Revision 1, November 4, 1997
Fuel Handling System, Revision 1, December 19, 1997
Reactor Building Sump System, Revision 1, December 19, 1997
Containment Atmosphere Control System, Revision 4, December 9, 1997
Control Room Indication Instrumentation Used for Significant EOP Decisions, Revision 0, March 25, 1998
NG-97-2056 DAEC Reply to Notice of Violation Letter to NRC for Inspection Report 97015
NG-99-0789, Procedure Changes Due to Penetration 1JX105A Conditions
WR A42356 'B' Recirc Pump Motor Snubber to Meet RAD Exposure Requirements", Scheduled RFO16

CWO A43366 Disconnect and Insulate Welding Cables in Penetration 1JX105A, and Penetration Test Plan
SPEC DES 7884-M-119, Revision 2, Addendum 3, "Technical Specification for Pipe Hangers, Supports & Restraints for the Duane Arnold Nuclear Power Plant Unit 1"
UFSAR Change Request for ECP 1608, December 2, 1998
Operability Evaluation for Hydraulic Snubber Radiation Exposure (DCA-004-SSB-004)

Drawings

BECH-E122<002A>, Revision 7, Nuclear Steam Supply Shutoff System
BECH-E122<002B>, Revision 1, Nuclear Steam Supply Shutoff System
BECH-E122<004>, Revision 13, Nuclear Steam Supply Shutoff System
BECH-E122<04A>, Revision 0, Nuclear Steam Supply Shutoff System
BECH-E113<89>, Revision 7, Heating and Ventilating Systems
BECH-M120, Revision 55, Residual Heat Removal System
BECH-M139, Revision 47, Floor Drain Radwaste System
BECH-M155-038<2>, Revision 20, Wiring Diagram Cubicle IC-31
BECH-M164, Revision 27, Ventilation System Radwaste Building
BECH-M183, Revision 17, Radwaste Sample System
BECH-M189<01>, Revision 15, Hydrogen Water Chemistry System
BECH-M117, Revision 56, Control Rod Drive Hydraulic System
BECH-M114, Revision 58, Nuclear Boiler System
APED-C71-004<04>, Revision 30, Reactor Protection System
APED-C71-004<06>, Revision 29, Reactor Protection System
APED-C71-004<08>, Revision 23, Reactor Protection System
APED-C71-004<14>, Revision 29, Reactor Protection System
APED-E11-007<03>, Revision 39, Residual Heat Removal System
APED-E11-007<04>, Revision 40, Residual Heat Removal System
APED-E11-007<05>, Revision 40, Residual Heat Removal System
APED-E11-007<06>, Revision 26, Residual Heat Removal System
APED-E11-007<07>, Revision 37, Residual Heat Removal System
APED-E11-007<08>, Revision 26, Residual Heat Removal System
APED-E11-007<09>, Revision 25, Residual Heat Removal System
APED-E11-007<10>, Revision 26, Residual Heat Removal System
APED-E11-007<10A>, Revision 06, Residual Heat Removal System
APED-E11-007<11>, Revision 28, Residual Heat Removal System
APED-E11-007<12>, Revision 17, Residual Heat Removal System
APED-E11-007<13>, Revision 25, Residual Heat Removal System
APED-E11-007<14>, Revision 32, Residual Heat Removal System
APED-E11-007<15>, Revision 15, Residual Heat Removal System
APED-E11-007<16>, Revision 30, Residual Heat Removal System
APED-E11-007<17>, Revision 15, Residual Heat Removal System
APED-E11-007<18>, Revision 24, Residual Heat Removal System
APED-E11-007<19>, Revision 16, Residual Heat Removal System
APED-B31-016<03>, Revision 18, Reactor Recirculation Pump and M-G Set