

## Duane Arnold 2Q/2014 Plant Inspection Findings

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### Initiating Events

**Significance:** G Jun 30, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO ESTABLISH FIRE PATROLS AS COMPENSATORY ACTIONS IN ACCORDANCE WITH THE FIRE PROTECTION PROGRAM.**

The inspectors identified a finding of very low safety significance (Green) and associated non-cited violation of Duane Arnold Energy Center (DAEC) Renewed Operating License Condition 2.C.(3), for the failure to implement compensatory measures for non-functional fire suppression deluge systems. Specifically, the licensee did not establish hourly fire patrols within 1 hour of discovering the non-functional status of deluges 3 and 4 in accordance with Technical Requirements Manual (TRM) Limiting Condition for Operation (TLCO) 3.11.4, "Fire Suppression Deluge and Sprinkler Systems," Condition A.2. The licensee documented the issue in the corrective action program (CAP) as condition reports (CRs) 01959153, 01964875, 01964878, 01968702, 01968720 and 01971501; and implemented fire patrols until the deluge systems were satisfactorily tested per TRM requirements.

The performance deficiency was determined to be more than minor and a finding in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," because it impacted the Reactor Safety - Initiating Events Cornerstone of Protection Against External Factors to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The inspectors also determined that if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern. The inspectors applied IMC 0609, Attachment 4, "Initial Characterization of Findings," to this finding. The inspectors answered "Yes" to question E.2(2), "Does the finding involve fixed fire protection systems or the ability to contain a fire within Table 3 – SDP Appendix Router," and transitioned to IMC 0609, Appendix F, "Fire Protection Significance Determination Process." The inspectors processed the finding in accordance with Fire Protection SDP Phase 1 Screening in IMC 0609, Appendix F, Attachment 1 and answered "Yes" to Step 1.3, Task 1.3.1 question, "Is the reactor able to reach and maintain safe shutdown (either hot or cold) condition?" Therefore, the finding screened as very low safety significance (Green).

The inspectors determined that the performance characteristic of the finding that was the most significant causal factor of the performance deficiency was associated with the cross-cutting aspect of Consistent Process in the Human Performance area and involving individuals using a consistent, systematic approach to make decisions.

Inspection Report# : [2014003](#) (*pdf*)

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### Mitigating Systems

**Significance:** G Jun 30, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO PRESCRIBE WORK ORDER PLANNING PROCEDURE APPROPRIATE TO THE**

**CIRCUMSTANCES.**

The inspectors identified a finding of very low safety significance (Green) and associated non-cited violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to prescribe a procedure appropriate to the circumstances for work order planning as related to the failure of under-voltage relay 127-SB2. Specifically, procedure MA-AA-203-1001, "Work Order Planning," Section 4.2, Step 2, inappropriately allowed the selection of model work orders without verification of the acceptance criteria, requirements for as-found/as-left data, set points, and other related information. The issue was entered into the licensee's CAP for resolution as CRs 01972812 and 01972807; and the licensee took actions to add a verification step to procedure MA-AA-203-1001, Section 4.2, Step 2, to verify the procedure being referenced contained the relevant information to the work task being accomplished.

The inspectors determined that the issue of concern represented a performance deficiency because it was the result of the licensee's failure to prescribe a procedure appropriate for the circumstances. The performance deficiency was determined to be more than minor and a finding in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," because if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern. The inspectors applied IMC 0609, Attachment 4, "Initial Characterization of Findings," to this finding. The inspectors answered "No" to all questions within Table 3 – SDP Appendix Router, and transitioned to IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." Per Exhibit 2 – Mitigating Systems Screening Questions, the inspectors determined that because the finding did not represent an actual loss of function (redundant loss of power instrumentation remained operable during the period of the 127-SB2 inoperability), the finding screened as very low safety significance (Green).

The inspectors determined that the performance characteristic of the finding that was the most significant causal factor of the performance deficiency was associated with the cross-cutting aspect of Evaluation in the Problem Identification and Resolution area and involved the organization thoroughly evaluating issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance.

Inspection Report# : [2014003](#) (*pdf*)

**Significance:**  Oct 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

**Failed to Establish Measures for the Selection and Review for the Suitability of Safety-Related Cables.**

The inspectors identified a finding of very low safety significance and an associated NCV of Title 10, Code of Federal Regulations (CFR), Part 50, Appendix B, Criterion III, "Design Control," where the licensee failed to establish measures for the selection and review for the suitability of safety-related cables with Procedure Electrical Cable Program Manual (ECPM) 4.5, "Electrical Cable Operability," Revision 2. Specifically, ECPM 4.5, Attachment 1, "Qualification of Cables in Wetted Environments," allowed for safety-related cabling that was not qualified or specifically designed for total submergence in water to be used in water filled conduits contrary to its unsuitability for this application, without suitable testing or design control measures. The licensee entered the issue into their Corrective Action Program as Action Request (AR) 01902782, "ECPM – Electrical Cable Operability," dated September 10, 2013, which suspended the use of ECPM 4.5 by quarantining the procedure until the identified discrepancies could be resolved.

The performance deficiency was determined to be more than minor because the finding, if left uncorrected, would become a more significant safety concern. Specifically, not identifying and appropriately evaluating degraded or non-conforming conditions to properly assess the operability of cables subjected to protracted and/or extensive exposure to water could warrant not declaring a structure, system, and component (SSC) inoperable by the use of compensatory actions to maintain or enhance a degraded or non-conforming condition. This finding has a cross-cutting aspect in the area of human performance, decision making because the licensee did not use conservative assumptions in implementing ECPM 4.5, "Electrical Cable Operability," Revision 2. Specifically, the licensee failed to perform an

effective review of the consequences of their decision to include an attachment to this procedure that provided a method not previously approved for qualifying safety-related cables for submergence.

Inspection Report# : [2013008](#) (*pdf*)

**Significance:**  Oct 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

**Failed to Ensure the SBDG Power Cables Were Not Submerged.**

The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to correct a condition adverse to quality following discovery of water and mud in safety-related electrical conduit 1K109 associated with the 'A' Standby Diesel Generator (SBDG). Specifically, the licensee identified an obstruction characterized as "mud" located 8-feet from the turbine building (TB) end of conduit 1K109. As a result, the licensee failed to take corrective action to remove the water and mud from the conduit and to evaluate the mud obstruction. The licensee entered the finding into their Corrective Action Program as AR 01909315, "NRC 5059/MOD Inspection Violation of App B Criterion 16," dated October 3, 2013. The licensee has performed insulation resistance checks on the EDG power cable and obtained satisfactory results. Additionally, the licensee performed an evaluation of the mud-like material in the conduit and determined that it is likely cable pulling compound, as opposed to degraded cable jacket material. The licensee also set a date for further inspection of the conduit to April 2014, which coincides with the next EDG outage period. These corrective action items are being tracked in CR 1909315. Additionally the licensee is evaluating the frequency interval for inspecting this and other similar conduits.

The performance deficiency was determined to be more than minor because the finding was associated with the Mitigating Systems' cornerstone's attribute of design control for ensuring the availability, reliability, and capability of systems that respond to Initiating Events to prevent undesirable consequences. Specifically, material characterized by the licensee as mud facilitated continual exposure to a wetted and water submergence environment of the safety-related 'A' SBDG power cables. Continual exposure to a wetted and water submergence environment could lead to cable failure. Cable failure would prevent the system from carrying out its intended safety-related function of automatically starting and connecting to its corresponding essential service bus to supply power to emergency loads in an event (i.e., a loss-of-coolant-accident (LOCA) and/or degraded/under-voltage condition). This finding has a cross-cutting aspect in the area of human performance, decision-making because the licensee did not use conservative assumptions to correct a condition adverse to quality following discovery of water and mud in safety-related electrical conduit 1K109 associated with the 'A' SBDG. Specifically, the licensee failed to perform an effective review of the safety-related consequences of their decision not to complete the inspection of conduit 1K109 to ensure that no water and mud remained inside the conduit subjecting the cables to a submergence environment.

Inspection Report# : [2013008](#) (*pdf*)

**Significance:**  Sep 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

**EXTENT OF CONDITION NOT PROPERLY EVALUATED.**

A finding of very low safety significance and associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified by the inspectors for the licensee's failure to accomplish safety-related procedure EN-AA-203-1001, "Operability Determinations/Functionality Assessments." Specifically, during the Fall 2012 refueling outage, the licensee failed to evaluate the extent of condition under a prompt operability determination (POD) for the 'A' residual heat removal service water (RHRSW) subsystem after identifying several locations of the 'B' RHRSW supply piping that was less than the minimum acceptable wall thickness. By not performing a POD, the operations shift manager (OSM) was not able to perform his or her

responsibility to review, assess, and approve the operability call regarding the potential for wall thinning of the 'A' RHRSW piping. The licensee entered the inspectors' concerns into the CAP as Condition Report (CR) 01892263. The licensee completed a POD to evaluate the extent of wall thinning condition for the 'A' RHRSW subsystem and determined that the 'A' RHRSW subsystem was operable but with reduced margin to design specifications. This was reviewed and approved by the OSM. The inspectors determined that the issue of concern represented a performance deficiency because it was the result of the licensee's failure to meet a procedural requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor and a finding because if left uncorrected, failing to properly assess the impact of extent of condition for operability on similar structures, systems, or components (SSCs) would have the potential to lead to a more significant safety concern. The inspectors applied IMC 0609, Attachment 4, "Initial Characterization of Findings," to this finding. Because the finding pertained to operations while the plant was both shutdown and operating, the inspectors referenced both IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process," and IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." Per IMC 0609, Appendix G, the inspectors determined that the finding did not require a quantitative assessment and therefore screened as very low safety significance (Green). Additionally, per IMC 0609, Appendix A, the inspectors determined that although the finding was a deficiency affecting the design and qualification of the SSC, the SSC maintained its operability and therefore also screened as very low safety significance (Green).

The inspectors determined that the performance characteristic of the finding that was the most significant causal factor of the performance deficiency was associated with the cross-cutting aspect of Human Performance, having Decision Making components, and involving the licensee making safety or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. Further, this includes formally defining the authority and roles for decisions affecting nuclear safety, and implementing these roles and authorities as designed. Specifically, the evaluation of extent of condition for the identified pipe wall thinning of the 'B' RHRSW subsystem was not performed under the systematic operability determination process which resulted in bypassing the OSM's role in assessing and approving operability following the identification of a degraded or non-conforming condition.

Inspection Report# : [2013004](#) (*pdf*)

**Significance:** **W** Sep 30, 2013

Identified By: NRC

Item Type: VIO Violation

**RCIC TURBINE OVERSPEED TRIP.**

A finding and apparent violation of Technical Specification (TS) Limiting Condition for Operation (LCO) 3.5.3, Condition B was self-revealed for the licensee's failure to perform an immediate operability determination (IOD) in accordance with licensee procedures on June 21, 2013, when a RCIC system turbine speed indicator in the main control room was found degraded. Specifically, the licensee failed to consider the degraded speed indication indicative of a problem within the RCIC EG-M circuitry (failed voltage-dropping resistor) that resulted in the inoperability of RCIC on August 22, 2013, when the RCIC turbine tripped on overspeed during post-maintenance surveillance testing. The licensee documented the issue in CR 01898931. Corrective actions included the replacement of the voltage-dropping resistor for the RCIC EG-M power supply, a review of extent of condition, and performing appropriate post-maintenance testing.

The inspectors determined that the licensee's failure to perform an immediate operability determination in accordance with licensee procedures on June 21, 2013, when a RCIC system turbine speed indicator in the main control room was found degraded was a performance deficiency, because it was the result of the failure to meet a procedure requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor and a finding because it impacted the Mitigating Systems Cornerstone attribute of equipment performance and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent

undesirable consequences. Specifically, the performance deficiency resulted in the inoperability of the RCIC system from June 21 through August 24, 2013.

Inspection Report# : [2013004](#) (pdf)

Inspection Report# : [2014007](#) (pdf)

**Significance:** **W** Sep 05, 2013

Identified By: Self-Revealing

Item Type: VIO Violation

**'A' STANDBY DIESEL GENERATOR LUBE OIL HEAT EXCHANGER GASKET FAILURE.**

A finding and violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed for the licensee's failure to prescribe a work instruction of a type appropriate to the circumstances for the re-assembly of the 'A' standby diesel generator (SBDG) lube oil (LO) heat exchanger (HX), an activity affecting quality. Specifically, on October 18, 2012, work order 40132858 was performed to replace the 'A' SBDG LO HX tube bundle assembly. On March 8, 2013, the LO HX tube bundle sheet-to-shell gasket catastrophically failed, rendering the 'A' SBDG unavailable. The gasket failure was attributed, in part, to the work order not containing sufficient detail and acceptance criteria, appropriate torque values, and operating experience information to ensure the gasket was properly compressed. The licensee documented the issue in condition report (CR) 01855032 and immediate corrective actions included a replacement of the 'A' SBDG LO HX gasket.

The inspectors determined that the licensee's failure to prescribe a work order appropriate to the circumstances was a performance deficiency, because it was the result of the failure to meet regulatory requirements, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor and a finding because it impacted the Mitigating Systems cornerstone attribute of equipment performance and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in the failure of the 'A' SBDG LO HX gasket during a maintenance run of the engine on March 8, 2013. This finding was assessed based on the best available information using the applicable Significance Determination Process (SDP) and based on the risk evaluation, the significance determination was White or low to moderate safety significance.

Inspection Report# : [2013010](#) (pdf)

Inspection Report# : [2013011](#) (pdf)

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## Barrier Integrity

**Significance:** **G** Jun 30, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO ACCOMPLISH PROCEDURE FOR REPETITIVE MALFUNCTIONS OF REFUEL FLOOR RADIATION MONITOR.**

A finding of very low safety significance and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified by the inspectors for the licensee's failure to accomplish procedure EN-AA-203-1001, "Operability Determinations/Functionality Assessments." Specifically, on multiple occasions but as recently as March 20, 2014, the licensee failed to properly evaluate operability following intermittent downward spikes of the 'A' refueling floor exhaust duct – high radiation monitor (RIS-4131A). The improper operability evaluations resulted in not declaring RIS-4131A inoperable when appropriate, improper

prioritization of investigation of the cause, and untimely resolution of the degraded conditions. The licensee entered the inspectors' concerns into the CAP as CR 01954560. The licensee invoked a policy to properly assess operability in the interim, completed a prompt operability determination (POD) to evaluate intermittent downward spikes, completed a past operability review (POR), and ultimately identified the cause and implemented repairs to RIS-4131A.

The inspectors determined that the issue of concern represented a performance deficiency because it was the result of the licensee's failure to meet a procedural requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor and a finding in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," because it impacted the Barrier Integrity Cornerstone Attribute of structure, system, and component (SSC) and Barrier Performance, and adversely affected the Cornerstone objective of maintaining containment and radiological barrier functionality. The inspectors applied IMC 0609, Attachment 4, "Initial Characterization of Findings," to this finding. The inspectors answered "No" to all questions within Table 3 – SDP Appendix Router, and transitioned to IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." Per Exhibit 3 – Barrier Integrity Screening Questions, the inspectors answered "No" to questions B.1 and B.2, and "Yes" to question C.1, therefore, the finding screened as very low safety significance (Green).

The inspectors determined that the performance characteristic of the finding that was the most significant causal factor of the performance deficiency was associated with the cross-cutting aspect of Human Performance, Consistent Process, and involving individuals using a consistent, systematic approach to make decisions.

Inspection Report# : [2014003](#) (*pdf*)

**Significance:**  Sep 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO REPORT CHANNEL CHECKS.**

A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified by the inspectors for the licensee's failure to prescribe a procedure with appropriate qualitative acceptance criteria to ensure that CHANNEL CHECKS were satisfactorily accomplished in accordance with TS Surveillance Requirement (SR) 3.3.6.2 prior to September 12, 2013. Specifically, Surveillance Test Procedure (STP) 3.0.0-01 did not perform a qualitative assessment of channel behavior, nor did it require comparisons to other channel indications measuring the same parameter. Had STP 3.0.0-01 contained appropriate acceptance criteria, the main steam line area temperature indicating switch (TIS)-4480 would have been considered inoperable based on trending prior to switch anomalies resulting in declaring TIS-4480 inoperable on June 22, 2013. The licensee documented the issue in CR 01903528, briefed operators on the requirement to perform qualitative checks of the applicable instruments, and initiated a procedure change to restore compliance of the STP to meet the requirements of SR 3.3.6.2.

The inspectors determined the licensee's failure to prescribe an STP with appropriate acceptance criteria was a performance deficiency because it was the result of the failure to meet a regulatory requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor and a finding because it impacted the Barrier Integrity Cornerstone attribute of procedure quality and adversely affected the Cornerstone objective of providing reasonable assurance that physical design barriers (i.e., containment) protect the public from radionuclide releases caused by accidents and events. The inspectors applied IMC 0609, Appendix A, Exhibit 3 for the Barrier Integrity Cornerstone. Because the finding did not represent an actual open pathway in the physical integrity of the reactor containment or containment isolation system, the finding screened as very low safety significance (Green).

Inspection Report# : [2013004](#) (*pdf*)

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## Emergency Preparedness

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## Occupational Radiation Safety

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## Public Radiation Safety

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## Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## Miscellaneous

Last modified : September 02, 2014