



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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LISLE, IL 60532-4352

April 25, 2011

Mr. Michael J. Pacilio
Site Vice-President, Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO), Exelon Nuclear
4300 Winfield Road
Warrenville IL 60555

**SUBJECT: CLINTON POWER STATION FIRE PROTECTION TRIENNIAL BASELINE
INSPECTION NRC INSPECTION REPORT 05000461/2011009(DRS)**

Dear Mr. Pacilio:

On March 18, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at your Clinton Power Station (CPS). The enclosed inspection report documents the inspection results, which were discussed on March 18, 2011, with Mr. F. Kearney and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, one NRC-identified finding of very low safety significance was identified. The finding involved a violation of NRC requirements. However, because of the very low safety significance, and because the issue was entered into your corrective action program, the NRC is treating the issue as a Non-Cited Violation (NCV) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission – Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at Clinton Power Station. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at Clinton Power Station.

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M. Pacilio

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Docket No. 50-461
License No. NPF-62

Enclosure: Inspection Report 05000461/2011009
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-461
License No: NPF-62

Report No: 05000461/2011-009(DRS)

Licensee: Exelon Generation Company, LLC

Facility: Clinton Power Station

Location: Clinton, IL

Dates: February 16 through March 18, 2011

Inspectors: Z. Falevits, Senior Reactor Inspector, Lead
A. Dahbur, Senior Reactor Inspector
R. Winter, Senior Reactor Inspector
L. Kozak, Senior Reactor Analyst

Observers: J. Hafeez, Reactor Engineer in Training

Approved by: R. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000461/2011009(DRS); 02/16/2011 – 03/18/2011 Clinton Power Station, Routine Triennial Fire Protection Baseline Inspection.

This report covers an announced triennial fire protection baseline inspection. The inspection was conducted by Region III inspectors. One Green finding was identified by the inspectors. The finding was considered a Non-Cited Violation (NCV) of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be (Green) or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance and associated NCV of Clinton Power Station Unit 1 Operating License NPF-62, Section 2.F was identified by the inspectors for the licensee's failure to ensure fire doors were closed and latched. Specifically, during a walkdown of fire area CB-1e "737' General Access Area," fire door 1DR1-432 located between fire area CB-1e and D-6 "Emergency Diesel 2 Room," was found unlatched/not fully closed. The door was a 3-hour fire rated door credited for fire barrier between the two fire areas. Site personnel closed the door when it was found open and the door remained fully closed when challenged. The issue was entered into the licensee corrective action program as AR 01187906.

The inspectors determined that this finding was more than minor because the finding affected the Mitigating Systems cornerstone attributes of protection against external factors (Fire) and affected the cornerstone objective of ensuring the capability of the system to respond to events to prevent undesirable consequences. This finding was of very low safety significance (Green) based on answering "Yes" to Question 7 of Task 1.3.2. of Appendix F of IMC 0609. The inspectors did not identify a cross-cutting aspect associated with this finding because the underlining cause of unlatched door was indeterminate during the inspection. (Section 1R05.b(1))

B. Licensee-Identified Violation

No violations of significance were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R05 Fire Protection (71111.05T)

The purpose of the fire protection triennial baseline inspection was to conduct a design based, plant specific, risk-informed, onsite inspection of the licensee's fire protection program's defense-in-depth elements used to mitigate the consequences of a fire. The fire protection program shall extend the concept of defense-in-depth to fire protection in plant areas important to safety by:

- preventing fires from starting;
- rapidly detecting, controlling and extinguishing fires that do occur;
- providing protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by fire suppression activities will not prevent the safe shutdown of the reactor plant; and
- taking reasonable actions to mitigate postulated events that could potentially cause loss of large areas of power reactor facilities due to explosions or fires.

The inspectors' evaluation focused on the design, operational status, and material condition of the reactor plant's fire protection program, post-fire safe shutdown systems and B.5.b mitigating strategies. The objectives of the inspection were to assess whether the licensee had implemented a fire protection program that: (1) provided adequate controls for combustibles and ignition sources inside the plant; (2) provided adequate fire detection and suppression capability; (3) maintained passive fire protection features in good material condition; (4) established adequate compensatory measures for out-of-service, degraded, or inoperable fire protection equipment, systems or features; (5) ensured that procedures, equipment, fire barriers, and systems exist so that the post-fire capability to safely shut down the plant was ensured; (6) included feasible and reliable operator manual actions when appropriate to achieve safe shutdown; and (7) identify fire protection issues at an appropriate threshold and ensured these issues were entered into the licensee's problem identification and resolution program.

In addition, the inspectors' review and assessment focused on the licensee's post-fire safe shutdown systems for selected risk significant fire areas. Inspector emphasis was placed on determining that the post-fire safe shutdown capability and the fire protection features were maintained free of fire damage to ensure that at least one post-fire safe shutdown success path was available. The inspectors' review and assessment also focused on the licensee's B.5.b related license conditions and the requirements of 10 CFR 50.54(hh)(2). Inspector emphasis was to ensure that the licensee could maintain or restore core cooling, containment, and spent fuel pool cooling capabilities utilizing the B.5.b mitigating strategies following a loss of large areas of power reactor facilities due to explosions or fires. Documents reviewed are listed in the Attachment to this report.

The fire areas/fire zones and B.5.b mitigating strategies selected for review during this inspection are listed below and in Section 1R05.6. The fire areas/fire zones and B.5.b mitigating strategies selected, constitute four inspection samples and four inspection samples, respectively, as defined in Inspection Procedure 71111.05T.

<u>Fire Zone</u>	<u>Description</u>
A-3f	Division 2 Switchgear Room
CB-1e	General Access Area
CB-2	Division 2 Cable Spreading Room
CB-3a	Auxiliary Electrical Equipment Room

.1 Protection of Safe Shutdown Capabilities

a. Inspection Scope

For each of the selected fire areas, the inspectors reviewed the fire hazards analysis, safe shutdown analysis, updated final safety analysis report (UFSAR), and supporting drawings and documentation to verify that safe shutdown capabilities were properly protected.

The inspectors reviewed the licensee's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the fire hazards analysis. The inspectors performed plant walkdowns to verify that protective features were being properly maintained and administrative controls were being implemented.

The inspectors also reviewed the licensee's design control procedures to ensure that the process included appropriate reviews and controls to assess plant changes for any potential adverse impact on the fire protection program and/or post-fire safe shutdown analysis and procedures.

b. Findings

No findings were identified.

.2 Passive Fire Protection

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the adequacy of fire area barriers, penetration seals, fire doors, electrical raceway fire barriers, and fire rated electrical cables. The inspectors observed the material condition and configuration of the installed barriers, seals, doors, and cables. The inspectors reviewed approved construction details and supporting fire tests. In addition, the inspectors reviewed license documentation, such as NRC safety evaluation reports, and deviations from NRC

regulations and the National Fire Protection Association (NFPA) standards to verify that fire protection features met license commitments.

The inspectors walked down accessible portions of the selected fire areas to observe material condition and the adequacy of design of fire area boundaries (including walls, fire doors, and fire dampers) to ensure they were appropriate for the fire hazards in the area.

The inspectors reviewed the installation, repair, and qualification records for a sample of penetration seals to ensure the fill material was of the appropriate fire rating and that the installation met the engineering design.

b. Findings

1) Failure to Ensure Fire Door was Closed and Latched

Introduction: A finding of very low safety significance (Green) and associated NCV of License Condition 2.F, Fire Protection, was identified by the inspectors for the licensee's failure to ensure that fire door 1DR1-432, located between the Division 2 emergency diesel generator (EDG) room (D 3-9) and control building corridor (D 3-13), was closed and latched. The door provided a 3-hour fire barrier between these two separate fire areas.

Description: On March 14, 2011, during a plant walkdown of the 737' Control Building, General Access Area, fire door 1DR1-432 was observed not to be fully latched. When noted, site personnel closed the door and the door remained closed/latched when it was challenged. The door was a 3-hour fire rated door credited for fire barrier between the two fire areas as discussed below.

Section 3.4.1.5 "Fire Zone CB-1e; Elevation 737' and 751' General Access Area," of the Appendix E of the fire protection report indicated that the portion of the south wall adjacent to the diesel generators rooms were 3-hour fire rated. The zone included Division 1 and 2 electrical cables and diesel generator associated motor control centers. In the event of a fire in this fire zone, safe shutdown can be achieved using Method 2 and 3 as described in the safe shutdown analysis. An ionization fire detection system and an automatic wet pipe sprinkler system were provided in this zone where cables for both divisions were located.

Section 3.5.6.1 "Fire Zone D-6a; Elevation 737' Division 2 Diesel Generator Room," indicated that this zone housed the Division 2 diesel generator and its associated support cables and equipment. Therefore, a fire in this zone may affect equipment relied upon for method 2 safe shutdown due to fire damage. This fire zone was protected by an automatic carbon dioxide (CO₂) fire suppression system actuated by thermal detectors.

The inspectors were concerned that with the door left unlatched, a fire could spread between the two fire areas. The inspectors noticed that the licensee currently has an open item in their corporate corrective action program to develop and implement a plan to reinforce with site workers the need to challenge fire doors and write condition reports if doors do not self close and latch.

On March 15, 2011, the inspectors questioned the licensee if a condition report was written to document the issue related to the door being found open during the plant walkdown on March 14, 2011. Subsequently, the licensee issued AR 01187906. The inspectors were concerned that the licensee was not timely in entering this issue into their corrective action program.

Procedure 9601.05 "Visual Inspection of Closed Fire Doors," was last completed on March 13, 2011, at which time door 1DR1-432 was verified closed and latched.

Analysis: The inspectors determined that the licensee's failure to ensure a 3-hour fire door was closed and latched was contrary to Licensee Condition 2.F. and was a performance deficiency. The finding was determined to be more than minor because it was associated with the Mitigating System cornerstone attribute of Protection Against External Factors (Fire) and affected the cornerstone objective of ensuring the availability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the failure to ensure that a 3-hour rated fire door was closed and latched between Fire Areas D-6 and CB-1e degraded the defense and depth element of the fire protection program. In the event of a fire in the EDG room (Fire Area D-6), the fire could spread to the control building corridor (CB-1e) and could have complicated safe shutdown of the plant.

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase I – Initial Screening and Characterization of Findings," Tables 3b the inspectors determined the finding degraded the fire protection defense-in-depth strategies. Therefore, screening under IMC 0609, Appendix F, "Fire Protection Significance Determination Process," was required. Based on Table 1.1-1 of Appendix F and Table A2.2 of Attachment 2 of Appendix F, the inspectors determined that the finding affected the fire confinement category and the barrier was moderately degraded because the door was not latched. Since the EDG room has a curb included in the wall between the two fire areas that could contain the fuel oil available in the EDG, the inspectors determined that in the event of a fire in the EDG room, the affect of a hot gas layer was the only concern for the adjacent fire area CB-1e. The inspectors determined that the finding was of very low safety significance (Green) because the inspectors answered "Yes" to Question 7 of Task 1.3.2 "Supplemental Screening for Fire Confinement Findings." In addition, Table 2.3.2 of IMC 0609, Appendix F, showed that for a 2MW fire in the EDG room, the zone of influence in the adjacent room (CB-1e) for damage to thermoset cables was 13.3 feet in height and 6.7 feet in radial distance. The Division 1 cables were located in cable trays and conduits installed near a wide ceiling area in CB-1e; therefore, the cables of concern were outside the zone of influence and would not be directly affected by a fire in the EDG room (Fire Area D-6). The inspectors also determined that the finding only affected one of the defense-in-depth elements of the fire protection program; because both fire areas had fully functional automatic fire detection and suppression systems.

The licensee entered this issue into their corrective action program on March 15, 2011, a day after the door was found unlatched and after the inspectors prompted the licensee to issue a corrective action document. The inspectors did not identify a cross-cutting aspect associated with this finding because the underlining cause of unlatched door was indeterminate during the inspection.

Enforcement: Clinton Power Station Unit 1 Operating Licensee Condition 2.F. required the licensee to implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report (UFSAR), as amended, and as approved in the Safety Evaluation Report (NUREG-0853), dated February 1982 and Supplemented Numbers 1 through 8. The Clinton Power Station UFSAR, Appendix E, "Fire Protection Evaluation Report," Section 3.4.1.5, "Fire Zone CB-1e," stated, in part, that the portion of the south wall adjacent to the EDG rooms is 3-hour fire rated. Section 3.1.2.2.9, "Fire Doors," of Appendix E, stated, in part, that access opening in the fire barrier walls is closed with fire rated doors or equivalent.

Contrary to the above, on March 14, 2011, the licensee failed to ensure that the 3-hour fire rated door 1DR1-432, located in the portion of the south wall between the EDG room (Fire Area D-6) and the control building corridor (Fire Area CB-1e) was closed and latched. Because this violation was of a very-low-safety significance and because it was entered into the licensee's Corrective Action Program as AR 01187906, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC enforcement policy. (NCV 05000461/2011009-01, Failure to ensure fire door was closed and latched)

3 Active Fire Protection

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the adequacy of fire suppression and detection systems. The inspectors observed the material condition and configuration of the installed fire detection and suppression systems. The inspectors reviewed design documents and supporting calculations. In addition, the inspectors reviewed license basis documentation, such as, NRC safety-evaluation reports, deviations from NRC regulations, and NFPA standards to verify that fire suppression and detection systems met license commitments.

b. Findings

No findings were identified.

4 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

For the selected fire areas, the inspectors verified that redundant trains of systems required for hot shutdown would not be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems including the effects of flooding. The inspectors conducted walkdowns of each of the selected fire areas to assess conditions such as the adequacy and condition of floor drains, equipment elevations, and spray protection.

b. Findings

No findings were identified.

5 Alternative Shutdown Capability

a. Inspection Scope

The inspectors reviewed the licensee's systems required to achieve alternative safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions. The inspectors also focused on the adequacy of the systems to perform reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions.

The inspectors conducted selected area walkdowns to determine if operators could reasonably be expected to perform the alternate safe-shutdown procedure actions and that equipment labeling was consistent with the alternate safe shutdown procedure. The review also looked at operator training, as well as consistency between the operations shutdown procedures and any associated administrative controls.

b. Findings

No findings were identified.

6 Circuit Analyses

a. Inspection Scope

The inspectors reviewed the licensee's post-fire safe shutdown analysis to verify that the licensee had identified both required and associated circuits that may impact safe shutdown. On a sample basis, the inspectors verified that the cables of equipment required achieving and maintaining hot shutdown conditions, in the event of fire in the selected fire zones, had been properly identified. In addition, the inspectors verified whether these cables had either been adequately protected from the potentially adverse effects of fire damage, mitigated with approved manual operator actions, or analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent safe shutdown. In order to accomplish this, the inspectors reviewed electrical schematics and cable routing data for power and control cables associated with each of the selected components.

In addition, the adequacy of circuit protective coordination for the safe shutdown systems' electrical power and instrumentation busses was evaluated. The inspectors also evaluated cable trays that contained both safe shutdown and non-safe shutdown cables for proper circuit protection to ensure that cables were protected by a proper protective device in order to preclude common enclosure concerns.

1) Review of Licensee's Multiple Spurious Operations (MSOs) Circuit Analyses In Accordance with Guidance in Regulatory Guide 1.189, Revision 2

Background

In October 2009 the NRC issued guidance in Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plant," Revision 2, to identify acceptable methods for resolving issues

related to circuits required for post-fire safe shutdown and circuits important to post-fire safe shutdown. Equipment required for post-fire safe shutdown (credited train) must use one of the three methods identified in 10 CFR Part 50, Appendix R, Section III.G.2 to protect the circuits located within the same fire area from damage, including single and multiple spurious operations (MSOs). For important to post-fire safe shutdown circuits, the licensee may use operator manual actions if the licensee demonstrates they can be shown to be feasible and reliable or resolve issues using other analysis methods including fire modeling.

In May 2009, the NRC issued Enforcement Guidance Memorandum 09-002, "Enforcement Discretion for Fire-Induced Circuit Faults," which described the conditions limiting enforcement discretion during the resolution of the fire protection concerns involving MSOs. The EGM limited the enforcement discretion to three years from the date of issuance of RG 1.189, Revision 2: (1) six months following the issuance of RG 1.189, Revision 2, for licensees to identify non-compliances related to multiple fire-induced circuit faults, place the non-compliances into their corrective action program and implement compensatory measures for the non-compliances and (2) three years following the issuance of RG 1.189, Revision 2, for licensees to complete the corrective actions associated with non-compliant multiple fire-induced circuit faults. The enforcement discretion would not be granted to identified non-compliances that are found to be willful or findings that the Reactor Oversight Process Significant Determination Process would evaluate as (Red) or categorized at Severity Level I.

Inspection Effort

During this inspection, the inspectors reviewed representative sampling of single and multiple spurious issues throughout the plant to verify:

- The licensee successfully addressed single and multiple spurious issues in a way that met regulations;
- The licensee properly classified equipment required for safe shutdown and equipment important for safe shutdown;
- The adequacy of the licensee's evaluation of multiple spurious actuations, in accordance with Regulatory Guide 1.189 and NEI 00-01, Revision 2; and
- The adequacy of the licensee's compensatory actions taken for identified non-compliances.

The inspectors reviewed the licensee's post-fire safe shutdown analysis to verify that the licensee had identified both required and important circuits that could impact safe shutdown. The inspectors reviewed the Clinton's expert panel results for the potential fire-induced operations of component supported safe shutdown at CPS. The expert panel performed this review in accordance with RG 1.189 and Guidance provided in NEI 00-01 Revision 2. The purpose of the expert panel was to review the applicable industry developed Generic BWR Owner's Group List of MSOs for applicability to CPS. The expert panel was also tasked with considering plant specific MSOs similar to those in the Generic List, but not specifically listed. The expert panel identified MSOs as applicable to CPS and provided recommendations to resolve these issues. The

inspectors reviewed a sample of MSO scenarios identified by the expert panel as potential non-compliances requiring further evaluations to determine corrective action needed.

The inspectors verified that the safe shutdown cables had either been adequately protected from the potentially adverse effects of fire damage, mitigated with approved compensatory measures, or analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent safe shutdown. In order to accomplish this, the inspectors reviewed piping and instrumentation diagrams (P&IDs), electrical schematics and logic diagrams, Safe Shutdown flow diagrams and cable routing data sheets associated with each of the selected safe shutdown components. In addition, the adequacy of electrical circuit protective coordination for the reviewed safe shutdown systems components was evaluated by sampling.

The licensee initiated 27 ARs to document the identified non-conforming MSO scenarios. In addition, the licensee implemented alternate compensatory measures as a form of documented operator rounds as justified by the fire protection engineering evaluation EC-EVAL 379435, "GL 86-10 Evaluation: Use of Alternate Compensatory Measures Related to Multiple Spurious Operations (MSOs)," Revision 1. The inspectors reviewed a sample of the nonconforming MSO scenarios identified by the licensee. The inspectors noted that the licensee has not completed the analyses and evaluations of the identified non-conforming MSOs. The licensee was in the process of determining the appropriate long term corrective actions needed to address these findings. The documents and ARs reviewed by the inspectors are listed in the Attachment to this report. The licensee plans to identify and complete corrective actions to address the identified MSOs prior to November 2, 2010, (the end of the enforcement discretion period per EGM 09-002). The licensee evaluated the identified MSO scenarios for potential significance and determined that none of the 27 identified MSOs were considered to be risk significant.

b. Findings

No findings were identified.

2) Review of Licensee Actions to Address a Post-Fire Safe Shutdown MSO Scenario Documented in NRC URI 461/2005-006-01(DRS)

(Open URI 461/2005-006-01(DRS): During the 2005 FP inspection, the NRC inspectors performed an independent review of post-fire safe shutdown circuit analysis, using the guidance and criteria provided in NRC Regulatory Issue Summary (RIS) 2004-003, Revision 1, "Risk-Informed Approach for Post-Fire Safe Shutdown Circuit Inspections," dated December 29, 2004. The inspectors postulated a fire in the Division III switchgear room, located in Fire Zone CB-5a, and determined that it could result in multiple fire-induced electrical circuit faults in the control logic cables used in the Division III High Pressure Core Spray (HPCS) Pump 1E22-C001 and discharge Valve 1E22-F004 control logic. The inspectors determined that postulating such multiple spurious faults could impair the capability to shut off the HPCS pump and stop it from continually injecting and overfilling the reactor pressure vessel (RPV).

The licensee documented in calculation IP-0532, "10 CFR Part 50, Appendix R, Compliance Assessment," that any and all spurious operations or failures shall be evaluated and that the spurious actuations or failures are not required to be evaluated simultaneously except for high/low pressure interface components. However, the licensee also documented that they did consider the potential for concurrent/simultaneous spurious actuations or failures in the Appendix R analysis for the ECCS system automatic initiation instrumentation logic network, as well as the high/low pressure interface components.

At the time of the inspection, the inspectors determined that documented evidence was not available to show that the licensee considered the potential hot shorts, shorts to ground and open circuits, postulated by the team, in the multi-conductor control cables used in the control logic of HPCS pump 1E22-C001 and pump discharge valve 1E22-F004.

On June 8, 2005, the licensee, RIII, and NRR fire protection staff members conducted a conference call to further discuss the concerns raised by the team. The NRC requested that the licensee evaluate the postulated scenarios provided by the team and determine if CPS can achieve and maintain safe shutdown in Fire-Zone CB-5a if HPCS injection cannot be stopped, and if CPS is within their licensing basis considering the electrical faults and fire-induced actuations of HPCS components. The licensee entered this issue in their Corrective Action Program under CR 00343489, dated June 13, 2005.

During this current inspection, the team reviewed the licensee's response to address the NRC finding documented in the URI. The team noted that the licensee had identified a similar finding during their MSO analysis and evaluation of automatic initiation logic instrumentation logic cables related to the high drywell pressure or low RPV level instrument loop logic. On April 7, 2010, the licensee initiated AR 01053529, "MSOPS Scenario 2U – Spurious HPCS/HPCI Operation," to document this similar finding to the one documented in the NRC's URI. The AR stated that further work was needed to resolve the Safe Shutdown Analysis (SSA) that evaluated the potential for spurious HPCS initiation due to fire damage to the initiation logic, instrumentation wiring, pump breaker wiring, and injection valve wiring and ensure the new regulatory requirements (i.e., RG 1.189, R2) are addressed.

Subsequently, on February 8, 2011, the licensee issued AR 01172335, "RVW Identifies Design Basis Issue for Spurious HP Operation," and Event Notification (EN) No. 46603, to document an unanalyzed condition identified by the licensee. The EN reported that an SSA assumed operator action to locally depress the HPCS internal trip plunger to trip the pump breaker in response to a fire in the MCR and continuous operation of the pump, could not be performed as stated in the written procedure. The unanalyzed condition involved a postulated scenario where, in the event of a MCR fire, the HPCS will continuously inject into the RPV due to fire-induced faults and instrument logic cable damage, and place the Main Steam Safety Relief Valves (MSSRVs) and their associated tailpipes in an unanalyzed condition for the stresses expected during the two-phase flow event. The licensee promptly initiated a confirmatory analysis to evaluate this issue and implemented compensatory measures for potential non-conforming MSOs until the analysis is complete.

Unresolved item (URI) 461/2005-006-01(DRS) remains open pending review of results of the licensee's confirmatory analysis of the stresses expected on the MSSRVs and their associated tailpipes. These stresses could potentially occur during the HPCS injection and a two-phase flow event as a result of multiple fire-induced faults in the instrument logic cables (refer to licensee MSO Scenario No. 2U) or in the HPCS pump and valve control logic cables (refer to NRC URI).

2. Communications

a. Inspection Scope

The inspectors reviewed, on a sample basis, the adequacy of the communication system to support plant personnel in the performance of alternative safe shutdown functions and fire brigade duties. The inspectors verified that plant telephones, page systems, sound powered phones, and radios were available for use and maintained in working order. The inspectors reviewed the electrical power supplies and cable routing for these systems to verify that either the telephones or the radios would remain functional following a fire.

b. Findings

No findings were identified.

3. Emergency Lighting

a. Inspection Scope

The inspectors performed a plant walkdown of selected areas in which a sample of operator actions would be performed in the performance of alternative safe shutdown functions. As part of the walkdown, the inspectors focused on the existence of sufficient emergency lighting for access and egress to areas and for performing necessary equipment operations. The locations and positioning of the emergency lights were observed during the walkdown and during review of manual actions implemented for the selected fire areas.

b. Findings

No findings were identified.

4. Cold Shutdown Repairs

a. Inspection Scope

The inspectors reviewed the licensee's procedures to determine whether repairs were required to achieve cold shutdown and to verify that dedicated repair procedures, equipment, and material to accomplish those repairs were available onsite. The inspectors also evaluated whether cold shutdown could be achieved within the required time using the licensee's procedures and repair methods. The inspectors also verified that equipment necessary to perform cold shutdown repairs was available onsite and properly staged.

b. Findings

No findings were identified.

5. Compensatory Measures

a. Inspection Scope

The inspectors conducted a review to verify that compensatory measures were in place for out-of-service, degraded or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems, and equipment, passive fire barriers, pumps, valves or electrical devices providing safe shutdown functions or capabilities). The inspectors also conducted a review on the adequacy of short term compensatory measures to compensate for a degraded function or feature until appropriate corrective actions were taken.

b. Findings

No findings were identified.

6. B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee's preparedness to handle large fires or explosions by reviewing one or more mitigating strategies as identified below. This review ensured that the licensee continued to meet the requirements of their B.5.b related license conditions and 10 CFR 50.54(hh)(2) by determining that:

- Procedures were being maintained and adequate;
- Equipment was properly staged, maintained, and tested;
- Station personnel were knowledgeable and could implement the procedures; and
- Additionally, inspectors reviewed the storage, maintenance, and testing of B.5.b related equipment.

The inspectors reviewed the licensee's B.5.b related license conditions and evaluated selected mitigating strategies to ensure they remain feasible in light of operator training, maintenance/testing of necessary equipment and any plant modifications. In addition, the inspectors reviewed previous inspection reports for commitments made by the licensee to correct deficiencies identified during performance of Temporary Instruction (TI) 2515/171 or subsequent performances of these inspections.

The B.5.b mitigating strategies selected for review during this inspection are listed below. Note: The off-site and onsite communications, notifications/ERO activation, initial operational response actions, and damage assessment activities identified in Table A.3-1 were evaluated during the review of the Command and Control Enhancements Strategy.

NEI 06-12, Revision 2 Section	Licensee Strategy (Table)	Selected for Review
2.2	SFP Makeup – Internal Strategy (Table A.2-1)	Selected
3.2.2 to 3.2.5	Command and Control Enhancements (Table A.3-1)	Selected
3.4.3	BWR Enhancement Strategy No. 3 Utilize Feedwater and Condensate (Table A.5-3)	Selected
3.4.8	BWR Enhancement Strategy No. 8 Manually Open Containment Vent Lines (Table A.5-8)	Selected

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

4OA2 Problem Identification and Resolution (71152)

a. Inspection Scope

The inspectors reviewed the licensee's Corrective Action Program Procedures and samples of corrective action documents to verify that the licensee was identifying issues related to the fire protection program at an appropriate threshold and entering them in the corrective action program. The inspectors reviewed selected samples of condition reports, design packages, and fire protection system non-conformance documents.

b. Findings

No findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. F. Kearney and to other members of the licensee staff on March 18, 2011, and during subsequent telephone calls with licensee representatives on March 24, 2011, and on April 13, 2011. The licensee acknowledged the issues presented.

The inspectors confirmed that none of the potential report input discussed was considered proprietary.

4OA7 Licensee-Identified Violations

No violations were identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

F. Kearney, Site Vice-President
M. Kanavos, Plant Manager
R. Zadislski, Manager, Nuclear Oversight Manager
T. Chalmers, Director, Operations
R. Frantz, Regulatory Assurance
K. Baker, Sr. Manager, Design Engineering
G. Mosley, Engineering Programs Manager
S. Fatora, Maintenance Director
C. Dunn, Shift Operations Superintendent
J. Ruth, Operations Training Manager
J. Ufert, Fire Marshall

Nuclear Regulatory Commission

B. Kemker, Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

OPENED

05000461/2011009-01; NCV Failure to Ensure Fire Door was Closed and Latched.(Section 1R05.2.b(1))

Closed

05000461/2011009-01; NCV Failure to Ensure Fire Door was Closed and Latched.
(Section 1R05.2.b(1))

Discussed

05000461/2005006-01; URI Review of Licensee Action to Address a Post-Fire Safe Shutdown MSO Scenario. (Section 1R05.2b(2))

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

ANALYSES, CALCULATIONS AND STANDARDS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
19-AN-04	480 ESF SWGR Breakers and Associated Upstream eRelay Setting	12
IP-M-0471	Safe Shutdown Equipment Selection	2
EE-01.00	Safe Shutdown Cable Selection	1
H600.Y35	Automatic Sprinkler, FP Hydraulics, Auxiliary Bldg	0
H706.B01	Automatic Sprinkler, FP Hydraulics, Control Bldg	1
H727.B02	Automatic Sprinkler, FP Hydraulics, Auxiliary Electric Equipment Room	1 A

CONDITION REPORTS (ARs) ISSUED DURING INSPECTION

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
01172335	RWW Identifies Design Basis Issue for Spurious Hp Operation	02/08/2011
01175632	NRC FP Insp. -- Paint Chips in Floor Drain 781' Control Bldg	02/15/2011
01176329	B.5.B Pump Implementation Strategy Enhancement	01/13/2011
01176370	NRC FP Triennial ID'D – TSC Copy of 4303.01F001 not Readily Available	02/16/2011
01176393	NRC FP Triennial ID'D – B.5.B Pump Operating Procedure not Staged at Pump Location	02/16/2011
01176407	NRC FP Triennial ID'D – Enhance B.5.B Strategies per Procedure 4303.01 for RCIC Verification	02/16/2011
01177009	1FP02E NRC FP Triennial ID'D – Enhance 4303.01P009	02/17/2011
01177205	Status of Cable Cannot be Determined	02/18/2011
01177206	Construction ERA Wood in Cable Tray	02/18/2011
01180184	NRC FP TRI – FECN Not Posted	02/25/2011
01180220	Suppression Effects Calc Weaknesses	02/25/2011
01181956	2011 FP Triennial Issue Regarding BOP UPS 1IP06E and 1IP07E	03/01/2011
01181876	NRC FP TRI – Cable Pull Box Number is Incorrect	03/01/2011
01183043	NRC FP TRI ID – USAR App E-3.4.3.1 Fire Detection Incorrect	03/03/2011
01183546	NRC FP TRI ID – Enhancement to 4003.01C002	03/03/2011
01186553	FP Licensing Basis Documents not Readily Available	03/03/2011
01187430	NRC FP TRI ID – Lanyard on Cable Tray Hanger	03/14/2011

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
01187435	NRC FP TRI – Thermo-Leg Cable Tray Discrepancies	03/14/2011
01187906	NRC FP TRI – Div. 2 DG Fire Door Found Unlatched	03/15/2011
01188547	NRC FP TRI – Housekeeping Above AB Battery Rooms	03/16/2011
01188935	NRC FP TRI – Drawings Identified Again as Having Incorrect	03/17/2011
01188952	NRC FP TRI – Margin Discussion is Missing from Sprinkler Calc	03/17/2011

Elevation Description

CONDITION REPORTS (ARs) REVIEWED DURING INSPECTION

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
01053529	Evaluate HPCS MSO	April 7, 2010
01053473	MSOPS 2L – Spurious RH Min. Flow Close With Spurious Pump Start	April 7, 2010
01053407	MSOPS—Use of Alternate Compensatory Measures for MSO	April 7, 2010
00985851	Coordinate Fleet Actions for RG 1.189/NEI 00-01	October 29, 2009
01053473	MSOPS 2L – Spurious RH Min Flow Close with Spurious Pump Start	October 07, 2010
01053538	MSOPS 2Y – RCIC Test Flow to CST Stop/Throttle Vlvs Flow Diversion	April 07, 2010
01029032	NOS ID Unauthorized BISCO Seal Penetration	February 11, 2010
01135002	FP FASA Walkdown Identified Improperly Breached Penetration	Nov. 3, 2010
01149954	ILL61BP06E Safe S/D Pathway Light Trickle Chg Lamp not lit	Dec. 8, 2010
01153758	Fire Doors not Kept Closed	Dec 17, 2010
01172335	RVW Identifies Design Basis Issue for Spurious HP Operation	February 8, 2011

DRAWINGS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
E26-1003-03A-E1	Electrical Installation Aux Bldg EI 781' 3"	AG
E26-1003-03A-FP	Fire Detection System, Aux Bldg Switchgear Floor Plan EI 781' 0"	A
E26-1003-03A-FP	Fire Detection System, Aux Bldg Switchgear Floor Plan EI 790' 0"	A
Fire Zone A-3F	Pre-Fire Plan, Auxiliary Building, Containment Pipe Penetration, El. 364'- 0"	1
Fire Zone CB-1e	Pre-Fire Plan, 737' Control Building, General Access	6a
Fire Zone CB-1e	Pre-Fire Plan, 751' Control Building, HVAC Mezzanine	6
Fire Zone CB-2	Pre-Fire Plan, 781' Control Building Div 2 Cable Spreading Room	5a
Fire Zone CB-3a	Pre-Fire Plan, 781 Control Building Auxiliary Electrical Equipment , Inverter and Battery Rooms	7a
M05-1039; sh, 008	P&ID Fire Protection (FP) Turbine Bldg	AL
M05-1056 sh. 002	P&ID Plant Service Water	AL

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
E02-0AP24	Key Diagram, Control Building MCC G and H (0AP56E and 0AP57E)	W
M05-1075	P&ID – Residual Heat Removal (RH)	AW
E02-1RH99	Residual Heat Removal Shutdown Cooling Upper Pool Valves 1E12-F037A and 1E12-F037B	K
E30-1003-04A-E1	Electrical Installation—Control Bldg Cable Spreading Room	AF
E03-0AP56E	External Wiring Diagram – Control Building MCC G (0AP56E)	M
E02-0AP24	Key Diagram – MCC G and H (0AP56E and 0AP57E)	1
CPS-SSD-LOG-301	Containment and Reactor Vessel Monitoring System Safe Shutdown Logic Diagram	2
CPS-SSD-LOG-102	Reactor Core Isolation Cooling Safe Shutdown Logic Diagram	2
M05-1079	P&ID Reactor Core Isolation Cooling (RCIC)	AJ

MODIFICATIONS/ENGINEERING CHANGES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
EC 383184	Design Bases Issues for Spurious HP Operations	0
EC 383133	Fire Protection With Alternate Comp Measures for Spurious HPCS Ops.	0
EC 379435	GL 86-10 Evaluation: Use of Alternate Compensatory Measures Related to Multiple Spurious Operations (MSO)	001
3822.04C003	Quarterly B.5.b Equipment Checklist	1d
3822.04C006	Quarterly OCA/NTD Fire Cage Checklist	2e
9277.11C001	Hose Replacement Checklist	24b
9601.05C001	Closed Fire Door Inspection Checklist	31a
9601.06C001	Semi-Annual Fire Door Operability Checklist	
CC-AA-201	Plant Barrier Control Program	8
OP-AA-201-009	Control of Transient Combustible Materials	11
OP-MW-201-007	Fire Protection System Impairment Control	7

PROCEDURES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
3822.04C003	Quarterly B.5.b Equipment Checklist	1d
3822.04C006	Quarterly OCA/NTD Fire Cage Checklist	2e
9277.11C001	Hose Replacement Checklist	24b
9601.05C001	Closed Fire Door Inspection Checklist	31a
9601.06C001	Semi-Annual Fire Door Operability Checklist	30c
CC-AA-201	Plant Barrier Control Program	8
OP-AA-201-009	Control of Transient Combustible Materials	11

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
OPOP-MW-201-007	Fire Protection System Impairment Control	7
9601.05	Visual Inspection of Closed Fire Doors	March 13, 2011
4303.01P020	Emergency Confirmation of Reactor Scram	0a

WORK ORDERS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
01162683 01	9601.01C003 Accessible Group 1 Penetration Fire Seal Inspections	August 17, 2009
01170437 01	9601.01C009 Inaccessible Group 1 Penetration Fire Seal Inspections	January 07, 2010
01170408 01	9601.01C003 Accessible Group 1 Penetration Fire Seal Inspections	April 13, 2010
01354876 04	Install BISCO Seal CB-781-09-1063 TS-EC 380713	September 17, 2010

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
AR 01056005-02	2010 Focused Area Self-Assessment Fire Protection Safe Shutdown Analysis Clinton Power Station Unit 1	November 18, 2010
USAR Apx. F NEI 00-01 Apx. G	Generic List of MSOs	14 2
ATI 1165189	Perform CCA on TCFZ Issues Report an Unanalyzed Condition Concerning HPCS Injection Scenario	February 15, 2011
EN No. 46603 Slice Version 7.6	Cable Tabulation-Main File (S101-1) Pg. HP 14	February 15, 2011
CPS-SSD-LOG-302	HPCS SRV and Containment Spray and Initiation Safe Shutdown Logic Diagram	September 29, 2010
E02-1HP99 Sh.5	High Pressure Core Spray (HP) (NSPS) (1E22-1050)	2 G
E02-1HP99 Sh.6	High Pressure Core Spray (HP) (NSPS) (1E22-1050)	D
E02-1HP99 Sh.7	High Pressure Core Spray (HP) (NSPS) (1E22-1050)	L
E02-1HP99 Sh.110	High Pressure Core Spray (HP) (NSPS) (1E22-1070)	H
E02-1HP99 Sh.501	High Pressure Core Spray (HP) HPCS Suction Valve (1E22-F001) and HPCS Pump Disch Valve (1E22-F004)	J

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AR	Action Request
CFR	Code of Federal Regulations
CO ₂	Carbon Dioxide
CPS	Clinton Power Station
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
EN	Event Notification
ESF	Engineered Safety Features
HPCS	High Pressure Core Spray
IMC	Inspection Manual Chapter
IR	Inspection Report
kV	KiloVolt
MCC	Motor Control Center
MCR	Main Control Room
MSO	Multiple Spurious Operations
MSSRV	Main Steam Safety Relief Valves
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NRC	U.S. Nuclear Regulatory Commission
NUREG	NRC Technical Report
PARS	Publicly Available Records
P&ID	Piping and Instrumentation Diagram
RIS	NRC Regulatory Issue Summary
RPV	Reactor Pressure Vessel
SDP	Significance Determination Process
SER	Safety Evaluation Report
SPAR	Standardized Plant Analysis Risk
SRA	Senior Reactor Analyst
SRP	Standard Review Plan
SSA	Safe Shutdown Analysis
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item

M. Pacilio

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of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at Clinton Power Station.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Docket No. 50-461
License No. NPF-62

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Letter to Mr. Michael J. Pacilio from Mr. Robert C. Daley dated April 25, 2011.

SUBJECT: CLINTON POWER STATION FIRE PROTECTION TRIENNIAL BASELINE
INSPECTION NRC INSPECTION REPORT 05000461/2011009(DRS)

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