ENGINEERING BRANCH 1 FIRE PROTECTION INSPECTION SUMMARY DEBRIEF

Inspection of: Hatch Nuclear Station **Report Number:** 50-321,366/03-06

Inspection Dates: July 7-11 and 21-25, 2003 (onsite inspection)

Type of Inspection: TRIENNIAL FIRE PROTECTION BASELINE INSPECTION: Fire Protection Features and Post-Fire Safe Shutdown Capability

Inspectors: C. Smith, Lead and Electrical Inspector; G. Wiseman, Fire Protection Inspector, R. Schin, Operations Inspector, K. Sullivan, Contractor, BNL (Electrical),

Accompanying Personnel: N. Staples, Nuclear Reactor Safety Intern, was in training and supported the review of post-fire safe shutdown electrical circuit analysis and fire protection program problems/issues. Additionally, Stefanie Belcher, Student Intern accompanied the team for observation and training (July 7-11, 2003).

Inspection Scope: This inspection was conducted in accordance with revised Inspection Procedure **71111.05**, Fire Protection, dated 03/06/03, and the NRC Reactor Oversight Process. The inspection team focused their review on the separation of the systems and equipment necessary to achieve and maintain safe shutdown and fire protection features of these plant areas. The team used IPEEE data, with assistance from the RII Senior Risk Analyst, to identify risk significant plant areas and components among those with the highest CDFs and CCDPs. The fire areas/fire zones chosen for review during this inspection are:

1. **Fire Area 2016, West 600 V Switchgear Room, Control Building, Elevation 130 feet.** This fire area is equipped with full smoke detector coverage which alarms both locally and in the Main Control Room to ensure prompt response by the fire brigade. There is no automatic suppression or manual fire fighting equipment in this area. There is a portable CO2 fire extinguisher available in adjacent area 2014. A hose station is also available in area 0014. Fire barriers in this area consists of 3 hour rated floors , ceiling, and the west and south walls. The north and east walls are 2 hour rated. A fire in this area would involve shutdown from the Main Control Room using Safe Shutdown Path 2.

2. **Fire Area 2104, East Cableway, Turbine Building, Elevation 130 feet.** This fire area is equipped with full coverage wet pipe sprinklers and full coverage smoke detectors which alarm both locally and in the Main Control Room. The reactor feed pump oil conditioner located in this area is equipped with a water spray system actuated by the dry pilot portion of the system. Hose stations and portable CO2 fire extinguishers are located in this area for manual fire fighting. Fire barriers in this area consists of 3 hour rated north wall, north portion of the west wall (from T12 to T14), and the ceiling under area 0024. The south wall is partially 2 hour rated. A fire in this area would involve shutdown from the Main Control Room using Safe Shutdown Path 1.

3. **Fire Area 2404, Switchgear Room 2E, Diesel Generator Building, Elevation 130 feet.** This fire area is equipped with full coverage smoke detection which provides an early warning alarm both locally and in the Main Control Room. This area is also

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provided with a CO2 hose reel and CO2 portable fire extinguisher to support manual fire fighting. Fire barriers located in this area consists of 3 hour rated south and east walls. A fire in this area would involve shutdown from the Main Control Room using Safe Shutdown Path 2.

4. **Fire Area 2408, Switchgear Room 2F, Diesel Generator Building, Elevation 130 feet.** This fire area is equipped with full coverage smoke detection which provides an early warning alarm both locally and in the Main Control Room. This area is also provided with a CO2 hose reel and CO2 portable fire extinguisher to support manual fire fighting. Fire barriers located in this area consists of 3 hour rated north, south and east walls. A fire in this area would involve shutdown from the Main Control Room using Safe Shutdown Path 2.

INSPECTION RESULTS: Two Findings involving violations of NRC requirements, and four URIs were identified.

Finding No. 1

A green finding and NCV involving a fire procedure operator action to open MOV 2E11-F015A, inboard LPCI injection valve, in the drywell access area was inadequate because it was unsafe and not all operations personnel may be capable of completing this action. Conditions included : operator standing on a small area of pipe lagging (4 inches by 12 inches) about 6 to 7 feet above the floor and reaching back to operate a 3 feet handwheel. There would be excessive difficulty in operating the valve. Additional difficulties included a high radiation area, high temperatures, contaminated area (anti-Cs needed) and poor emergency lighting.

Finding No. 2

A green finding and NCV was identified in connection with the emergency lighting not being adequate for some fire procedure operator's actions. Examples included opening links in the control room and placing station battery chargers in service following a LOOP.

Unresolved Items

1) Design change package DCR 91-134, was implemented in response to concerns raised in General Electric Report NEDC-3200P, " Evaluation of SRV Performance during Jan. - Feb. 1991 Turbine Trip Events for Plant Hatch Units 1 and 2." To assure that individual SRV(s) will actuate at or near the appropriate set point and within allowable limits, a backup mode of operation was implemented by this design change request (DCR). A new sensor initiated logic (described as one out of two taken twice), was installed to actuate the SRVs at, or slightly above the respective mechanical set point. The modification was intended to provide a redundant method of preventing over-pressurization of the Nuclear Steam Supply System, in addition to the mechanical relief mode of the SRV(s). The inspection team performed an independent design review of the plant modification package and determined that the logic implemented by the DCR was two out of two coincident logic (taken twice), and one out of two coincident logic (taken twice). The inspection team also determined that implementation of this logic has created a potential common cause failure which results in all eleven SRV(s) opening upon a fire induced failure of two 4 to 20 milliamp instrument circuit cables which are

routed in the same cable tray in fire area 2104. The 10 CFR 50.59 Evaluation that was performed for the plant modification was inadequate in that it failed to identify this failure mode. The safety evaluation was also inadequate in that it incorrectly referenced chapter 15.1-17 has having analyzed the potential worst case failure of the SRV(s) caused by implementation of the plant modification. Additionally, the 10 CFR 50.59 Evaluation failed to provide an adequate technical basis that an Unreviewed Safety Question had not been created by implementation of the plant modification. The team was informed by Plant Management that this issue was a problem that was not unique to Plant Hatch but was a generic problem for BWRs having mark 1 containments, (total of 24 BWRs). This issue is Unresolved pending additional NRC review of the technical adequacy of the logic implemented by DCR 91-134; the 10 CFR 50.59 Evaluation completed for the DCR; and its generic implications as alluded to by Plant Management. Guidance to be issued by the NRC concerning the application of multiple hot shorts or multiple fire induced cable failures of instrument circuits will be required for resolution of this item.

2) Fire procedure operator actions to open two links, in two control room back panels, were not adequate. The actions were intended to prevent spurious opening of all eleven SRVs which could occur due to fire induced failure of two instrument circuits in fire area 2104 (Unit 2 east cable way). This action would not be completed in time to be effective. Operators and NRC inspectors estimated that it would take about 30 minutes from the time of the initial fire alarm for operators to get the links opened. However, a fire could potentially cause cable damage in much less than 30 minutes.

   Other deficiencies with this action included inadequate emergency lighting, poor labeling and poor tools. Additionally, other operator actions were relied upon for a hot shutdown from a fire instead of providing physical protection in accordance with the requirements of section III.G.2. These operator actions were not approved by the NRC. Examples included placing station battery chargers in service following a LOOP, and opening links or a breaker to stop a HPCI runaway. Labeling was poor for operator actions to open links. These issues are Unresolved pending additional NRC review.

3) Capability of Core Spray to Mitigate the Spurious Opening of all (11) SRVs; In the event that all eleven SRVs were to spuriously actuate as a result of fire in fire area 2104, the Safe Shutdown Analysis credits the use of Core Spray system as a means of mitigating the event. On July 24, 2003, the licensee performed a simulator exercise which showed that the Core Spray system was capable of providing an adequate supply of reactor coolant makeup. The licensee did not, however, provide objective evidence (calculation of record or analysis) which demonstrated that the specific equipment relied upon to mitigate this event under worst case fire conditions would be capable of satisfying all of the safe shutdown performance criteria specified in Appendix R. This item is Unresolved pending receipt of the calculation of record or analysis from the licensee and review by the NRC to determine its adequacy.

4) Operator Actions to Open/Close Links; As described in current licensing basis documents (Ref. SER dated January 2, 1987, and Georgia Power request for exemption dated May 16, 1986) operator actions to open /close links appear to be considered " repair activities". Repair activities performed for achieving and maintaining hot shutdown are not permitted as a means of complying with Appendix R to 10 CFR50.

The licensee has initiated a Condition Report (CR 2003800152 dated 7/24/2003), to evaluate this issue. This issue remains Unresolved pending review of additional licensing basis documents which demonstrates that the opening or closing of links is no longer considered a repair.

Thirteen CRs were written as a result of this inspection. The CRs were evaluated and determined to meet the NRC criteria for minor findings/violations and will not be discussed in the IR details (with the exceptions of those written in connection with items described above)

CR 2003007719,	Use of Link Wrench
CR 2003007978	Fire Damper Corrective Action.
CR 2003008141	Breaker Maintenance Handle,
CR 2003008165	SSAR Section 2.100,
CR 2003008179	Drywell Access Emergency Lights
CR 2003008181	Link Labeling
CR 2003008203	SRV Manual Action Steps in Procedure
CR 2003008237	Emergency Lights and Component Labeling for Manual Actions
CR 2003008238	CO2 Floor Drain Migration.
CR 2003800151	Instruments for manual Actions.
CR 2003800152	Sliding Links in SSAR
CR 2003800153	Promat Test Report.
CR 2003008250	Communications.

LESSONS LEARNED:

Successes:

- Nuclear Safety Interns involvement/support for assigned inspection areas (**Note:** *Necota Staples assisted in the circuit analysis of instrumentation and control circuits (analog and digital) developed and implemented by plant modification DCR 91-134. Stephanie Belcher was instrumental in assisting Bob Schin with the operations review assignments.* Her knowledge of Plant Hatch layout was also very helpful to the team.

- Experience/knowledge of Fire Protection Contractor Inspector. Ken Sullivan provided valuable support in determining the plants licensing basis. His knowledge of systems

operational requirements was useful in addressing the issue of all 11 SRVs opening. He has the action item to verify the adequacy of using Core Spray to mitigate this event.

Challenges:

- Being team lead does not provide adequate time for performing technical reviews related to inspection items eg. DCR 91-134 was reviewed at home in preparation for Monday morning on site technical discussion with licensee's engineers. Discipline inspectors add value by performing technical inspections.

- Conflict in time allotted for management of overall team inspection planning effort versus required inspection preparation time for team lead.