

July 24, 2012  
Serial: HNP-12-082

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

Shearon Harris Nuclear Power Plant, Unit 1  
Docket No. 50-400/License No. NPF-63

Subject: Request for Enforcement Discretion  
Technical Specification (TS) 3.8.1 *A.C. Sources - Operating*

Ladies and Gentlemen:

Carolina Power & Light requests Enforcement Discretion for the Shearon Harris Nuclear Power Plant, Unit 1 (HNP) from the required action of Technical Specification (TS) 3.8.1 *A.C. Sources – Operating*. Enforcement discretion is requested to avoid an unnecessary reactor shutdown without a commensurate benefit in nuclear safety.

This request concerns an extension of the TS Completion Time for “B” Emergency Diesel Generator (B-EDG) inoperability from the current 72 hours by an additional 12 hours, for a total of 84 hours. The requested extension is necessary to restore the B-EDG to operable status. The enclosure discusses the request for enforcement discretion due to an identified crack in head of the B-EDG engine. This crack was discovered when water was identified draining from the 5L cylinder during preparations for returning the unit to service following unrelated maintenance. The 72 hour TS action statement 3.8.1.1.b.3 was entered at 0400 on July 19, 2012 when diesel generator was removed from service for scheduled maintenance. Following completion of the scheduled maintenance, the issue above was discovered at about 2346 on July 19 during preparations for returning the engine to service. The enclosure describes the current schedule for completing the repairs which will extend beyond the 72 hour allowed outage time which ends at 0400 on July 22, 2012.

HNP concludes that granting of discretionary enforcement in this case is in the best interest of nuclear safety. Conclusions of the risk-informed analysis are included in the enclosure as the safety basis for the request, which includes an evaluation of the safety significance and potential consequences of the proposed course of action.

This NOED request was reviewed and approved by the Plant Nuclear Safety Committee (PNSC) on July 21, 2012.

This enforcement discretion request was verbally discussed with the NRC during a teleconference on July 20, 2012 and formally requested in a teleconference on July 21, 2012. The NRC verbally granted the Notice of Enforcement Discretion on July 21, 2012.

This document contains no regulatory commitments. HNP has a planned action to evaluate the feasibility of a permanent change to the Technical Specification allowed outage time for the emergency diesel generators.

Please refer any questions regarding this submittal to Dave Corlett at (919) 362-3137.

Sincerely,

A handwritten signature in black ink, appearing to read "Eric J. Kinnell". The signature is fluid and cursive, with the first name "Eric" and last name "Kinnell" clearly distinguishable.

Enclosure: Request for Enforcement Discretion, Technical Specification 3.8.1 *A.C. Sources - Operating*

cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP  
Ms. A. T. Billoch Colón, NRC Project Manager, HNP  
Mr. V. M. McCree, NRC Regional Administrator, Region II

Shearon Harris Nuclear Power Plant, Unit 1  
Docket No. 50-400/License No. NPF-63  
Request for Enforcement Discretion  
Technical Specifications (TS) 3.8.1, *A.C. Sources - Operating*

### **Background Information**

On July 19, 2012, at 0400 hours Eastern Daylight Time (EDT), Emergency Diesel Generator B (B-EDG) was removed from service for routine maintenance. Shearon Harris Nuclear Power Plant, Unit 1 (HNP), entered Technical Specification (TS) 3.8.1, "A.C. Sources - Operating," TS 3.8.1.1, Action b.3, which requires the inoperable EDG to be restored to operable status within 72 hours (i.e., on July 22, 2012, at 0400 hours). On July 19, 2012, B-EDG was being barred locally as part of post-maintenance testing. During the barring, water was observed issuing from the 5L cylinder. Investigation has determined that the cause of the water intrusion is a cracked cylinder head of the 5L cylinder. Repair efforts are complete, however, the time needed to complete the operability testing associated with the planned and emergent maintenance may not be sufficient to preclude exceeding the existing allowed out-of-service time (AOT).

While working on the repair of the B-EDG, technicians discovered that a push rod connector separated and was not in its design condition. The condition did not impair the operation of the B-EDG. At this time, there is no indication that this condition is related to a specific event and no indication it is related to the cracked cylinder head. The condition has been entered into the corrective action program. The push rod has been replaced and is not involved with the request for enforcement discretion.

Unless B-EDG is restored to operable status, HNP will be required to be in Hot Standby at 1000 hours on July 22, 2012 and in Cold Shutdown within the following 30 hours (i.e., 1600 hours on July 23, 2012). The requested NOED extends the AOT of TS 3.8.1.1, Action b.3, from 72 hours to 84 hours.

### **Need for Enforcement Discretion**

Enforcement discretion is needed to avoid an unnecessary reactor shutdown without a commensurate benefit in nuclear safety. NRC Regulatory Issue Summary (RIS) 2005-01, *Changes to Notice of Enforcement Discretion (NOED) Process and Staff Guidance*, and the accompanying NRC Inspection Manual Part 9900 *Technical Guidance, Operations - Notices of Enforcement Discretion* states that whenever possible, licensees should request an emergency license amendment in accordance with 10 CFR 50.91 rather than enforcement discretion. The guidance also indicates that an emergency license amendment may not be feasible if less than 72 hours remain until the TS require shutting down, in which case the staff will consider enforcement discretion requests on a case-by-case basis.

On July 19, 2012, at 2346 hours, post-maintenance testing identified that water intrusion had occurred on the 5L cylinder on B-EDG, later determined to be caused by a crack in the cylinder head. Completion of testing and operability restoration activities associated with both the scheduled and corrective maintenance could take up to 12 hours longer than allowed by the AOT. Therefore, the requested NOED extends the AOT of TS 3.8.1.1, Action b.3, from 72 hours to 84 hours.

### **Basis for Enforcement Discretion**

Carolina Power & Light (CP&L) performed a risk-informed evaluation demonstrating the risk associated with continued operation for an additional 12 hours is within the plants normal risk management controls. There is a very small increase in radiological risk to the public or adverse impact on the environment associated with an AOT extension of 12 hours. Normal work control risk management impact, expressed in terms of incremental core damage probability and large early release probability, are specified in industry and NRC guidance on configuration risk management. Conclusions of the risk-informed analysis are included below as the safety basis for the request, which includes an evaluation of the safety significance and potential consequences of the proposed course of action.

The following provides the information described in NRC Regulatory Issue Summary (RIS) 2005-01, *Changes to Notice of Enforcement Discretion Process and Staff Guidance*, and the accompanying NRC Inspection Manual Part 9900 Technical Guidance, *Operations - Notices of Enforcement Discretion*, Section D, required to be included in requests for enforcement discretion.

#### **1. The TS or other license condition that will be violated.**

CP&L is requesting enforcement discretion for TS 3.8.1, "A.C. Sources – Operating." TS 3.8.1.1.b requires two separate and independent diesel generators to be operable. With one diesel generator inoperable, TS 3.8.1.1, Action b.3, requires that an inoperable diesel generator be restored to operable status within 72 hours or be in at least Hot Standby within the next 6 hours and in Cold Shutdown within the following 30 hours.

The basis for the TS requirement is to ensure that the operability of the AC power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for: (1) the safe shutdown of the facility, and (2) the mitigation and control of accident conditions within the facility.

A 12 hour extension to the 72 hour completion time of TS 3.8.1.1, Action b.3 is requested. This extension will allow sufficient time to implement and complete the repairs necessary to return B-EDG to operable status. Without this extension, HNP will be required to be in Hot Standby at 1000 hours on July 22, 2012, and in Cold Shutdown within the following 30 hours (i.e., 1600 hours on July 23, 2012).

#### **2. The circumstances surrounding the situation including likely causes, the need for prompt action, action taken in an attempt to avoid the need for a NOED, and identification of any relevant historical events.**

On July 19, 2012, at 0400 hours EDT, B-EDG was removed from service for unrelated routine maintenance. On July 19, 2012, at approximately 2346 hours, restoration from maintenance revealed that the 5L cylinder on B-EDG had water intrusion that was later confirmed to be from a crack in the cylinder head. At this time, we have found no previous indication of a problem with the cylinder head nor was any water observed from any cylinders during the previous B-EDG operation.

There have been no similar failures associated with the HNP EDG cylinder heads. Due to the emergent nature of the failure and lack of historical problems associated with the EDG cylinder heads, the need for a NOED could not have reasonably been avoided.

**3. Information to show that the cause and proposed path to resolve the situation are understood by the licensee, such that there is a high likelihood that planned actions to resolve the situation can be completed within the proposed NOED time frame.**

The water draining from the 5L cylinder was caused by a small crack in the cylinder head, which allowed water from the jacket water cooling system to enter the combustion chamber. The cracked head has been replaced and the cylinder liner inspected to confirm there are no additional sources of leakage. Therefore, HNP is confident that actions taken will prevent additional water intrusion into the 5L cylinder. Activities remaining to restore operability include lifting clearances, testing following the scheduled and corrective maintenance, and restoration to normal configuration. HNP is confident that an additional 12 hours will provide sufficient time to complete those actions.

**4. The safety basis for the request, including an evaluation of the safety significance and potential consequences of the proposed course of action.**

**a. Provide the incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP) associated with the period of enforcement discretion.**

Within the constraints of extending the AOT for B-EDG by 12 hours, the overall risk increase is well within the acceptable thresholds of  $5E-07$  for ICCDP and  $5E-08$  for ICLERP provided in Regulatory Issue Summary 2005-01, *Changes to Notice of Enforcement Discretion (NOED) Process and Staff Guidance*. The risk results are provided below:

| Parameter  | Internal Events | High Winds | Seismic  | Fire     | Total    | NOED Limit |
|------------|-----------------|------------|----------|----------|----------|------------|
| Delta CDF  | 1.12E-06        | 4.58E-06   | 1.89E-06 | 2.02E-05 | 2.78E-05 | -          |
| Delta LERF | 1.40E-07        | 6.06E-07   | 2.15E-07 | 2.32E-06 | 3.28E-06 | -          |
| ICCDP      | 1.53E-09        | 6.27E-09   | 2.59E-09 | 2.77E-08 | 3.81E-08 | 5.00E-07   |
| ICLERP     | 1.92E-10        | 8.29E-10   | 2.94E-10 | 3.18E-09 | 4.49E-09 | 5.00E-08   |

**b. Discuss the dominant risk contributor (cutsets/sequences) and summarize the risk insights for the plant-specific configuration the plant intends to operate in during the period of enforcement discretion.**

The dominant sequences for the internal events ICCDP and ICLERP results are reactor coolant pump seal LOCAs, loss of all AC power, and loss of decay heat removal. The associated dominant initiating events are reactor trips, feed water transients, and loss of off-site power. Risk significant equipment failures include the Dedicated Shutdown Diesel

system, A-EDG, and the associated support systems. The Steam Driven Auxiliary Feed Water pump is also a risk significant system for this plant configuration. The High Winds and Seismic events initiate a loss of off-site power resulting in similar sequences. The same equipment failures as for internal events are also important systems for these external events except the Dedicated Shutdown Diesel system is assumed unavailable for seismic events. The fire results are dominated by fire events listed below with the same equipment failures discussed above. The high voltage transformer fire events have a slightly different sequence, where the loss of all AC is caused by fire induced failures of 6.9kv breakers or electrical control logic failures such as load shed failure or automatic bus transfer failures. Those failures combined with operator action failures for the recovery of off-site power using the Startup Transformers A or B in the dominant sequences.

**Dominant Fire Sources:**

- B-Phase Trans - High Voltage power transformer
- Main Control Board
- DP-1B-SB - DISTRIBUTION PANEL 1B-SB
- C-Phase Trans - High Voltage power transformer
- A-Phase Trans - High Voltage power transformer
- 1B1 - 480V Auxiliary Switchgear
- WC-2(B) - chiller unit, 40 hp motor
- 1E - 6.9KV AUX BUS 1E
- ARP-13 - ARP-13
- MUX 7 - 2x 2 vertical section Multiplexer
- C10-1IH0052BSB - ERFIS MUX unit
- 1-4A(sec2) - switchgear/bus
- B-Phase Trans - Catastrophic - High Voltage power transformer
- A-Phase Trans - Catastrophic - High Voltage power transformer
- C-Phase Trans - Catastrophic - High Voltage power transformer
- 1-G Turbine Oil System Pumps - turbine oil system pumps
- 1EE-E087 - Battery Charger
- 1E3 - 480 V switchgear
- 1IC-E025 - PIC 9 A Safety
- 1-4A(sec1) - switchgear/bus
- Annunciator Cabinet 2 ( 5 Bays ) - Annunciator Cabinet 2 - Bays 1, 2, 3, 4, 5
- Transient 124 - Transient 4
- Train A Output Cabinets - Train A output cabinets 1 & 2

**c. Explain compensatory measures that will be taken to reduce the risk associated with the specified condition. Compensatory measures to reduce plant vulnerabilities should focus on both event mitigation and initiating event likelihood.**

The following compensatory measures will be employed to mitigate the risk associated with the extended AOT:

1. Non-essential surveillances or other maintenance activities in the Switchyard and Relay House will not be allowed to minimize the initiation probability of a Loss of Offsite Power (LOOP).
2. Non-essential surveillances or other maintenance activities on risk-significant equipment will not be allowed (protected equipment strategy). This equipment includes:
  - A-EDG and it's auxiliaries (i.e., including ESW)
  - Turbine-Driven Auxiliary Feedwater Pump (TDAFWP)
  - Dedicated Shutdown Diesel Generator (DSDG)
  - Essential train A AC/ DC power
  - Division A Switchgear
  - Diesel-driven Fire Pump
3. Review and brief operator actions related to connection of the DSDG to station battery chargers.
4. Review and brief operator actions related to restoration of power using the start-up transformers in the event of an automatic transfer failure.
5. Protect against maintenance and surveillances that could result in a reactor trip.
6. Protect against maintenance and surveillances that could result in loss of main Feedwater.
7. Protect breakers from the Unit Auxiliary Transformers and Startup Transformers to 1D and 1E buses.
8. Walk-down the alternate seal injection system for challenges to functionality.
9. Verify grid conditions are stable.

- d. Discuss how compensatory measures are accounted for in the PRA. These modeled compensatory measures should be correlated, as applicable, to the dominant PRA sequences identified in Item 4.b above. In addition, other measures not directly related to the equipment out-of service may also be implemented to reduce overall plant risk and, as such, should be explained. Compensatory measures that cannot be modeled in the PRA should be assessed qualitatively.**

The only compensatory measure accounted for in the PRA is the operator action to restore off-site power from the Switchyard using either or both start-up transformers in the event of an automatic transfer failure. The other compensatory measures are not reflected in the PRA. Although these other compensatory measures are not reflected in the PRA, they are significant improvements in defense in depth.

- e. Discuss the extent of condition of the failed or unavailable component(s) to other trains/divisions of equipment and what adjustments, if any, to the PRA common cause factors have been made to account for potential increases in the failure probabilities. The method to use to determine the extent of condition should be discussed. It is recognized that a formal root cause or apparent cause is not required given the limited time available in determining acceptability of a proposed NOED. However, a discussion of the likely cause**

**should be provided with an associated discussion of the potential for common cause failure.**

Based on visual observation and External OE, the likely cause of the water intrusion into the cylinder is a manufacturing defect that propagated into a crack. With this cause, it is reasonable to state that the EOC could apply this to all the other cylinders in the EDG (both A and B). A-EDG has two group 2 cylinder heads and the remainder are the improved design group B. The EDG's are maintained and operated per vendor recommendations and industry practice, which requires that 25% of cylinder heads are inspected every 15 years. HNP has inspected 100% of the cylinder heads since installation.

OE searches and discussions with vendor reveal that there has only been one reported group 3 head discovered with a crack; HNP has not had a group 3 head crack. Barring during prestart checks is the best indicator of leaking head and there have been no other reported instances of moisture from any cylinders during this test. The last barring of A-EDG was 6/28/12 and B-EDG was 7/18/12. Therefore, the extent of condition was considered to be reduced to the single cylinder head that was found to be cracked.

As a sensitivity to consider the impact of common mode failure in the PRA analysis, the probability of the A-EDG start failure was increased by a factor of ten. This resulted in an increase (for all hazards) in ICCDP to  $1.0E-7$  and ICLERP to  $9.4E-9$ , which remains well within acceptance criteria.

- f. Discuss external event risk for the specified plant configuration. An example of external event risk is a situation where a reactor core isolation cooling pump (RCIC) has failed and a review of the licensee's individual plant examination of external events or full-scope PRA model identifies that the RCIC pump is used to mitigate certain fire scenarios. Action may be taken to reduce fire ignition frequency in the affected areas or reduce human error associated with time critical operator actions in response to such scenarios.**

The external events that have a contribution are specifically to include risk increase analysis for high winds, seismic, and fire. The external flooding is not included based upon the topography of the site and the associated flood water sources. Other external hazards such as aviation and transportation have been evaluated and have been screened out for additional risk contribution.

- g. Discuss forecasted weather conditions for the NOED period and any plant vulnerabilities related to weather conditions.**

The current forecast for Sunday from the National Weather Service as of 1330 on July 21, 2012, is a slight chance of showers before noon, then a slight chance of showers and thunderstorms between noon and 2pm, then a chance of thunderstorms after 2pm.

A sensitivity was performed to address a key area of uncertainty: *Weather related Loss of Off-site Power*.



As a sensitivity to address this area of uncertainty, the probability of a weather-related loss of off-site power was increased by a factor of 10. The resultant ICCDP is  $4.9\text{E-}9$  and ICLERP is  $5.5\text{E-}10$ , which is a negligible increase.

**5. The justification for the duration of the noncompliance.**

As demonstrated by the above risk analysis, operation of the HNP for an additional 12 hours with B-EDG inoperable is acceptable from a risk perspective. Measures will be implemented to prevent any maintenance activities on systems in the plant that could impact the AC power system. The load dispatcher validated that there are no operations on the grid that would present a challenge to the offsite power system to the HNP site. Based on these factors, and the fact that the required activities can be completed within the requested additional time period, CP&L has determined that the proposed duration of the NOED is acceptable.

**6. The condition and operational status of the plant (including safety-related equipment out of service or otherwise inoperable).**

During the period of the NOED, HNP will be in Mode 1 with only B-EDG inoperable. Other TS, risk significant, and safety-related equipment will remain operable. Online risk is green and there are no clearances or surveillances in progress that affect safety system operability. No intrusive maintenance is scheduled on risk significant, safety related, or Technical Specification equipment.

**7. The status and potential challenges to off-site and on-site power sources.**

There are no expected challenges to off-site or on-site power sources, other than inoperability of B-EDG itself, during the proposed NOED. Measures will be implemented to prevent any maintenance activities on systems in the plant that could impact the AC power system. The load dispatcher confirmed that there are no operations on the grid that would present a challenge to the offsite power system to the HNP site. Compensatory measures will be implemented to prevent any work activities in the plant that could challenge the availability and reliability of initiators or redundant systems.

**8. The basis for the licensee's conclusion that the noncompliance will not be of potential detriment to the public's health and safety.**

There is no significant difference in nuclear safety risk by extending the B-EDG allowed out of service time by 12 hours to accomplish required repairs and testing. The change in risk is consistent with the normal work control practices. Additionally, there is an inherent safety benefit of repairing B-EDG without shutting the unit down when compared to shutting the units without B-EDG available. Therefore, requiring this repair to be performed during shutdown would result in additional plant equipment and personnel challenges without any significant benefit to the safety of the plant or the health and safety of the public.

In addition to the risk insights discussed above, A-EDG ensures that the onsite emergency AC power supply function is performed. A-EDG will be maintained in an operable condition in accordance with TSs. Appropriate plant redundant and support systems (i.e., including non-TS equipment) will be considered as protected systems to ensure there is no undue risk of redundant or support equipment inoperability during the proposed NOED time frame.

Work on B-EDG will be prioritized such that work will be performed around the clock in accordance with site administrative procedures. In addition, to ensure that the work proceeds in an orderly, yet expeditious manner, the Outage Control Center has been activated to make certain that appropriate focus is placed on scheduling, prioritization, contingencies, and relief turnover. Senior Corporate and Site Management personnel will continue to closely monitor the work activities to assure prompt completion.

**9. The basis for the licensee's conclusion that the noncompliance will not involve adverse consequences to the environment.**

This request for enforcement discretion does not result in any significant changes in the types, or significant increase in the amounts, of any effluents that may be released offsite. In addition, no significant increase in individual or cumulative occupational radiation exposures is involved as a result of the request. Therefore, it can be concluded that the NRC's granting of this request for enforcement discretion does not involve any adverse consequences to the environment.

**10. Approval by the Plant Nuclear Safety Committee (PNSC)**

The requested NOED was reviewed by the PNSC and approved by the Plant General Manager at 1555 hours on July 21, 2012.

**11. The request must specifically address which of the NOED criteria for appropriate plant conditions specified in Section B is satisfied and how it is satisfied.**

The proposed NOED meets criteria 1.a by avoiding an unnecessary transient and, thus, minimize potential safety consequences and operational risks as a result of compliance with TS 3.8.1.1, Action b.3.

**12. Unless otherwise agreed to, a commitment is required from the licensee that the written NOED request will be submitted within 2 working days and the followup amendment will be submitted within 4 working days of verbally granting the NOED. The licensee's amendment request must describe and justify the exigent circumstances (see 10 CFR 50.91(a)(6)).**

This letter fulfills the requirement to submit a written NOED request within two working days. Harris has a planned action to study the feasibility of an extended EDG AOT.

**13. Severe weather related NOED requirements.**

The proposed NOED is not related to severe weather.