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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Additional Information Related to License Amendment Request to Remove Operating Mode Restrictions for Performing Division 3 AC Sources Surveillance Testing (TAC NO. ME4949)

References:

1. Letter from J. L. Hansen (Exelon Generation Company, LLC (EGC)) to U. S. NRC, "License Amendment Request to Remove Operating Mode Restrictions for Performing Division 3 AC Sources Surveillance Testing," dated October 28, 2010

2. Letter from N. J DiFrancesco (U. S. NRC) to Mr. M. J. Pacilio (EGC), " Clinton Power Station, Unit No.1 -Request for Additional Information Re: License Amendment Request for the Removal of Division 3 Alternating Current Mode Restrictions for Performing High Pressure Core Spray Emergency Diesel Generator Surveillance Testing (TAC NO. ME4949)," dated March 22, 2011

In Reference 1, Exelon Generation Company, LLC (EGC) requested an amendment to Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-62 for Clinton Power Station, Unit 1 (CPS). The proposed change would modify CPS Technical Specifications (TS) Section 3.8.1, "AC Sources – Operating," by revising certain Surveillance Requirements (SR) related to the Division 3 AC Sources. In Reference 2, the NRC requested that EGC provide additional information in support of their review of Reference 1. The information requested in Reference 2 is provided in the Attachment to this letter.

The information provided in this letter does not affect the No Significant Hazards Consideration, or the Environmental Consideration provided in Attachment 1 of the original license amendment request as described in the Reference 1 submittal.

In accordance with 10 CFR 50.91(b), "State consultation," EGC is providing the State of Illinois with a copy of this letter and its attachment to the designated State Official.

This letter contains no new regulatory commitments. If you have any questions concerning this letter, please contact Mr. Mitchel A. Mathews at (630) 657-2819.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 8th day of April, 2011.

Respectfully,

Jeffrey L. Hansen
Manager – Licensing
Exelon Generation Company, LLC

Attachment: Additional Information Related to License Amendment Request to Remove Operating Mode Restrictions for Performing Division 3 AC Sources Surveillance Testing

ATTACHMENT

Additional Information Related to License Amendment Request to Remove Operating Mode Restrictions for Performing Division 3 AC Sources Surveillance Testing

NRC Request No. 1. ***In Section 2.1, surveillance requirement (SR) 3.8.1.8, of license amendment request (LAR), the licensee states, "Revise Note 2 to remove restriction that prohibits performance of the SR in Modes 1 or 2 for Division 3 AC Sources only." However, the technical specification (TS) markup sheet for SR 3.8.[1.]8 attached to the LAR does not show Note 2. Please provide clarification to this discrepancy.***

Exelon Generation Company, LLC (EGC) Response to NRC Request No. 1

The Section 2.1 verbiage related to Surveillance Requirement (SR) 3.8.1.8 contains a typographical error. As shown in Technical Specifications (TS) markup associated with SR 3.8.1.8 in Figure 1 below, this SR contains only one note.

SR 3.8.1.8 (not applicable to Division 3 AC sources)	----------NOTE---------- This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ----------	
	Verify automatic and manual transfer of unit power supply from the normal offsite circuit to the alternate offsite circuit.	24 months

Figure 1: SR 3.8.1.8 Markup

The Section 2.1 discussion associated with SR 3.8.1.8 should read as follows:

SR 3.8.1.8: Revise the Note to remove the restriction that prohibits performance of the SR in Modes 1 or 2, for Division 3 AC sources only. This SR requires verification of the automatic and manual transfer of unit power supply from the normal offsite circuit to the alternate offsite circuit.

NRC Request No. 2. ***Attachment 1, page 17 of 25, of the LAR states, "Lastly, the Division 3 power system is an independent electrical distribution system with a dedicated DG. Division 3 loads such as Division 3 Source Range Monitor and Reactor Protection System isolation features are supported by a battery that is designed to carry these loads for four hours; therefore, there is minimal opportunity for the performance of this SR for the Division 3 DG to have any impact on other safety-related plant equipment or normal plant operation. The simulated LOOP signal is generated only at the Division 3 switchgear and does not affect the other two safety-related electrical divisions or their associated loads."***

Please explain in detail the "minimal opportunity" which could have impact on other safety-related plant equipment or normal plant operation for the performance of this SR for Division 3 DG.

EGC Response to NRC Request No. 2

The Division 3 AC electrical distribution system provides the necessary power for maintaining the required float on the Division 3 Battery, via a dedicated battery charger. The Division 3 Battery is the normal source to the NSPS Inverter, which supplies power to essential logic systems of Nuclear System Protection System (NSPS). The Division 3 AC electrical distribution is also the alternate source to the NSPS power supply. A momentary loss of AC power during the simulated loss of offsite power test, will have no effect on the Division 3 battery or the NSPS power supply and therefore will have no direct effect on the three other NSPS divisions. Additionally, the static transfer switch for Division 3 NSPS inverter is designed to prevent a transfer to the alternate source when voltage and frequency of the alternate source is not within a prescribed range. In the unlikely event that the Division 3 diesel generator (DG) does not successfully power the Division 3 AC electrical distribution system and power is not restored within 4 hours, the NSPS alternate power supply will become unavailable and the Division 3 battery will lose it capacity to power the Division 3 NSPS Instrumentation, logic, and actuation outputs. This condition will impact the Division 3 essential logic for the Reactor Protection System (RPS); the Nuclear Steam Supply Shutoff System (NS4); and the High Pressure Core Spray (HP) System. The HP system is a non-fail safe logic system but only affects the Division 3 loads and has no effect on the other safety-related equipment or plant operation. The RPS and NS4 trip logic are fail-safe logic systems in that loss of power or input signals will produce a trip signal. The RPS trip condition will de-energize the Group 3 "A" and "B" solenoids resulting in a half scram. Likewise, the NS4 trip will result in a half isolation of the Inboard Main Steam Isolation Valves (MSIVs) and certain inboard (Division 2) Containment Isolation Valves (CIVs).

Other system functions affected by the loss of Division 3 NSPS power include a divisional loss of start-up and power range monitoring (i.e., Source Range, Intermediate Range, Local Power Range, and Average Power Range Monitoring); a rod block from the Rod Control and Information System; and a divisional loss of the RPS actuation of the Recirculation Pump Trip. These system impacts do not prevent accomplishment of the safety functions occurring from Divisions 1, 2, and 4.

In summary, the minimal opportunity effect is that a Division 3 DG failure to load and an extended loss of power (i.e., greater than 4 hours) to the Division 3 AC distribution system will make it more likely for a RPS scram or NS4 isolation from a spurious accident signal from other safety-related trip logic. Should the Division 3 DG fail to load, Operators would promptly restore power to the Division 3 AC distribution system using the operable offsite power sources (i.e., reserve auxiliary transformer (RAT) and emergency reserve auxiliary transformer) in accordance CPS Procedure 4200.01, "Loss of AC Power."

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NRC Request No. 3. ***The upper portion of relays DG 1C IAC, DG 1C FCV, and 251-221C1-51 on Attachment 3 of the LAR are shown with dotted lines and lower portion with continuous lines. Please provide a detailed discussion on how the upper (dotted) portion of time current plot of relays DG 1 C IAC, DG 1 C FCV, and 251-221 C1 -5[1] were determined and confirm that they were concurred by relay manufacturers.***

EGC Response to NRC Request No. 3

The dotted lines for the upper portions of the overcurrent relay settings curves for relays DG 1C IAC, DG 1C FCV, and 251-221C1-51 were generated from the Electrical Transient Analyzer Program (ETAP), Version 5.5, Star Protective Device Coordination Module using the "Extend inverse time curve" plot option. The ETAP Star Module contains an extensive device library. The protective device library has been Verified & Validated (V&V) by Operations Technology, Inc. (OTI) using published manufacturer data.

The following information is provided from OTI:

ETAP has become the de facto analysis standard within the United States nuclear generation plants market. Currently, 60 of 64 operating sites (i.e., 94%) utilize ETAP as their standard.

ETAP complies with established quality standards and regulations as discussed below. Each release of ETAP is V&V by OTI against field results, real system measurements, established programs, and hand calculations in order to ensure its technical accuracy. The V&V process includes the entire ETAP Library including the device libraries.

According to OTI, the ETAP V&V procedures for each nuclear release are in full compliance with the following standards:

- United States Code of Federal Regulation, Title 10 CFR Part 50, Appendix B
- United States Code of Federal Regulation, Title 10 CFR Part 21
- United States Code of Federal Regulation, Title 10 CFR Part 50.55
- ANSI / ASME N45.2 - 1977
- ASME NQA-1 (includes Subpart 2.7)
- ISO 9001:2008 Standards
- ANSI / IEEE 730.1 - 1989
- CAN / CSA-Q 396.1.2 - 1989
- ANSI N45.22 - 1972

Moreover, the safety-related nuclear facility version of ETAP includes: a Certification Letter, Software Requirements Specification, Software Verification & Validation Plan, Software Verification & Validation Report, Test Files & Output Report Files in an Electric Format, Opportunity to Audit & Assess OTI's Quality System, and Error Reporting of Defects and Noncompliance. The safety-related version of ETAP was used to generate all regions of the

curves provided in Attachment 3 of the LAR. In summary all portions of the Attachment 3 plot curves were developed according relay manufacturer's specifications via ETAP software.

NRC Request No. 4. ***Attachment 1, page 6 of 25, of the LAR, states, "All safety related continuous duty motors have the ability to deliver their rated horsepower continuously without damage when the voltage at the terminals is 10% above or below rated voltage with rated frequency."***

Please confirm that when the Division 3 DG (1 C) is allowed to deliver maximum voltage output (4580 Volt (V)) per Clinton's TSs SR 3.8.1.2, all the safety-related continuous duty motors, including motors fed from 4160 V buses, will have the ability to deliver the rated horsepower continuously without damage.

EGC Response to NRC Request No. 4

According to Surveillance Requirements Section of the TS 3.8.1 Bases, the minimum and maximum steady state output voltages of 4084 V and 4580 V respectively, are equal to - 2% and + 10% of the nominal 4160 V output voltage. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively, are equal to ± 2% of the 60 Hz nominal frequency. The specified steady state voltage and frequency ranges are derived from the recommendations given in Regulatory Guide 1.9, "Selection, Design, and Qualification of Diesel-Generator Units Used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants." However, the minimum voltage was increased to ensure adequate voltage to operate all safety-related loads during a Design Basis Accident (DBA). Also, General Electric documented in Licensing Topical Report NEDO-10905, "HPCS System Power Supply Unit," that the HPCS DG meets the power quality requirement of IEEE 387 – Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations. Specifically, GE certified in NEDO-10905 that maintaining voltage and frequency within limits will not degrade the performance of any of the loads composing the design loads below their minimum requirements, including the duration of transients caused by load application or load removal.

The maximum output voltage of 4580 VAC for the Division 3 DG is specific to recovery of the DG from voltage transients during starting or load sequencing. This is consistent with USAR Section 8.3.1.2.2 and Regulatory Guide 1.9, that during load sequence, restoration of voltage to within 10% of nominal (4580 VAC) is required within 60% of the load sequence time interval (i.e., 2 seconds). The voltage transients on the 4kV HPCS motor and Division 3 loads, including short periods with output voltage reaching 4580 VAC, will have no effect on their capability to deliver their rated horsepower without damage. In addition, the Division 3 DG and Voltage regulator is designed to provide regulation of 0.5% with a response time less than 17 milliseconds. The voltage regulation and automatic voltage reset (i.e., on startup and the initiation of a loss of coolant accident signal), ensure the DG output voltage is maintained between 4126 VAC and 4271 VAC during normal conditions and during recovery from transient conditions.

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Clinton analyses in Calculations 19-AK-13, 19-AK-06, and 19-AJ-74, specify that the maximum acceptable voltage on the Division 3 4 kV safety-related bus is 4454 VAC for 30 minutes and 4300 VAC for continuous operation. These calculations evaluated the effects of the overvoltage condition on the connected loads in the 120 VAC distribution panels and determined that continuous operation above 4300 VAC on the 4kV 1E buses would result in voltages above allowable for certain 120 VAC devices. The analysis allows for elevated voltages up to 4454 VAC for 30 minutes that account for overvoltage conditions that can occur if the RAT Static VAR Compensator trips coincident with high 345 kV transmission system voltages. The 30 minute duration was considered to be sufficient time to restore 4 kV voltages to within specification without damaging downstream Division 3 AC loads. Implementation of these voltage limits are administratively controlled by CPS Operating and Surveillance Procedures.