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U.S. Nuclear Regulatory Commission
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Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Renewed Facility Operating License Nos. DPR-53 and DPR-69
NRC Docket Nos. 50-317 and 50-318

Subject: License Amendment Request
Proposed Changes to Technical Specification (TS) 3.8.1 Actions A.3 and D.3 to Extend the Offsite Circuit Inoperable Completion Times from 72 hours to 14 days on a One-Time Basis on each Unit

References: 1. NUREG 0800, Branch Technical Position 8-8, "Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions," dated February 2012.

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (Exelon), proposes changes to the Technical Specifications (TS), Appendix A of Operating License Nos. DPR-53 and DPR-69 for Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2, respectively.

This submittal requests two one-time use extensions to TS 3.8.1 (AC Sources-Operating) Actions A.3 and D.3 Completion Time (CT) for an inoperable offsite circuit from 72 hours to fourteen (14) days in order to allow for the future installation and tie in of a new 13 kV service transformer during the 2019 Unit 2 Refuel Outage and the 2020 Unit 1 Refuel Outage. The tie in of the new service transformer cannot be accomplished within the current CT of 72 hours. A TS footnote will be added to the affected TS 3.8.1 Actions A.3 and D.3 CTs to indicate that the extended 14-day CT period for the affected inoperable offsite circuit may be entered for the specific task of installing the new service transformer.

Attachment 1 provides the evaluation of the proposed changes. Attachment 2 provides the marked-up TS pages indicating the proposed changes. Attachment 3 provides a List of Compensatory and Risk Management Actions required during the period of extended CT. Attachment 4 provides CCNPP Simplified Electrical Single Line Drawings and

Simplified Figures to facilitate the technical discussions contained in Attachment 1. Attachment 5 provides the Electrical Distribution Reliability Improvement Project (EDRIP) Schedule during the 14-Day CT period. Attachment 6 provides ESF Bus and SMECO Offsite Load Tables.

There are no regulatory commitments contained within this submittal.

Exelon has concluded that the proposed changes present no significant hazards consideration under the standards set forth in 10 CFR 50.92.

Exelon requests approval of the proposed amendment by December 14, 2018 in support of the Winter 2019 Unit 2 Refuel Outage. Upon NRC approval, the amendment shall be implemented within 60 days of issuance.

The proposed changes have been reviewed by the Plant Operations Review Committee.

The State of Maryland is notified of this application for changes to the Technical Specifications by transmitting a copy of this letter and its attachments to the designated State Official.

If you have any questions or require additional information, please contact Frank Mascitelli at 610-765-5512.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 23rd day of August 2018.

Respectfully,

D. A. Helker

David P. Helker
Manager, Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachments:
1. Evaluation of Proposed Changes
2. Markup of Proposed Technical Specifications Pages
3. List of Compensatory and Risk Management Actions
4. CCNPP- Simplified Electrical Single Line Drawing and Simplified Figures
5. EDRIP Schedule during 14-Day CT Period
6. ESF Bus and SMECO Offsite Load Tables

cc: USNRC Region I, Regional Administrator
USNRC Project Manager, CCNPP
USNRC Senior Resident Inspector, CCNPP
D. A. Tancabel, State of Maryland

ATTACHMENT 1
License Amendment Request

Calvert Cliffs Nuclear Power Plant, Units 1 and 2

Docket Nos. 50-317 and 50-318

EVALUATION OF PROPOSED CHANGES

Subject: License Amendment Request
Proposed Changes to Technical Specification (TS) 3.8.1 Actions A.3 and D.3 to Extend the Offsite Circuit Inoperable Completion Times (CT) from 72 hours to 14 days on a One-Time Basis on each Unit

1.0 DESCRIPTION

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit, "Exelon Generation Company, LLC (Exelon), proposes changes to the Technical Specifications (TS), Appendix A of Operating License Nos. DPR-53 and DPR-69 for Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2, respectively.

This submittal requests changes to TS 3.8.1, "AC Sources - Operating" to revise Actions A.3 and D.3 with a footnote to restore required offsite circuit to operable status from a Completion Time (CT) of 72 hours to fourteen (14) days when the 14-day CT extended period is entered. These proposed TS changes will support the specific one-time conditions to tie in the new 13.8 kV P-13000-3 service transformer during the next Unit 2 (2019) and following Unit 1 (2020) Refuel Outages. When operational, the new service transformer will improve the reliability of the 13.8 kV qualified offsite circuits.

Note that this License Amendment Request (LAR) scope is limited to the request for a TS 14-day CT period extension. All background discussions involving modifications to the offsite circuits being implemented under the Electrical Distribution Reliability Improvement Project (EDRIP) and background discussions involving the Control Room Emergency Ventilation System (CREVS) and the Control Room Emergency Temperature Control System (CRETS) are for information only and intended to provide the necessary context and initial plant conditions to facilitate the technical review for the 14-day CT period extension. Modifications to the qualified offsite circuits are being evaluated under the 10 CFR 50.59 process. No physical changes are being proposed to the CREVS/CRETS systems.

The proposed changes have been evaluated in accordance with and meet the defense - in-depth (DID) guidance of, NUREG-0800 Branch Technical Position (BTP) 8-8, "Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions," dated February 2012 (Reference 1).

2.0 PROPOSED CHANGES

<u>TS LCO 3.8.1, Action A.3</u>

A footnote will be added to TS LCO 3.8.1, Action A.3, to extend the 72-hour CT for one inoperable offsite circuit to 14 days:

Insert * after 72 hours in TS LCO 3.8.1, Action A.3:

Add the following footnote:

"* Or 14 days, once during each applicable 2019 and 2020 Refuel Outage, for the connection of the new P-13000-3 Service Transformer."

TS LCO 3.8.1, Action D.3

A footnote will be added to TS LCO 3.8.1, Action D.3, to extend the 72-hour CT to declare the CREVS and CRETS train supported by the inoperable offsite circuit inoperable to 14 days:

Insert * after 72 hours in TS LCO 3.8.1, Action D.3:

Add the following footnote:

"* Or 14 days, once during each applicable 2019 and 2020 Refuel Outage, for the connection of the new P-13000-3 Service Transformer."

3.0 BACKGROUND

3.1 Offsite Circuit System Description

13.8 kV System

Refer to Attachment 4, Updated Final Safety Analysis (UFSAR) Fig. No. 8-1, which is the Electrical Main Single Line Diagram for CCNPP to facilitate the following discussion.

Offsite power is supplied to the 500 kV Switchyard from the transmission network by three 500 kV transmission lines. Two electrically and physically separated circuits supply electric power from the 500 kV Switchyard to two 13.8 kV busses and then to the four 4.16 kV Engineered Safety Feature (ESF) busses (two per Unit). A third 69 kV/ 13.8 kV offsite power source that may be manually connected to either 13.8 kV bus is available from the Southern Maryland Electric Cooperative (SMECO). When appropriate, a manual Engineered Safety Feature Actuation System (ESFAS) Loss-of-Coolant Incident (LOCI) and shutdown sequencer actuation is provided in the Control Room to ensure that the SMECO system is loaded in an orderly manner to minimize system transients. The SMECO offsite power source is not used to carry loads for an operating unit.

The required TS offsite power circuits are the two 13.8 kV service busses (Nos. 11 and 21) (Refer to Attachment 4, 13.8 kV Distribution System) which can be powered by:

a. Two 500 kV lines, two 500 kV busses each of which have connections to a 500 kV line that does not pass through the other 500 kV bus and both P-13000 (500 kV / 13.8 kV) transformers; or
b. One 500 kV line, one 500 kV bus, and one associated P-13000 (500 kV / 13.8 kV) transformer, and the 69 kV/ 13.8 kV SMECO line.

Each offsite circuit includes the cabling to and from a 13.8/13.8 kV voltage regulator, 13.8/4.16 kV unit service transformer, and one of the two breakers to each 4.16 kV ESF bus. Transfer capability between the two required offsite circuits is by manual means only. The required circuit breaker to each 4.16 kV ESF bus must be from different

13.8/4.16 kV unit service transformers for the two required offsite circuits. Thus, each unit is able to align one 4.16 kV ESF bus to one required offsite circuit, and the other 4.16 kV ESF bus to the other required offsite circuit.

3.2 Onsite Circuit Electrical Distribution

4.16 kV System:

The AC sources to the Class 1E Electrical Power Distribution System consist of the offsite power sources starting at the 4.16 kV ESF busses and the onsite diesel generators (DGs). As required by 10 CFR 50 Appendix A, General Design Criteria (GDC) 17, the design of the AC electrical power system has sufficient independence and redundancy to ensure a source to the ESF busses assuming a single failure.

The Class 1E AC Distribution System is divided into two redundant load groups so that the loss of one group does not prevent the minimum safety functions from being performed. Each load group has connections to two offsite sources and one Class 1 EDG at its 4.16 kV 1E bus, as shown in Attachment 4, 4.16 kV Distribution.

The 4.16 kV system is designed to function reliably and supply power during normal operation and under accident conditions. The system will supply power to the 4.16 kV auxiliary loads from the 13.8 kV system through the six-unit service transformers. There are six 4.16 kV busses per unit, two of which supply power to the ESF. The ESF electrical system incorporates the two-channel concept, i.e., independent electrical controls and power systems supply redundant 4.16 kV ESF. The 4.16 kV ESF electrical system meets the single failure criterion defined in IEEE 279, Section 4.2, and is designed as a Class 1E system.

Whenever offsite power is available, the 4.16 kV system is supplied by the 13.8 kV system. Each 4.16 kV bus can be fed from either of two 13.8 kV sources of auxiliary power through different unit service transformers. Normally, Busses 11, 12, and 13 are fed from unit Service Transformer U-4000-11, Bus 14 from U-4000-21, Bus 21 from U-4000-12, Busses 22, 23, and 24 from U-4000-22, Busses 15 and 16 from U-4000-13, and Busses 25 and 26 from U-4000-23. Transfers, if required, are performed manually.

Two of the 4.16 kV busses for each unit (11 and 14 for Unit 1; 21 and 24 for Unit 2) supply power to the ESF systems. These four busses are considered the onsite Class 1E AC electrical power distribution system. The two busses feed redundant equipment. Each of the two busses per unit are supplied from separate EDGs. These busses are located in separate Seismic Category I rooms. Feeder cables from the EDGs and from ESF equipment are also located within Seismic Category I structures, and separation is maintained between the feeder cables of the two busses.

In the event of a loss of offsite power to a 4.16 kV ESF bus, if required, the ESF electrical loads will be automatically sequenced onto the EDG in sufficient time to provide for safe shutdown for an anticipated operational occurrence (AOO) and to ensure that the containment integrity and other vital functions are maintained in the event of a design bases accident.

The ESF busses are equipped with one set of under voltage sensing relays, and upon receipt of a two-out-of-four logic signal, the EDGs are energized to supply power.

3.3 Emergency Diesel Generators (EDGs)

The EDGs are designed to furnish onsite power to reliably shut down the plant and maintain it in a safe shutdown condition under all conditions including accidents. Four safety-related EDGs (1A, 1B, 2A, 2B) are provided for the plant although each Unit requires only one EDG to supply the minimum power requirements for its ESF equipment. The Unit 1 4.16 kV ESF Busses are 11 and 14. The Unit 2 4.16 kV ESF Busses are 21 and 24. EDG 1A is connected to 4.16 kV ESF Bus 11, 1B is connected to 4.16 kV ESF Bus 14, 2A is connected to 4.16 kV ESF Bus 21, and 2B is connected to 4.16 kV ESF Bus 24 as shown in Attachment 4, 4.16 kV Distribution.

The continuous service rating for the 1A EDG is 5400 kW and for the 1B, 2A, and 2B EDGs is 3000 kW. The EDG's capacities are tested monthly in accordance with TS surveillance requirements per STP-O-8A-1, 8B-1, 8A-2, 8B-2 (Reference 2).

The EDGs are automatically started by either a 4.16 kV bus Under Voltage (UV) or Safety Injection Actuation Signal (SIAS); however, in the latter case, actual transfer to the bus is not made until the preferred source of power is lost. When all four EDGs are available, the design provides power for two independent systems for safety injection, containment spray, and related 480 Volt auxiliary devices for the unit incurring the accident. In addition, it provides power to operate two sets of equipment for shutting down the non-accident unit.

During accident conditions accompanied by simultaneous loss of offsite power, the LOCI sequencers start automatically to load the EDGs sequentially. Similarly, the shutdown sequencer for the non-accident unit loads the EDG's sequentially to maintain safe shutdown conditions. The sequencing is performed so that essential loads are started within the time limits of the appropriate safety analyses.

In addition, the non-safety related Station Blackout (SBO) diesel generator (also referred to as 0C DG or SBO Diesel) is designed to provide a power source capable of starting and supplying the essential loads necessary to safely shutdown one unit and maintain it in a safe shutdown condition during an SBO event. The SBO diesel generator has the ability to supply any of the four ESF busses. The SBO diesel generator is designated as "Diesel Gen. No. 0C" on Attachment 4, UFSAR Fig. No. 8-1. The SBO Diesel is capable of supplying the same emergency loads as the EDGs.

The SBO diesel generator is started manually and is paralleled onto an ESF bus when it is determined that the EDG dedicated to that bus is not available to supply plant loads. The SBO diesel generator is connected to the onsite 4.16 kV ESF buses through a Class 1E breaker, a non-Class 1E breaker and a Class 1E disconnect switch, all of which are normally open. Operator action is required to isolate the safety related diesel generator (1A, 1B, 2A, or 2B EDG) dedicated to the ESF bus. The SBO diesel generator is then started manually, connected to the selected ESF bus (11, 14, 21 or 24) and automatically loaded using the load sequencer. Load sequencing is in accordance with Attachment 6, UFSAR Table 8-7. The SBO diesel generator is capable of powering a single safety-related train of equipment on one unit.

Regarding onsite fuel storage for EDGs, there are two (No. 11 and No. 21) fuel oil storage tanks (FOSTs), each sized to hold 107,000 gallons of useable fuel oil that provide adequate fuel capacity. The 1A EDG has a FOST (No. 1A) sized to hold 75,677 gallons of fuel. The design of the EDG fuel oil system is based on fuel oil capacity of seven days following a design basis accident, which assumes one EDG powering one unit under accident conditions (3500 kW) and one EDG powering the opposite unit under normal shutdown conditions (3000 kW) for seven days (or the time required to replenish fuel oil from an offsite source following a design basis event, whichever is longer).

Regarding the onsite fuel storage for the SBO Diesel, there are two fuel oil day tanks connected in series, that have a combined capacity sufficient to allow the SBO diesel to operate at 100% nominal load, without fuel transfer to the day tanks, for a period of four hours. Replenishment of the fuel oil day tanks is accomplished using the No. 11 FOST.

In addition, as part of the response for EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigating Strategies for Beyond Design-Basis External Events" (Reference 3), Calvert Cliffs has implemented a FLEX strategy that has made available the following additional onsite portable diesel generators for powering ESF equipment for extended loss of ac power (ELAP), loss of ultimate heat sink (LUHS) and beyond design basis external events (BDBEE):

Two (2) FLEX diesel generators 500kW 480V
Four (4) FLEX diesel generators 100kW 480V

The two on-site 500 kW and four on-site 100 kW 480 VAC FLEX EDG's are available to power 480 VAC ESF busses for transitional phase (Phase 2) coping strategies. To provide additional DID for both units, one of the two portable 500 KW 480 VAC FLEX diesel generators will be made available to facilitate quick connection to 480 V ESF Busses (See Attachment 4, 4.16 kV to 480 V Busses Distribution) to provide sufficient power for a charging pump, battery charger, vital instrumentation or a CREVS/CRETS 11 or 12 train in the event of a total loss of offsite and onsite AC power to Unit 1 or Unit 2.

Additionally, four portable 1MW diesel generators are available offsite to power 4.16 kV safety busses for powering longer term (Phase 3) loads. All FLEX diesel generators include connecting devices and plant implementing procedures.

Regarding the onsite fuel storage capability for FLEX diesel generators, CCNPP uses two fuel tanker trucks to provide fuel to each of the FLEX diesel powered diesel generators. Procedure FSG-5, "Initial Assessment and FLEX Equipment Staging," (Reference 4) directs the operating crew to provide diesel fuel sources and refueling means to support the continuous operation of applicable FLEX equipment for an indefinite period.

3.4 <u>Station Blackout (SBO) Description</u>

With the addition of a non-safety related diesel generator (0C Diesel) for SBO response, CCNPP is required to cope with an SBO for one hour, which is the maximum time assumed to start and load the non-safety-related 0C Diesel (SBO diesel generator).

The CCNPP SBO scenario is as follows: Both units are at full power when offsite power is lost. Only one unit is assumed to be in an SBO condition. Three EDGs fail to start. The fourth EDG starts and loads the shutdown loads for one unit. The other unit is in an SBO. Restoration of AC power after a blackout was assumed to be from an onsite diesel generator. This was because restoration of offsite sources could take in excess of four hours for major grid blackouts.

3.5 Control Room Emergency Ventilation System (CREVS) and Control Room Emergency Temperature Control System (CRETS)

The Control Room and the Cable Spreading Room are incorporated into a single year-round air-conditioning system serving both Units 1 and 2. Therefore, the ambient temperature in the Control Room is expected to be the same as the ambient temperature in the Cable Spreading Room. Air handling and refrigeration equipment are redundant. The Control Room and Cable Spreading Room areas have a third source of cooling, which is not safety-related, in the form of a water chiller supplying a second set of coils in the safety-related air handling systems.

The CREVS is a shared system providing protection to the common Control Room for both Unit 1 and Unit 2. The CREV system consists of two redundant subsystems (Trains 11 and 12), each capable of maintaining the habitability of the Control Room Envelope (CRE). Each CREV system train is considered operable when the individual components necessary to limit operator exposure are operable within the given train. A CREV system train is considered operable when the associated:

- Control Room Heating, Ventilation, and Air Conditioning (CRHVAC) Supply and Return fans are operable;
- Post Loss-of-Coolant Incident (LOCI) fan is operable;
- Post LOCI filter train is operable.
- High Efficiency Particulate Air (HEPA) filters and charcoal adsorbers are not excessively restricting flow, and are capable of performing their filtration functions;
- Ductwork, valves, and dampers are operable, and air circulation can be maintained; and
- CRE boundary is operable (the single boundary supports both subsystems).

The CCNPP CREV system has its inlet fresh air supplies, one for each train, and the common air exhaust isolated by leak tight hatches; therefore, the CCNPP CREV system is operated in full recirculation mode during normal and accident conditions. With the CREV system operating in the recirculation mode at all time, if a chemical, radiological, or smoke event occurred, the ventilation system would not require damper actuation or system realignment to establish the boundary and protect the operators in the CR.

The CRETS is a subsystem that provides temperature control for the Control Room following isolation of the Control Room. The CRETS is a shared system that is supported by the CREVS, since the CREVS must be operating for CRETS to perform its safety function. The CRETS consists of two independent, redundant trains (11 and 12) that provide cooling of recirculated control room air. Each train consists of cooling coils, instrumentation, and controls to provide for control room temperature control. During events that require the Control Room to be isolated during Modes 1 through 4, the CRETS is designed to maintain the temperature below the required limit.

CREVS/CRETS 11 train is normally powered from the Unit 1 4.16 kV ESF Bus 11, which is connected to 13.8 kV Bus 11 offsite circuit and backed up by 1A EDG.

CREVS/CRETS 12 train is normally powered from the Unit 2 4.16 kV ESF Bus 24, which is connected to 13.8 kV Bus 21 offsite circuit and backed up by 2B EDG.

3.6 EDRIP Description

CCNPP has started a project to improve the reliability of the site's Electrical Distribution System. The Electrical Distribution Reliability Improvement Project (EDRIP) will install a new P-13000-3 Service Transformer. Refer to Attachment 4, Key Plan Conceptual Changes. This 500/13.8 kV transformer will be tied to both the 500KV Red and Black busses. The transformer can be aligned to either Unit 1 or Unit 2 and meet all TS requirements for a qualified offsite circuit power supply.

In addition to the new transformer installation, the existing Service Transformers, P-13000-1 and P-13000-2, will have 500 kV power breakers installed. These new power breakers will allow the existing Service Transformers to be isolated from the switchyard without removing the 500 kV Red or 500 kV Black bus from service. This allows for the offsite power source to remain available when taking a service transformer out for maintenance. A new set of electrical busses will be installed at the 13.8 kV level. The busses will be aligned to create a ring bus. Refer to Attachment 4, Ring and Split Bus Arrangement. The ring bus will protect the plant from tripping on a service transformer failure. A failed service transformer will be isolated from the bus, thereby eliminating a potential dual unit trip.

The project began in October of 2016 following the most recent (April 7, 2015) of three dual unit scrams (Reference 5) in the preceding 5 years. The project is currently installing the infrastructure to support the equipment. The final plant connections will take place during the Unit 2 2019 and Unit 1 2020 Refueling Outages. To make the final plant connections, significant equipment in both the plant and switchyard will be required to be taken out of service. The required work cannot be accomplished within the 72-hour LCO CT for an inoperable offsite circuit. The estimated time required will be 14 days and provides the basis for the CT period requested. See Attachment 5, EDRIP Schedule during 14-Day CT period. The installation work will take approximately 13 days with a one-day float for contingency for a total of 14 days.

For Unit 2 2019 Refuel Outage, in the switchyard, the Red Bus will need to be out of service to support the electrical connections and final testing. In the plant, Service Transformer P-13000-2 and 13 kV Bus 21 will be out of service to support final connections and testing.

The switchyard will require the 500 kV Red Bus to be extended to the new Switchyard bay. New overhead lines and structures will have to be installed to connect the new bay. Two 72-foot drop down tower structures will be required to be installed for the new power breakers. The new towers are underneath the Red Bus lines and cannot be installed prior to the outage. The overhead lines will need to be modified to support connecting to the new power breaker. Multiple control, primary relay, and backup relay panels will have to be tied into the Switchyard Control House equipment. The final relay setting and trip path testing will be required prior to energizing the new equipment.

The work in the protected area will require Service Transformer P-13000-2, 13 kV Bus 21 kV to be out of service. In order to connect P-13000-2 to the new bus, the existing rigid bus work on the secondary side of the transformer will have to be cut and removed. New bus work will be run to the transformer and a weather tight enclosure installed to protect the bus work. The rigid bus connecting Bus 21 will have to be cut and removed. New bus work will be installed and a weather tight enclosure will be installed to protect the bus work.

A new Distributed Control System (DCS) final connections will be made to both the switchyard and the new metalclad switchgear. A site acceptance test will be performed for all of the breakers and relays associated with the system. Metering data will also have to be verified in this window for all of the new equipment.

For the Unit 1 2020 Refuel Outage the 500 kV Black Bus will need to be taken out of service and the above process will be repeated to tie in the new P-13000-3 Service Transformer for the applicable Unit 1 busses.

Defense-in-Depth (DID) Strategy

The SBO Diesel, and the SMECO delayed qualified offsite circuit, have enough capacity on their own to simultaneously power accident loads on the operating unit and safe shutdown loads on the other unit.

Furthermore, the FLEX diesel generators provide an added DID capability. They have adequate capacity to provide power during ELAP, LUHS and BDBEE events.

Additionally, sufficient onsite fuel oil storage exists for seven days (with adequate resupply arrangements for 14 days) for the 14-day CT period. There are existing procedures for all DID equipment discussed, and operators have been trained and are familiar with the equipment; and additional compensatory actions, risk mitigating actions, and pre-outage training will provide additional assurance that risk is minimized.

4.0 TECHNICAL ANALYSIS

With the given background and DID discussions, the Technical Analysis examined the overall configuration change to the plant electrical systems, reviewed the applicable requirements of NUREG-0800, Branch Technical Position 8-8 (BTP 8-8) and described how CCNPP complies with these requirements. It considered the additional effects to CREVS/CRETS from one inoperable offsite source due to cross unit design by which each Unit's redundant CREVS/CRETS train is powered from the other Unit's ESF bus.

4.1 Station Electrical Power Configuration during the 14-day CT Period

During the 2019 Refuel Outage, when entering the one time temporary 14-day CT, Unit 1 is expected to be at full power operation and Unit 2 is expected to be in cold shutdown or refueling mode. During that time, with 13.8 kV 21 Service Bus out of service, two redundant and separate circuit paths will not be available to the 4.16 kV ESF busses via the plant 13.8 kV service busses and 13.8/4.16 kV unit service transformers.

All four 4.16 kV ESF busses will be powered from the remaining qualified offsite circuit, the 13.8 kV Service Bus 11, which is powered from the P-13000-1 Service Transformer. The third delayed qualified offsite circuit 13.8 kV SMECO line, however, will be available and aligned to 13.8 kV Service Bus 11 in a standby mode. Thus, if the normal 500 kV offsite switchyard supply or the Unit 1 500/13.8 kV service transformer is lost, the SMECO line can be manually closed (using existing operation procedures) onto 13.8kV Service Bus 11 and provide enough power sufficient for accident mitigation on Unit 1 and shutdown loads for Unit 2. With the SMECO line pre-aligned to, but not connected to, the 13.8 kV Service Bus 11, the manual transfer can be accomplished utilizing existing procedures in approximately 10 minutes.

During the 2020 Refuel Outage, when entering the one time temporary 14-day CT, Unit 2 is expected to be at full power operation and Unit 1 is expected to be in cold shutdown or refuel mode. During that time, with the 13.8 kV Service Bus 11 out of service, and as discussed above, two redundant and separate circuit paths will not be available to the 4.16 kV ESF busses.

All four 4.16 kV ESF busses will be powered from the 13.8 kV Service Bus 21, which is powered from the P-13000-2 Service Transformer. Similar to the 2019 Refuel Outage electrical plant configuration, the third delayed qualified offsite circuit 13.8 kV SMECO line, will be available, but aligned to 13.8 kV Service Bus 21 in a standby mode.

During the 2019 Refuel Outage, the 1A and 1B EDG will be operable and protected equipment on Unit 1.

The 2A EDG or 2B EDG will be operable and protected equipment on Unit 2, except for a brief period where the Saltwater System maintenance outages are scheduled.

A Saltwater System B train maintenance outage will be conducted for approximately four days during the 14-day CT period, which will make the 2B EDG inoperable. Following the B train Saltwater System maintenance, an A train Saltwater System outage will be conducted for approximately four days during the 14-day CT period, which will make the 2A EDG inoperable. The 12 train of CREVS will be maintained operable and EDG backed throughout these Saltwater System maintenance windows.

During the 2020 Refuel Outage, the 2A and 2B EDG will be operable and protected equipment on Unit 2.

The 1A EDG or 1B EDG will be operable and protected equipment on Unit 1, except for a brief period where the Saltwater System maintenance outages are scheduled.

A Saltwater System B train maintenance outage will be conducted for approximately four days during the 14-day CT period, which will make the 1B EDG inoperable. Following the B train Saltwater System maintenance, an A train Saltwater System outage will be conducted for approximately four days during the 14-day CT period. In this case the 1A EDG (SACM) is air cooled and not dependent on the Saltwater System for cooling, and therefore will remain operable. The 11 train of CREVS will be maintained operable and EDG backed throughout these Saltwater System maintenance windows.

As discussed above, the short-term inoperability of one EDG during these Saltwater System maintenance outages (2019 and 2020) is adequately compensated based on the DID equipment (SBO EDG, SMECO line, FLEX Equipment) available to CCNPP.

Regarding the CREVS/CRETS, the proposed design and temporary operational changes of the EDRIP Project will have no direct impact other than the loss of one of the two offsite circuits powering the common plant CREVS/CRETS.

During normal plant operation the 11 train of CREVS/CRETS is powered from the Unit 1 4.16 kV ESF Bus 11, which is powered from 13.8 kV 11 Service Bus offsite circuit. The 12 train of CREVS/CRETS is powered from the Unit 2 ESF 4.16 kV ESF Bus 24, which is powered from the 13.8 kV Service Bus 21offsite circuit.

During the Unit 2 2019 refuel outage 14-day CT period, both trains of CREVS/CRETS will be powered from the 13.8 kV Service Bus 11 bus offsite circuit. During the Unit 1 2020 refuel outage 14-day CT period, both trains of CREVS/CRETS will be powered from the 13.8 kV Service Bus 21 offsite circuit. During each of these refueling outages CREVS/CRETS alternate power can be provided by either the SBO Diesel or the SMECO line.

4.2 NUREG-0800 Branch Technical Position 8-8 Requirements

NUREG-0800, Branch Technical Position 8-8, "Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions," specifically discusses the DID aspects for onsite power sources from a deterministic perspective for proposed Allowed Outage Time (AOT) or CT extensions. No changes are being proposed to the current AOTs (CTs) for the onsite EDGs. The following is a list of critical BTP 8-8 requirements and an explanation of how CCNPP meets these requirements, with plant configuration described in the previous Section 4.1:

a) *The supplemental source must have the capacity to bring a unit to safe shutdown (cold shutdown) in case of a loss of offsite power (LOOP) concurrent with a single failure during plant operation (Mode 1).*

The SBO Diesel is being credited as the supplemental source. The SBO Diesel is not Class 1E grade; however, it was purchased to the same equipment specifications as the safety-related 1A EDG. The SBO Diesel generator has a design continuous rating of 5,400 kW and a design 2-hour peak rating of 5,940 kW. However, a current equipment issue has caused a small temporary derating that will be discussed in response to requirement c).

Per the existing EDG loading calculation, E-88-015, "Diesel Generator Accident Loading," (Reference 6) the highest EDG peak loading during a LOOP, for Unit 1's 4.16 kV busses are 3,512.7 kW for ESF Bus 11 (includes Bus 17) and 2,341.0 kW for ESF Bus 14. Similarly, for Unit 2, the highest EDG peak loading during a LOOP are 2406.2 kW for ESF Bus 21 and 2734.9 kW for ESF Bus 24 (See Attachment 6, pages 63 and 64 from E-88-015 calculation). These loads are within the capacity of the SBO Diesel as demonstrated by OI-21C procedure (Reference 11); thus, it can meet the electrical load requirements for 4.16 kV ESF bus 11 or 14, during a Unit 1 LOOP concurrent with a single failure (loss of 1A or 1B EDG) and for the 4.16 kV ESF Bus 21 or 24 during a Unit 2 LOOP concurrent with a single failure (loss of 2A or 2B EDG) to safely shutdown the plant.

In addition to the SBO diesel supplemental source, Calvert Cliffs also has the Southern Maryland Electric Cooperative (SMECO) system.

The SMECO power source has the capability to supply the power necessary to maintain Unit 1 and Unit 2 in a safe shutdown condition. The SMECO system has a capability of 5,000 kW. Electrical indication is provided in the Control Room for bus voltage, bus current and power usage. Upon loss of the switchyard power source, the SMECO system could then be used to supply any two 4.16 kV ESF busses, one for each Unit through either 13 kV Service Bus 11 or 21.

Regarding the SMECO offsite circuit, it will be pre-aligned to the remaining operable offsite circuit, and within approximately an hour, using procedures EOP-0 (Reference 7) and OI-27E, (Reference 8), the affected ESF busses (maximum of two) can be repowered from the SMECO offsite circuit. It requires one normally open local manual breaker to be closed and one normally open breaker to be manipulated from the Control Room.

A manual Engineered Safety Feature Actuation System (ESFAS) LOCI and shutdown sequencer actuation is provided in the Control Room to ensure that the SMECO system is loaded in an orderly manner to minimize system transients.

The SMECO (5,000 kW) also has the capability of providing the necessary power to maintain Unit 1 and Unit 2 in a safe shutdown condition.

b) *The permanent or temporary power source can be either a diesel generator, gas or combustion turbine, or power from nearby hydro units. This source can be credited as a supplemental source, that can be substituted for an inoperable EDG during the period of extended AOT in the event of a LOOP, provided the risk-informed and deterministic evaluation supports the proposed AOT and the power source has enough capacity to carry all LOOP loads to bring the unit to a cold shutdown.*

As stated in response to question a), the SBO Diesel is being credited as the supplemental source. The SBO Diesel, with a continuous rating of 5,400 KW and a 2-hour peak rating of 5,940 kW, has enough capacity to carry all LOOP loads to bring the unit to a cold shutdown.

As a backup for the SBO Diesel (part of the DID strategy), the delayed SMECO off site circuit (5,000 kW) can carry the LOOP loads as described in response to requirement a).

The risk analysis insights (Section 4.4) supports the proposed CT of 14 days for TS 3.8.1 Action A.3 and D.3 for an inoperable offsite source. Note that the CREVS is not specifically modeled in the CCNPP PRA.

Note: Exelon performed a review of the Prairie Island OPEX involving the same model diesel generators (manufactured by Societe Alsacienne de Constructions Mecaniques de Mulhouse (SACM)) and concluded that it is not applicable to the CCNPP SBO diesel and 1A EDG. The CCNPP SBO Diesel and 1A EDG have not experienced the Prairie Island diesel issues with cylinder liner wear / piston wear / deposit formation in the piston ring grooves / piston rings "sticking", being seen through the symptom of high crankcase pressure.

c) *Multi-unit sites that have installed a single AAC power source for SBO cannot substitute it for the inoperable diesel when requesting AOT extensions unless the AAC source has enough capacity to carry all LOOP loads to bring the unit to a cold shutdown as a substitute for the EDG in an extended AOT and carry all SBO loads for the unit that has an SBO event without any load shedding.*

CCNPP is a multi-unit that has installed a single AAC source (SBO Diesel) for the SBO event. As previously described above, the SBO Diesel has sufficient capacity to meet its dedicated 10 CFR 50.63 (SBO Rule) requirements to carry all required LOOP loads. During the Unit 2 2019 and Unit 1 2020 Refuel Outage 14-day CT periods, the SBO Diesel must have the capacity to simultaneously provide power for safe shutdown of the operating unit experiencing an SBO, and to maintain shutdown cooling loads on the unit that is in the shutdown/refueling mode.

As stated earlier in the submittal, the SBO scenario for Calvert Cliffs is as follows: both units are at full power when offsite power is lost. Three EDGs fail to start. The fourth EDG starts and loads the shutdown loads for one unit. The other unit is in an SBO. However, during the requested CT extension Unit 2 will be in Mode 5 or 6 and Unit 1 will be operating at 100% power. Thus, it is assumed that the one operating EDG will power the shutdown loads of the unit already shutdown, and the unit that was operating at 100% power will be in the SBO condition.

To calculate a realistic essential load profile for the SBO Diesel, the SMECO Summary Table (Attachment 6) was used and ESF Busses 11 and 24 were selected since they are the two most heavily loaded busses of the four busses. The normal shutdown highest value of 4,168.9 kW was conservatively selected over a two-hour period. The SMECO Tables do not include the Auxiliary Feedwater (AFW) pumps and the SBO Diesel building loads. The SBO Diesel building loads are conservatively estimated to be 597.4 kW and the highest AFW pump load for the unit in Mode 1 is 427.3 kW for Unit 1 and 368.2 kW for Unit 2 (to address the single failure of a steam driven AFW system). Since the AFW pumps are not in use at the time of maximum loading that occurs after shutdown cooling conditions are established, their contribution is not additive to the total maximum loading condition.

With the above conservative assumptions, the resultant maximum normal shutdown ESF bus loading is 4,766.3 kW for Unit 1 in Mode 1 and Unit 2 in shutdown / refueling modes during the 2019 Refueling Outage and 4,766.3 kW for Unit 2 in Mode 1 and Unit 1 in shutdown / refueling modes during the 2020 Refueling Outage. Both plant loading conditions are below the continuous design rating of 5,400 kW for the SBO Diesel. It is noted that the SBO Diesel currently has an equipment issue with its OC2 turbocharger. A special test run and Technical Evaluation (Reference 24) concluded that the SBO Diesel will maintain greater than continuous 4,766.3 kW load with engine room temperatures averaging 75.4 °F, as would be expected during the months of January through March, based upon historical ambient (outside) and engine room temperatures. An additional limit of 92 °F ambient air temperature restriction will be placed on the SBO Diesel to ensure adequate room temperature and SBO capacity. See Attachment 3.

Therefore, the SBO Diesel meets the exception criteria for a multi-unit site and can fulfill the requirements as a substitute for an inoperable offsite source during the AOT period.

d) *For plants using Alternate Alternating Current (AAC) or supplemental power sources discussed above, the time to make the AAC or supplemental power source available, including accomplishing the cross-connection, should be approximately one hour to enable restoration of battery chargers and control reactor coolant system inventory.*

CCNPP is a one-hour coping time plant per the UFSAR (Reference 9).
The total time to power any of the four ESF 4.16 kV busses by the SBO Diesel for either unit is less than 60 minutes. Aligning the SBO Diesel within 60 minutes is considered a Time Critical Action (TCA) and the Operations expected performance time to re-align the SBO EDG is 40 minutes.

This TCA is contained in procedure OP-CA-102-106, Operator Response Time Program at Calvert Cliffs, Attachment 1, Calvert Cliffs Master List of Time Critical Actions, Action Number TCA_Sim14 (Reference 10). OP-CA-102-106 establishes the process, controls, and methodologies to validate and document operator TCAs and Time Sensitive Actions (TSA).

e) *The availability of AAC or supplemental power source should be verified within the last 30 days before entering extended AOT by operating or bringing the power source to its rated voltage and frequency for 5 minutes and ensuring all its auxiliary support systems are available or operational.*

The SBO Diesel will be tested within the past 30 days prior to entering the extended CT by bringing the power source to its rated voltage and frequency for more than 5 minutes and ensuring all its auxiliary support systems are available or operational. See Attachment 3.

The SBO Diesel (0C Diesel) is tested on a monthly frequency per Performance Evaluation O-024-08-O-M. This test is performed in accordance with procedure OI-21C) and is a two hour fully loaded run of the SBO diesel connected to one of the 4.16 kV ESF busses. The selected 4.16kV ESF bus is rotated every month it is performed. This test will be used to satisfy this requirement.

f) *To support the one-hour time for making this power source available, plants must assess their ability to cope with loss of all AC power for one hour independent of an AAC power source.*

CCNPP is a one-hour coping time plant per UFSAR 1.8.2 (Reference 9) and procedures EOPs-7-1 and 2 (References 12 and 13) and EOP-7 Technical Basis Document (Reference 14).

Originally, the CCNPP coping time licensing basis had been four hours. Since the SBO rule was initiated, CCNPP added two new 5,400 kW SACM diesel generators (one safety grade diesel, now 1A EDG; and one SBO Diesel) capable of powering a 4.16 kV ESF Bus on each unit. The restrictions of a four-hour coping time plant have been relieved. The present requirements show that Units 1 and 2 are capable of surviving a Station Blackout for one hour. Subsequent revisions to the above references retain the conservative requirements for the four-hour coping time, and adds the required actions to restore power with the SBO Diesel within one hour.

g) *The plant should have formal engineering calculations for equipment sizing and protection and have approved procedures for connecting the AAC or supplemental power sources to the safety buses.*

The existing EDG loading calculation, E-88-015 "Diesel Generator Accident Loading," (Reference 6) confirms the capability of the SBO Diesel to meet the shutdown load requirements. Calculation D-E-94-003 "Diesel Generator DG1A / DG0C Protective Relay Settings" (Reference 15) contains protective settings and bases for the SBO Diesel. Calculation D-E-94-001 "Relay Settings and Coordination" (Reference 16) contains protective setting bases for the associated 4.16 kV bus breakers.

During normal operations, OI-21C (Reference 11) is the controlling procedure to start and load the SBO Diesel (0C EDG) onto any of the four 4.16 kV ESF busses. However, in an SBO event, EOP-0, "Post-Trip Immediate Actions," and EOP-7, "Station Blackout," would both direct starting and loading the SBO Diesel onto the appropriate ESF bus as determined by the control room staff. Emergency Response Plan Implementing Procedure (ERPIP) - 611 (Reference 17) allows for connecting more than one 4.16 kV ESF bus to the SBO Diesel, if required.

h) *The EDG or offsite power AOT should be limited to 14 days to perform maintenance activities. The licensee must provide justification for the duration of the requested AOT (actual hours plus margin based on plant-specific past operating experience).*

CCNPP is requesting a 14-day CT period. See Attachment 5 for a detailed EDRIP schedule of major installation activities planned in the 14-day CT period.

i) *The Tech Specs (TS) must contain Required Actions and Completion Times to verify that the supplemental AC source is available before entering extended AOT.*

Procedure OI-21C, "OC Diesel Generator," provides the direction for loading the SBO Diesel onto an ESF bus monthly per Performance Evaluation O-024-08-O-M (Reference 18). CCNPP will continue to validate SBO Diesel functional availability by starting the SBO Diesel and loading onto an ESF bus within 60 minutes per OI-21C 30 days prior to entering the 14-day CT period. The SBO Diesel will be verified available before entering the extended 14-day CT period. See Attachment 3.

j) *The availability of the AAC or supplemental power source shall be checked every 8-12 hours (once per shift).*

CCNPP will check the availability of the SBO Diesel once during each12-hour shift per OI-21C (not to exceed 12 hours). See Attachment 3.

k) *The extended AOT will be used no more than once in a 24-month period (or refueling interval) on a per diesel basis to perform EDG maintenance activities, or any major maintenance on offsite power transformer or bus.*

The planned extended 14-day CT will be used once for 21 13.8 kV bus out-of-service (OOS) window in the 2019 Unit 2 Refueling Outage and once for 11 13.8 kV bus OOS window in the 2020 Unit 1 refueling outage.

l) *The preplanned maintenance will not be scheduled if severe weather conditions are anticipated.*

Preplanned maintenance affecting EDGs or operable offsite circuits will be assessed within existing procedures/process WC-AA-101, "On-line Work Control Process," (Reference 19) and WC-AA-104, "Integrated Risk Management," (Reference 20) and these processes will ensure that station Operations would not authorize performance of preplanned maintenance affecting EDGs or operable offsite circuits during the extended 14-day CT period if severe adverse weather conditions are expected. See Attachment 3.

m) *The system load dispatcher will be contacted once per day to ensure no significant grid perturbations (high grid loading unable to withstand a single contingency of line or generation outage) are expected during the extended AOT.*

At the time of implementation, station Operations will contact the grid operator (Load Dispatcher) once per day during the extended 14-day CT period to ensure no significant grid disturbances are expected during the extended CT period. See Attachment 3.

n) *Component testing or maintenance of safety systems and important non-safety equipment in the offsite power systems that can increase the likelihood of a plant transient (unit trip) or LOOP will be avoided. In addition, no discretionary switchyard maintenance will be performed.*

CCNPP will not conduct any non-discretionary testing or maintenance of safety systems and important non-safety equipment in the offsite power systems while in the extended 14-day CT period, which can increase the likelihood of a plant transient (unit trip) or LOOP. Procedure OU-CA-104, "Calvert Cliffs Shutdown Safety Management Program, Attachment 6, Vital Auxiliaries," (Reference 21) will be in effect during the Refuel Outages. A LOOP HRE (High Risk Event) trigger in PARAGON or in the manual evaluation trees is activated if certain conditions are present (e.g., repeated station power line trips, severe weather, Transmission Operator maximum emergency generation actions, offsite circuit low voltage alarms, below minimum unit trip contingency voltage limits). If advanced notice is given on any of these conditions that can trigger a LOOP HRE from organizations such as the transmission system operator or weather forecasters, the risk is evaluated for the periods when the condition is expected to occur. If a LOOP HRE is activated, actions are taken to suspend any switchyard activities that may be in progress.

In addition, no discretionary switchyard maintenance will be performed on protected equipment. Equipment will be protected in accordance with procedure OP-AA-108-117, "Protected Equipment Program." (Reference 22). See Attachment 3.

o) *TS required systems, subsystems, trains, components, and devices that depend on the remaining power sources will be verified to be operable and positive measures will be provided to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices.*

See answer to n). During the 2019 and 2020 refueling outages, the remaining operable offsite circuit and the delayed SMECO offsite circuit will be controlled as protected equipment. See Attachment 3.

CCNPP will continue to operate the facility in accordance with the approved TS.

p) *Steam-driven emergency feedwater pump(s) (in the case of PWR units) will be controlled as "protected equipment".*

The steam driven emergency feedwater pumps (AFW) on the operating unit will be controlled as protected equipment. See Attachment 3.

4.3 CREVS/CRETS

During the conversion to the CCNPP Improved Technical Specifications (ITS) in 1996, the Control Room Emergency Ventilation System (CREVS) Technical Specification 3.7.8 and Control Room Emergency Temperature System (CRETS) Technical Specification 3.7.9 were created from the technical specification requirements in effect at that time.

The TS bases for the Action TS 3.8.1.D.3 to declare the redundant CREVS/CRETS train inoperable when its offsite circuit is inoperable is consistent with RG 1.93, Revision 0, "Availability of Electric Power Sources," December 1974 and allows operation of the redundant CREVS/CRETS train to continue in Condition A (inoperable offsite circuit) for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and EDGs are adequate to supply electrical power to the onsite Class 1E Distribution System. The 72-hour CT takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a Design Basis Accident (DBA) occurring during this period.

The proposed TS actions to delay declaring the redundant CREVS/CRETS train inoperable for an additional 11 days (three days existing plus 11 days for total CT of 14 days) is a reasonable timeframe, based on the redundancy of the proposed SBO diesel and availability of the delayed SMECO offsite circuit and the availability of FLEX diesel generator to power a single train of CREVS/CRETS, if required. In addition, the calculated probability of an event causing core damage or a large early release, that would require at least one CREVS/CRETS train operable, occurring during the 14-day CT period is very low. See risk analysis insights in Section 4.4 for the extended 14-day CT period for an inoperable offsite circuit.

The CREVS/CRETS loads for each train is approximately 200 kW. See Attachment 6. The 11 train CREVS/CRET 1ZA 480 V Load is powered from ESF 11 Bus and the 12 train CREVS/CRETS 2ZB Load is powered from the ESF Bus 24. Each train's electrical loading is well within the capacity of the available 500 kW portable FLEX diesel generator to power either unit's ESF 480 V Load Centers to support at least one train of CREVS/CRETS.

The CREVS/CRETS systems (in addition to the 500 kV Red and Black Busses, 13.8 kV Service Buses 11 and 21, and Service Transformers P-13000-1 and 2) are considered shared systems between Unit 1 and Unit 2. The CREVS/CRETS were designed to meet single failure criteria of IEEE 279, "Proposed IEEE Criteria for Nuclear Power Plant Protective Systems," dated August 30, 1968.

The plant configuration during the requested 14-day CT period will be such that one unit will be in Mode 1 at 100% power and the other Unit will be shutdown in either Mode 5 or Mode 6. However, because Calvert Cliffs has a shared control room with a shared CREVS/CRETS system, two trains of CREVS/CRETS are required to be operable.

CREVS/CRETS 11 train is normally powered from the Unit 1 4.16 kV ESF Bus 11, which is connected to 13.8 kV Bus 11 offsite circuit and backed up by 1A EDG.

CREVS/CRETS 12 train is normally powered from the Unit 2 4.16 kV ESF Bus 24, which is connected to 13.8 kV Bus 21 offsite circuit and backed up by 2B EDG.

Regarding CREVS/CRETS safety functions, the three most limiting transients and DBAs per UFSAR Chapter 14 Safety Analysis are:

- 14.10 Loss of Non-Emergency AC Power (LOOP)
- 14.17 Loss of Coolant Accident (LOCA)
- 14.24 Maximum Hypothetical Accident (MHA)

Only one train of CREVS/CRETS is required to meet its safety function, and existing EDG capacity is such that any three of the four diesels can supply all the required loads, including CREVS/CRETS, for the safe shutdown of one unit and a design basis accident on the other unit without offsite power.

- 14.10 Loss of Non-Emergency AC Power (LOOP)
- 14.17 Loss of Coolant Accident (LOCA)

For a normal LOOP and a single failure of one EDG, either the 11 or 12 train of CREVS/CRETS will be operable because either the 1A (powering the 11 train) or 2B EDG (powering the 12 train of CREVS/CRETS) will be operable. The most limiting single failure case for CREVS/CRETS during the 2019 outage is a LOOP with the single failure of the 1A EDG during the salt water system outage which renders the 2B EDG inoperable. In this case, it has already been demonstrated that the SBO Diesel can be aligned to power the 11 ESF bus, thus providing power to the 11 CREVS/CRETS train and satisfying the requirement of having one train of CREVS/CRETS operable to perform its safety function. The SBO Diesel capacity, as demonstrated by Procedure OI-21C, is more than enough to carry the maximum loading of 3,512.7 kW for Unit 1.

Similarly, during the 2020 outage when Unit 1 is in Mode 5 or 6 and Unit 2 is at 100% power, the SBO Diesel can be aligned to the 24 ESF bus providing power to the 12 CREVS/CRETS train. The SBO Diesel capacity, as demonstrated by Procedure OI-21C, is more than enough to carry the maximum loading of 2,734.9 kW for Unit 2.

The CCNPP CREV system has its inlet fresh air supplies, one for each train, and the common air exhaust isolated by leak tight hatches; therefore, the CCNPP CREV system is operated in full recirculation mode during normal and accident conditions. With the CREV/CRETS system operating in the recirculation mode at all time, if a chemical, radiological, or smoke event occurred, the ventilation system would not require damper actuation or system realignment to establish the boundary and protect the operators in the CR.

For the LOCA, the CREVS/CRETS systems are designed to meet the LOCA Accident concurrent with a LOOP. If a LOCA/LOOP occurs during the 14-day CT, and assuming single failure of the Unit 1 1A EDG (11 CREVS/CRETS train is lost), the 12 train of CREVS/CRETS would be available, as it would be powered from the ESF Bus 24 via the 2B EDG, to perform its safety function. Assuming the single failure of the 2B EDG (12 CREVS/CRETS train is lost), the 11 train of CREVS/CRETS would be available as it would be powered from the ESF Bus 11 via the 1A EDG to perform its safety function.

- 14.24 Maximum Hypothetical Accident (MHA)

For the MHA, which involves a gross release of fission products from the fuel to containment during an accidental release, air containing radionuclides may enter the Control Room through in-leakage into the Control Room ventilation system. Although more challenging from a system performance perspective, from an electrical power perspective the CREVS/CRETS response is the same as LOCA/LOOP response.

4.4 Risk Analysis Insights

Although this technical analysis is based on a deterministic evaluation centered on meeting BTP 8-8, a risk analysis was performed that demonstrated with reasonable assurance that the proposed TS changes are within the current risk acceptance guidelines in RG 1.174 and the current acceptance guidelines in RG 1.177 for one-time changes. This ensures that the TS change meets the intent of the incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP) acceptance guidelines of 1.0E-06 (actual 3.76E-07) and 1.0E-07 (actual 2.42 E-08) established for compatibility with the ICDP and ILERP limits of Section 11 in NUMARC 93-01 (Reference 23), which is applicable for configuration changes that require normal work controls. The risk analysis was based on the 13.8 kV bus 21 and SMECO line being unavailable and without credit for additional proposed risk management actions (RMAs).

The Unit 1 risk analysis is largely representative of the risk for Unit 2 during the 13.8 kV Bus 11 outage for the 2020 Unit 1 Refueling Outage. Unit 2 has a slightly higher risk impact due to the shared dependency of both Unit 2 EDGs on Service Water System (SRW) for cooling, but the risk remains below the normal work control thresholds. The recommended RMAs are similar (switched Units), and fire protection would be needed for the 45' SWGR room because the Motor Driven Auxiliary Feed Pump (MDAFP) is powered by the 24 Bus on Unit 2.

The identification of the RMAs was derived from a detailed review of the results of the risk assessment. None of the RMAs were credited in the base risk analysis; the identified compensatory actions would further lessen the overall risk incurred during the extended 14-day CT period.

The assessment of risk from internal events and internal fires did help to identify the following actions as important compensatory measures that will help to reduce the overall risk during the performance of the extended 14-day CT period:

1. Shift briefs will be performed to reinforce other potentially important operator actions associated with the performance of the extended CT (i.e., operator actions to start and align the 0C DG (SBO diesel) to the Unit 1 ESF busses, and operator actions to Trip the Reactor Coolant Pumps (RCPs) with reduced indication; Open the Auxiliary Feed Water (AFW) Block Valves; control AFW Flow).
2. Shift briefs and pre-job walkdowns to reduce and manage transient combustibles prior to entrance into the extended CT will be used to alert the staff about the increased sensitivity to fires in the following areas during the extended 13.8 kV outage windows. Additionally, any hot work activities in the following areas will be prohibited during the time within the 14-day CT period.

   For 2019 Refuel Outage:

   - 317 (U1 27' SWGR)
   - 529 (Unit 1 69' West Electrical Penetration Room)
   - 518 (Unit 1 Horizontal Cable Chase)
   - 301 (Unit 1 Battery Room No. 11)
   - 306 (Unit 1 Cable Spreading Room)
   - 302 (Unit 2 Cable Spreading Room)
   - 13 kV Bus 11 Metal Clad

   For 2020 Refuel Outage:

   - 407 Unit 2 45' Switchgear Room
   - 532 Unit 2 West Electrical Room
   - 414 Unit 2 45' West Electrical Penetration Room
   - 306 Unit 1 Cable Spreading Room
   - 302 Unit 2 Cable Spreading Room
   - 311 Unit 2 27' Switchgear Room

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

The proposed changes have been evaluated to determine whether applicable regulations and requirements continue to be met. Exelon has determined that the proposed changes do not require any exemptions or relief from regulatory requirements from the following current applicable regulations and regulatory requirements, which were reviewed in making this determination:

10 CFR 50.36, Technical Specifications

10 CFR 50.36(c) provides that TS will include Limiting Conditions for Operation (LCOs) which are "the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee will shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met." The proposed changes involve extensions of the affected TS CTs from 72 hours to 14 days. The LCOs themselves remain unchanged, as do the required remedial actions or shut down requirements in accordance with 10 CFR 50.36. In addition,10 CFR 50.36 requires that a licensee's TS be derived from the analyses and evaluation included in the safety analysis report. The proposed changes do not affect CCNPP's compliance with the intent of 10 CFR 50.36.

10 CFR 50.63, Loss of all alternating current

10 CFR 50.63 requires that light water cooled nuclear power plants licensed to operate be able to withstand for a specified duration and recover from a station blackout (SBO). The proposed changes do not alter CCNPP's duration (coping time) nor affect its compliance with the intent of 10 CFR 50.63.

10 CFR 50.65, Requirements for monitoring the effectiveness of maintenance at nuclear power plants

10 CFR 50.65 requires that when performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. The scope of the assessment may be limited to structures, systems, and components that a risk-informed evaluation process has shown to be significant to public health and safety. The maintenance activities associated with this project will be assessed and the increased risk will be managed in accordance with 10 CFR 50.65 (a)(4). The proposed changes do not affect CCNPP's compliance with the intent of 10 CFR 50.65.

Regulatory Guide 1.93, Availability of Electric Power Sources

Regulatory Guide (RG) 1.93 provides guidance with respect to operating restrictions, that is Allowed Outage Time (AOT), if the number of available onsite emergency diesel generators (EDGs) and offsite power sources is less than that required by the Technical Specifications (TS). In addition, this RG prescribes a maximum AOT (CT) of 72 hours for an inoperable onsite or offsite power source. The proposed changes have been evaluated in accordance with RG 1.93 and have been found to be acceptable for extending the CT to 14 days.

Regulatory Guide 1.155, Station Blackout

RG 1.155 describes a method acceptable to the NRC staff for complying with the Commission regulation that requires nuclear power plants to be capable of coping with an SBO event for a specified duration. The proposed changes have been evaluated in accordance with RG 1.155 and have been found to be acceptable.

Regulatory Guide 1.174, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis

Regulatory Guide (RG) 1.174 describes a risk-informed approach, acceptable to the NRC, for assessing the nature and impact of proposed permanent licensing-basis changes by considering engineering issues and applying risk insights. This regulatory guide also provides risk acceptance guidelines for evaluating the results of such evaluations. Although the proposed changes are being technically justified via a deterministic approach and this is not a risk informed submittal, the proposed changes have been evaluated in accordance with RG 1.174 and have been found to be acceptable.

Regulatory Guide 1.177, An Approach for Plant-Specific, Risk-Informed Decision-making: Technical Specifications

RG 1.177 describes an acceptable risk-informed approach specifically for assessing proposed permanent TS changes in CTs. This regulatory guide also provides risk acceptance guidelines for evaluating the results of such evaluations.

One acceptable approach to making risk-informed decisions about proposed TS changes is to show that the proposed changes meet the five key safety principles stated in RG 1.174 and RG 1.177 shown below.

1. The proposed change meets the current regulations unless it is explicitly related to a requested exemption or rule change.
2. The proposed change is consistent with the defense-in-depth philosophy.
3. The proposed change maintains sufficient safety margins.
4. When proposed changes result in an increase in core-damage frequency (CDF) or risk, the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.
5. The impact of the proposed change should be monitored using performance measurement strategies.

Although the proposed changes are being technically justified via a deterministic approach and this is not a risk informed submittal, the proposed changes have been evaluated in accordance with RG 1.177 and have been found to be acceptable.

Regulatory Guide 1.200, An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities

RG 1.200, Revision 1, describes one acceptable approach for determining whether the quality of the PRA, in total or the parts that are used to support an application, is sufficient to provide confidence in the results, such that the PRA can be used in regulatory decision-making for light-water reactors. The guidance is intended to be consistent with the NRC's PRA Policy Statement and subsequent, more detailed, guidance in RG 1.174. It is also intended to reflect and endorse guidance provided by standards-setting and nuclear industry organizations. In RG 1.200, as in RG 1.174, the quality of a PRA analysis used to support an application is measured in terms of its appropriateness with respect to scope, level of detail, and technical acceptability.

Although the proposed changes are being technically justified via a deterministic approach and this is not a risk informed submittal, the proposed changes have been evaluated in accordance with RG 1.200 and have been found to be acceptable.

General Design Criterion 17, Electric Power Systems

GDC 17 requires an onsite electric power system and an offsite electric power system shall be provided to permit the functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

The onsite electric power supplies, including the batteries, and the onsite electric distribution system shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. A switchyard common to both circuits is acceptable. Each of these circuits shall be designed to be available in sufficient time following a loss of all onsite alternating current power supplies and the other offsite electric power circuit, to assure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. One of these circuits shall be designed to be available within a few seconds following a loss-of-coolant accident to assure that core cooling, containment integrity, and other vital safety functions are maintained. Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.

The proposed changes do not affect CCNPP's compliance with the intent of GDC 17.

General Design Criterion 18, Inspection and testing of electrical power systems

GDC-18 requires that electric power systems that are important to safety must be designed to permit appropriate periodic inspection and testing of important areas and features, such as insulation and connections to assess the continuity of the systems and the condition of their components.

The proposed changes do not affect CCNPP's compliance with the intent of GDC 18.

General Design Criterion 34, Residual Heat Removal

"A system to remove residual heat shall be provided. The system safety function shall be to transfer fission product decay heat and other residual heat from the reactor core at a rate such that specified acceptable fuel design limits and the design conditions of the reactor coolant pressure boundary are not exceeded. Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure."

The proposed changes do not affect CCNPP's compliance with the intent of GDC 34.

General Design Criterion 38, Containment Heat Removal

"A system to remove heat from the reactor containment shall be provided. The system safety function shall be to reduce rapidly, consistent with the functioning of other associated systems, the containment pressure and temperature following any loss-of-coolant accident and maintain them at acceptably low levels. Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure."

The proposed changes do not affect CCNPP's compliance with the intent of GDC 38.

General Design Criterion 44, Cooling Water

"A system to transfer heat from structures, systems, and components important to safety, to an ultimate heat sink shall be provided. The system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions. Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure."

The proposed changes do not affect CCNPP's compliance with the intent of GDC 44.

<u>NUREG 0800, Branch Technical Position 8-8, Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions</u>

The Electrical Engineering Branch (EEB) staff evaluates AOT extension requests for onsite or offsite power sources to allow on-line maintenance on EDGs that would normally be performed during refueling outages or maintenance of offsite power source(s) such as a transformer or bus. The on-line maintenance can help reduce the risk for loss of power during plant refueling outages when refueling activities are conducted. The staff evaluates the licensee's request for AOT (CT) extension from deterministic as well as PRA perspectives. The risk-impact evaluation is performed by the PRA Licensing Branch. The traditional deterministic evaluation is performed by EEB.

Consistent with the Commission's final policy statement, it is expected that a license amendment request for an onsite or offsite CT extension will contain a PRA assessment. However, this BTP specifically discusses the defense-in-depth aspects for onsite and offsite power sources from a deterministic perspective. A supplemental power source should be available as a backup to the inoperable EDG or offsite power source, to maintain the defense-in-depth design philosophy of the electrical system to meet its intended safety function. The supplemental source must have capacity to bring a unit to safe shutdown (cold shutdown) in case of a loss of offsite power (LOOP) concurrent with a single failure during plant operation (Mode 1).

According to NUREG--1784, December 2003, "Operating Experience Assessment – Effects of Grid Events on Nuclear Power Plant Performance, considering the changes in electric grid performance post-deregulation, the duration of LOOP events has increased and the probability of a LOOP, as a consequence of a reactor trip, has increased. This evaluation was done before the August 14, 2003, Blackout in the Northeast. The lessons learned from this Blackout event indicate that restoration of offsite power will take longer than previously considered, indicating that post-deregulation conditions challenge grid reliability. The staff's objective of requiring an extra (i.e., supplemental) power source for an inoperable EDG or offsite power source is to avoid a potential extended Station Blackout (SBO) event during the period of an extended CT and to enable safe shutdown (cold shutdown) of the unit if normal power sources cannot be restored in a timely manner.

CCNPP meets the intent of BTP-8-8 by proposing additional defense-in-depth actions and procedures and using currently installed AAC power source (onsite SBO Diesel) as the supplemental AC power source for the inoperable offsite circuit. Additional DID strategy plans include use of the delayed SMECO offsite source and FLEX diesel generators (at 480 V Load Center level) as backup to the SBO Diesel.

5.2 Precedent

The following precedent is applicable to this proposed submittal in that the NRC granted, or accepted for review, extensions to existing CTs for an inoperable offsite circuit or inoperable emergency generator:

Brunswick Steam Electric Plant, Units 1 and 2-Issuance of Amendment for Technical Specification 3.8.1, "AC (Alternating Current) Sources-Operating" One-Time Extension of Emergency Diesel Generator Completion Times and Suspension of Surveillance Requirements (Emergency Situation) (EPID L-2017-LLA-0392), dated November 26, 2017 (ML17328B072).

Virginia Electric and Power Company Surry Power Station Units 1 and 2 - Proposed License Amendment Request Temporary, One Time 21-day Allowed Outage Time for Replacement of Reserve Station Service Transformer C and Associated Cabling, dated November 7, 2017 (ML17317A464).

Comanche Peak Nuclear Power Plant, Units 1 and 2-Issuance of Amendment Re: Revision to Technical Specification 3.8.1, "AC Sources-Operating," for Extension of the Completion Time for the Offsite Circuits on a One-Time Basis from 72 Hours to 14 Days (TAC Nos. ME2546 and ME2547), dated October 29, 2010 (ML102810130).

5.3 No Significant Hazards Consideration

Exelon has concluded that the proposed changes to the Calvert Cliffs Nuclear Power Plant (CCNPP), Unit 1 and Unit 2, Technical Specifications (TS), which involve changes to extend the Completion Time (CT) for one of the offsite circuits inoperable from 72 hours to 14 days and to extend declaring the redundant Control Room Emergency Ventilation System (CREVS) and Control Room Emergency Temperature Control System (CRETS) supported by the inoperable offsite circuit inoperable from 72 hours to 14 days, do not involve a Significant Hazards Consideration. In support of this determination, an evaluation of each of the three (3) standards, set forth in 10 CFR 50.92, "Issuance of amendment," is provided below.

1. **Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?**

   Response: No.

   The proposed TS changes will not increase the probability of an accident since they will only extend the time period that one qualified offsite circuit can be out of service. The extension of the time duration that one qualified offsite circuit is out of service has no direct physical impact on the plant. The proposed inoperable offsite circuit limits the available redundancy of the offsite electrical system to a period not to exceed 14 days per each Unit. Therefore, the proposed TS changes do not have a direct impact on the plant that would make an accident more likely to occur due to their extended completion times.

   During transients or events which require these subsystems to be operating, there is sufficient capacity in the operable loops/subsystems and available but inoperable equipment to support plant operation or shutdown. Therefore, failures that are accident initiators will not occur more frequently than previously postulated as a result of the proposed changes.

In addition, the consequences of an accident previously evaluated in the Updated Final Safety Analysis Report (UFSAR) will not be increased. With one offsite circuit inoperable, the consequences of any postulated accidents occurring on Unit 1 or Unit 2 during these CT extensions was found to be bounded by the previous analyses as described in the UFSAR.

The minimum equipment required to mitigate the consequences of an accident and/or safely shut down the plant will be operable or available. Therefore, by extending certain CTs and extending the assumptions concerning the combinations of events for the longer duration of each extended CT, Exelon concludes that at least the minimum equipment required to mitigate the consequences of an accident and/or safely shut down the plant will still be operable or available during the extended CT.

Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?**

Response: No.

The proposed TS changes will not create the possibility of a new or different type of accident since they will only extend the time period that one of the offsite circuits can be out of service. The extension of the time duration that one offsite circuit can be out of service has no direct physical impact on the plant and does not create any new accident initiators. The systems involved are accident mitigation systems. All of the possible impacts that the inoperable equipment may have on its supported systems were previously analyzed in the UFSAR and are the basis for the present TS Action statements and CTs. The impact of inoperable support systems for a given time duration was previously evaluated and any accident initiators created by the inoperable systems was evaluated. The lengthening of the time duration does not create any additional accident initiators for the plant.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. **Do the proposed changes involve a significant reduction in a margin of safety?**

Response: No.

The present offsite circuit TS CT limits were set to ensure that sufficient safety-related equipment is available for response to all accident conditions and that sufficient decay heat removal capability is available for a loss-of-coolant accident (LOCA) coincident with a loss of offsite power (LOOP) on one unit and simultaneous safe shutdown of the other unit. A slight reduction in the margin of safety is incurred during the proposed extended CT due to the increased risk that an event could occur in a 14-day period versus a 72-hour period. This increased risk is judged to be minimal due to the low probability of an event occurring during the extended CT and maintaining the minimum ECCS/decay heat removal requirements.

The slight reduction in the margin of safety from the extension of one offsite circuit current CT limit is not significant since the remaining operable offsite circuit, the emergency diesel generators, the Station Blackout (SBO) Diesel, the Southern Maryland Electric Cooperative (SMECO) delayed offsite circuit, and the FLEX diesel generators provide an effective defense-in-depth plan to support the station electrical plant configurations during the extended 14-day CT periods.

Operations personnel are fully qualified by normal periodic training to respond to, and mitigate, a Design Basis Accident, including the actions needed to ensure decay heat removal while CCNPP Unit 1 and Unit 2 are in the operational electrical configurations described within this submittal. Accordingly, existing procedures are in place that address safe plant shutdown and decay heat removal for situations applicable to those in the proposed CTs.

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, Exelon concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.4 Conclusions

There are no changes being proposed in this amendment application such that commitments to the regulatory requirements and guidance documents above would come into question. The evaluations documented above confirm that CCNPP will continue to comply with all applicable regulatory requirements.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR

51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. NUREG 0800, Branch Technical Position (BTP) 8-8 "Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions," dated February 2012.

2. STP-O-8A-1, "Test of the 1A DG AND 11 4KV BUS UV," Revision 30, and 8B-1, 8A-2, 8B-2 for 1B, 2A and 2B EDG respectively.

3. Exelon Letter RS-16-14, James A. Barstow to NRC, "Revised Final Integrated Plan Document-Mitigating Strategies NRC Order EA-12-049, dated August 9, 2016.

4. Procedure FSG 5, "Initial Assessment and FLEX Equipment Staging," Revision 00103.

5. CNPP Root Cause Report 2481527, "Dual Unit Trip-Grid Disturbance," dated May 29, 2015.

6. Calculation E-88-015, "Diesel Generator Accident Loading," Revision 5.

7. Procedure EOP-0, "Post Trip Immediate Actions," Revision 13.

8. Procedure OI-27E, "SMECO Offsite Power System," Revision 01600.

9. UFSAR Section 1.8.2, 'Station Blackout, Revision 50.

10. Procedure OP-CA-102-106, "Operator Response Time Program at Calvert Cliffs," Revision 6.

11. Procedure OI-21C, "OC Diesel Generator," Revision 02800.

12. Procedure EOP-7-1, "Station Blackout," Revision 20.

13. Procedure EOP-7-2, "Station Blackout," Revision 21.

14. Procedure EOP-7 Technical Basis Document," Revision 23.

15. Calculation D-E-94-003 "Diesel Generator DG1A / DGOC Protective Relay Settings," Revision 3.

16. Calculation D-E-94-001 "Relay Settings and Coordination," Revision 8.

17. Procedure ERPIP-611, "Severe Accident Management Restorative Actions," Attachment 2, "Electrical Power Supplies," Revision 00400.

18. Routine Number O-024-08-O-M, Operations Performance Evaluation Requirements for 0C Diesel Generator, Revision 3.

19. Procedure WC-AA-101, "On-line Work Control Process," Revision 28.

20. Procedure WC-AA-104, "Integrated risk Management Program," Revision 25.

21. Procedure OU-CA-104, "Calvert Cliffs Shutdown Safety Management Program, Attachment 6, Vital Auxiliaries," Revision 2.

22. Procedure OP-AA-108-117, "Protected Equipment Program," Revision 5.

23. NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 3, July 2000.

24. ECP-18-000496, Technical Evaluation for the Long-Term Degradation Occurring in the OC2 DG Exhaust Gas Temperatures, dated August 15, 2018

ATTACHMENT 2

License Amendment Request

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Docket Nos. 50-317 and 50-318

Proposed Changes to Technical Specification (TS) 3.8.1 Actions A.3 and D.3 to Extend the Offsite Circuit Inoperable Completion Times from 72 hours to 14 days on a One-Time Basis on each Unit

<u>Markup of Proposed Technical Specifications Page</u>

<u>Unit 1 and 2 TS Page</u>

3.8.1-2
3.8.1-5

ACTIONS

------------------------------ NOTE ------------------------------

LCO 3.0.4.b is not applicable to DGs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required LCO 3.8.1.a offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 or SR 3.8.1.2 for required OPERABLE offsite circuits.	1 hour AND Once per 8 hours thereafter
	AND	
	A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
	AND	
	A.3 Restore required offsite circuit to OPERABLE status.	72 hours*

* Or 14 days, once during each applicable 2019 and 2020 Refuel Outage, for the connection of the new P-13000-3 Service Transformer.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. LCO 3.8.1.c offsite circuit inoperable.	---------- NOTE ---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems-Operating," when Condition D is entered with no AC power source to a train. -------------------------	
	D.1 Perform SR 3.8.1.1 or SR 3.8.1.2 for required OPERABLE offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND	
	D.2 Declare, CREVS or CRETS with no offsite power available inoperable when the redundant CREVS or CRETS is inoperable.	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
	AND	
	D.3 Declare CREVS and CRETS supported by the inoperable offsite circuit inoperable.	72 hours*

* Or 14 days, once during each applicable 2019 and 2020 Refuel Outage, for the connection of the new P-13000-3 Service Transformer.

ATTACHMENT 3

License Amendment Request

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Docket Nos. 50-317 and 50-318

Proposed Changes to Technical Specification (TS) 3.8.1 Actions A.3 and D.3 to Extend the Offsite Circuit Inoperable Completion Times from 72 hours to 14 days on a One-Time Basis on each Unit

Summary of Compensatory and Risk Management Actions (RMAs)

Summary of Compensatory and Risk Management Actions

The following table identifies Compensatory and Risk Management Actions (RMAs) required by this document. (They are described to the NRC for the NRC's information and are not regulatory commitments.)

Action	Type
Perform OI-21C within 30 days prior to entry into the 14-day CT period.	Compensatory
The SBO Diesel will be verified available before entering the extended 14-day CT period. Verify the ambient (outside) air temperature would be expected to be below 92 °F for the duration of the 14-day CT period.	Compensatory
The availability of the SBO Diesel will be checked once per 12-hour shift per OI-21C (not to exceed 12 hours).	Compensatory
Ensure that station Operations would not authorize performance of preplanned maintenance affecting the EDGs or operating offsite circuits during the extended 14-day CT period if severe adverse weather conditions are expected.	Compensatory
At the time of implementation, station Operations will contact the grid operator (Load Dispatcher) once per day during the extended 14-day CT period to ensure no significant grid disturbances are expected during the extended CT.	Compensatory
No discretionary switchyard maintenance will be performed on protected equipment. Equipment will be protected in accordance with procedure OP-AA-108-117, "Protected Equipment Program."	Compensatory
During the 2019 and 2020 refueling outages the remaining operable offsite circuit and the delayed SMECO offsite circuit will be controlled as protected equipment.	Compensatory
The steam driven emergency feedwater pumps (AFW) on the operating unit will be controlled as protected equipment.	Compensatory

Shift briefs will be performed to reinforce other potentially important operator actions associated with the performance of the extended CT (i.e., operator actions to start and align the 0C DG (SBO diesel) to the Unit 1 ESF busses, and operator actions to Trip the Reactor Coolant Pumps (RCPs) with reduced indication; Open the Auxiliary Feed Water (AFW) Block Valves; control AFW Flow.	RMA
Shift briefs and pre-job walkdowns to reduce and manage transient combustibles prior to entrance into the extended 14-day CT will be used to alert the staff about the increased sensitivity to fires in the following areas during the extended 13.8 kV outage windows. Additionally, any hot work activities in the following areas will be prohibited during the time within the 14-day CT period. For 2019 Refuel Outage: • 317 (U1 27' SWGR) • 529 (Unit 1 69' West Electrical Penetration Room) • 518 (Unit 1 Horizontal Cable Chase) • 301 (Unit 1 Battery Room No. 11) • 306 (Unit 1 Cable Spreading Room) • 302 (Unit 2 Cable Spreading Room) • 13 kV Bus 11 Metal Clad For 2020 Refuel Outage: • 407 Unit 2 45' Switchgear Room • 532 Unit 2 West Electrical Room • 414 Unit 2 45' West Electrical Penetration Room • 306 Unit 1 Cable Spreading Room • 302 Unit 2 Cable Spreading Room • 311 Unit 2 27' Switchgear Room	RMA

ATTACHMENT 4

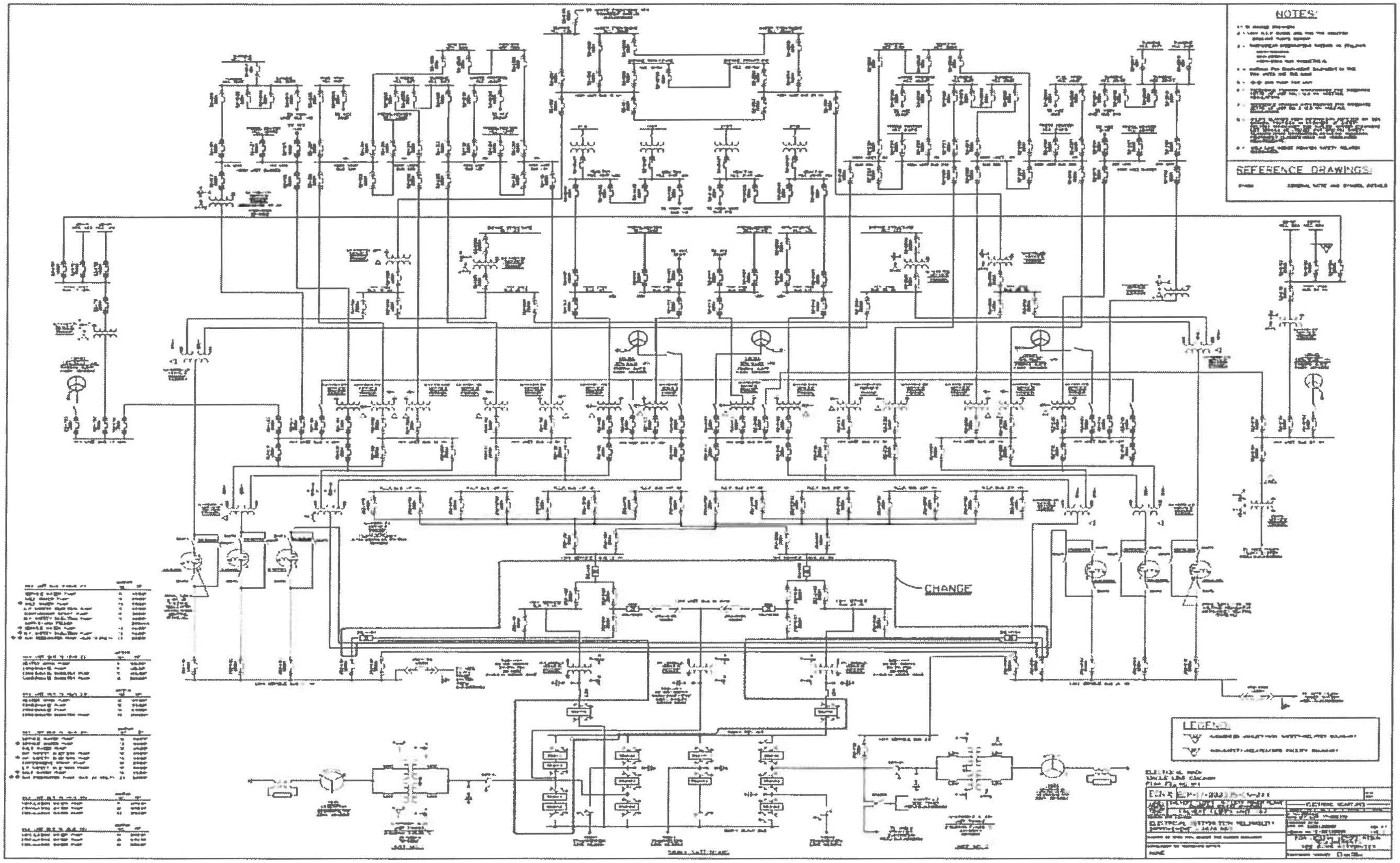
License Amendment Request

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Docket Nos. 50-317 and 50-318

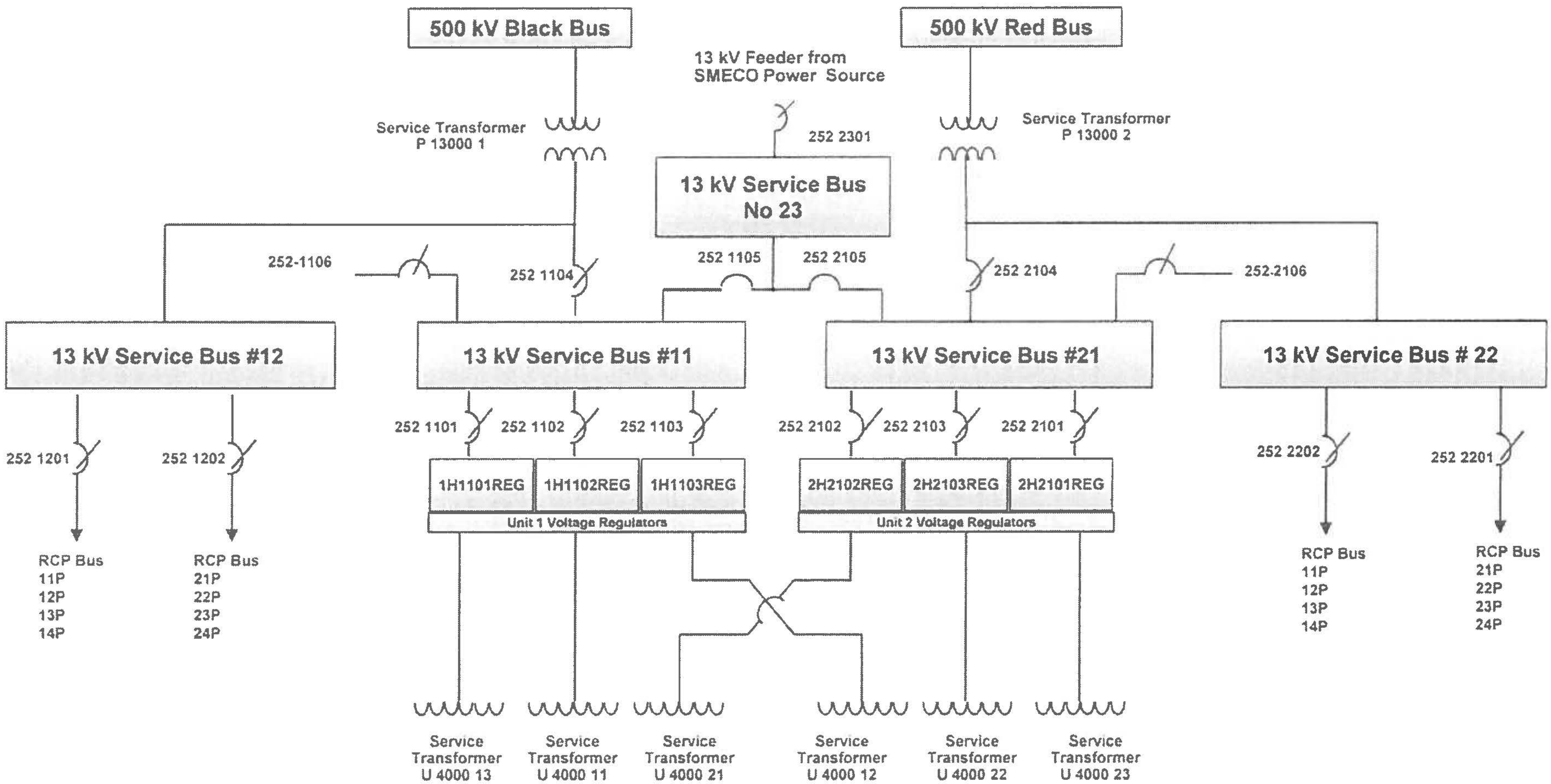
Proposed Changes to Technical Specification (TS) 3.8.1 Actions A.3 and D.3 to Extend the Offsite Circuit Inoperable Completion Times from 72 hours to 14 days on a One-Time Basis on each Unit

CCNPP Electrical Single Line Drawing and Simplified Figures

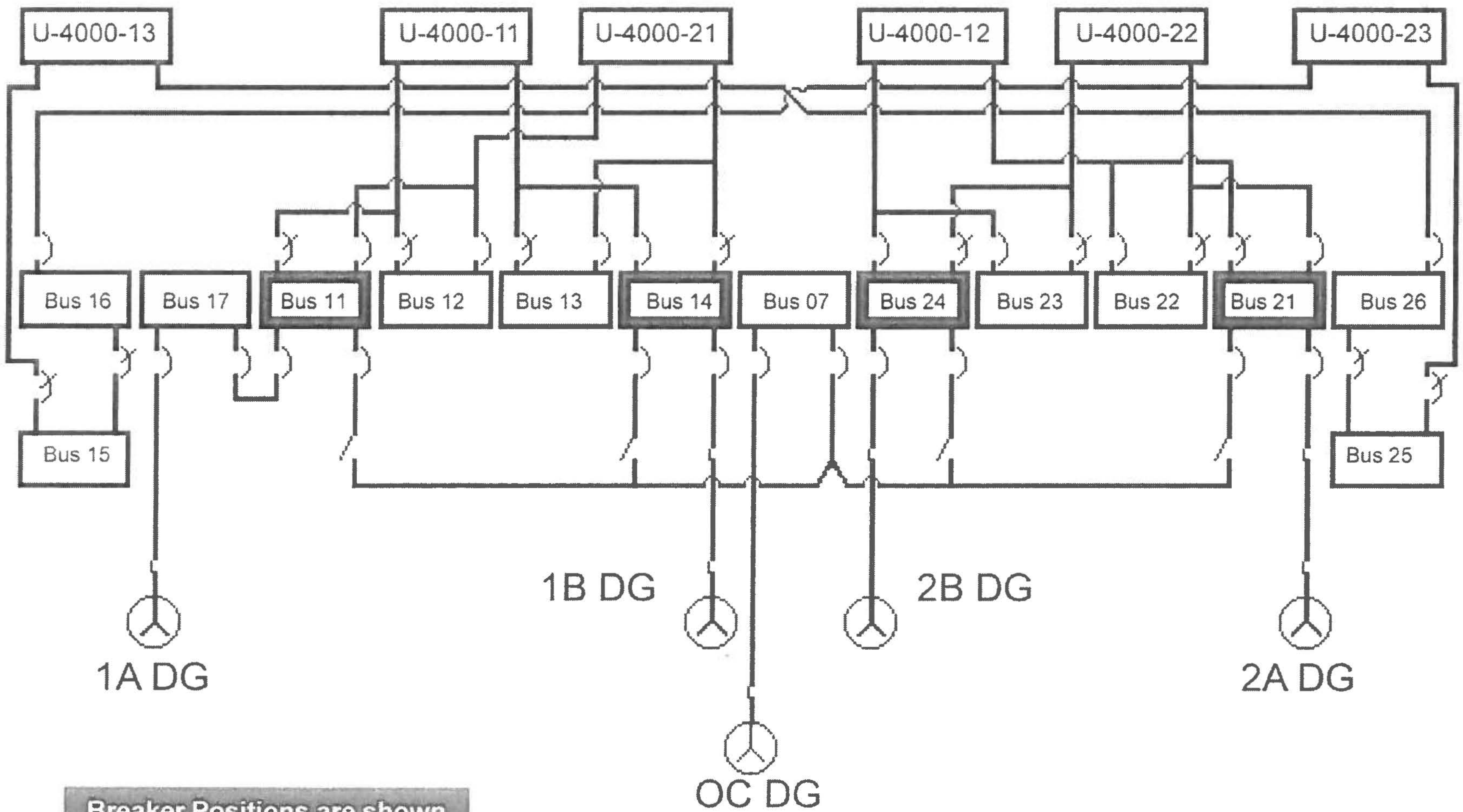
Conceptual Electrical Main Single Line Diagram
Calvert Cliffs Nuclear Power Plant - EDRIP



13.8 KV Distribution System



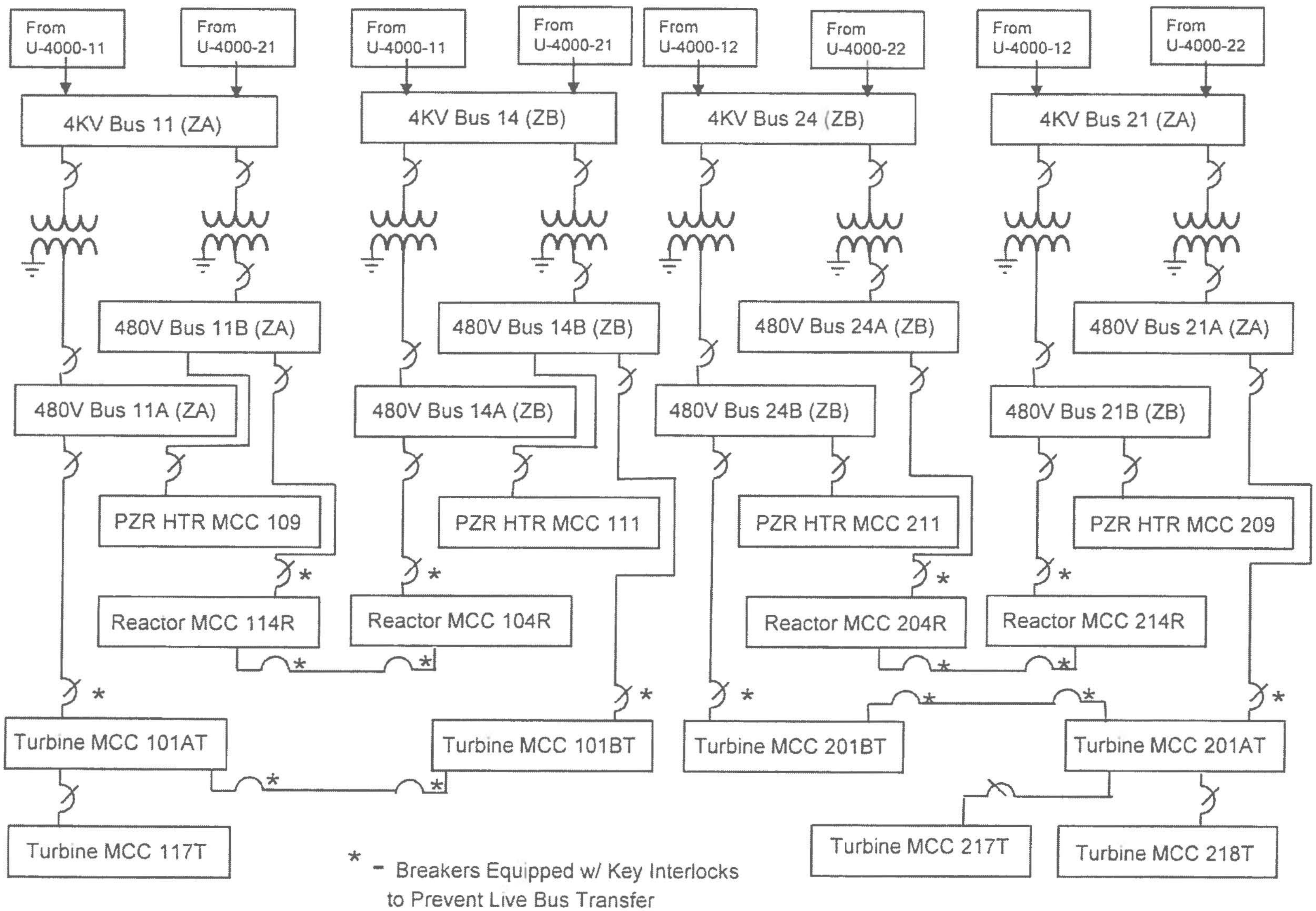
4.16 KV Distribution



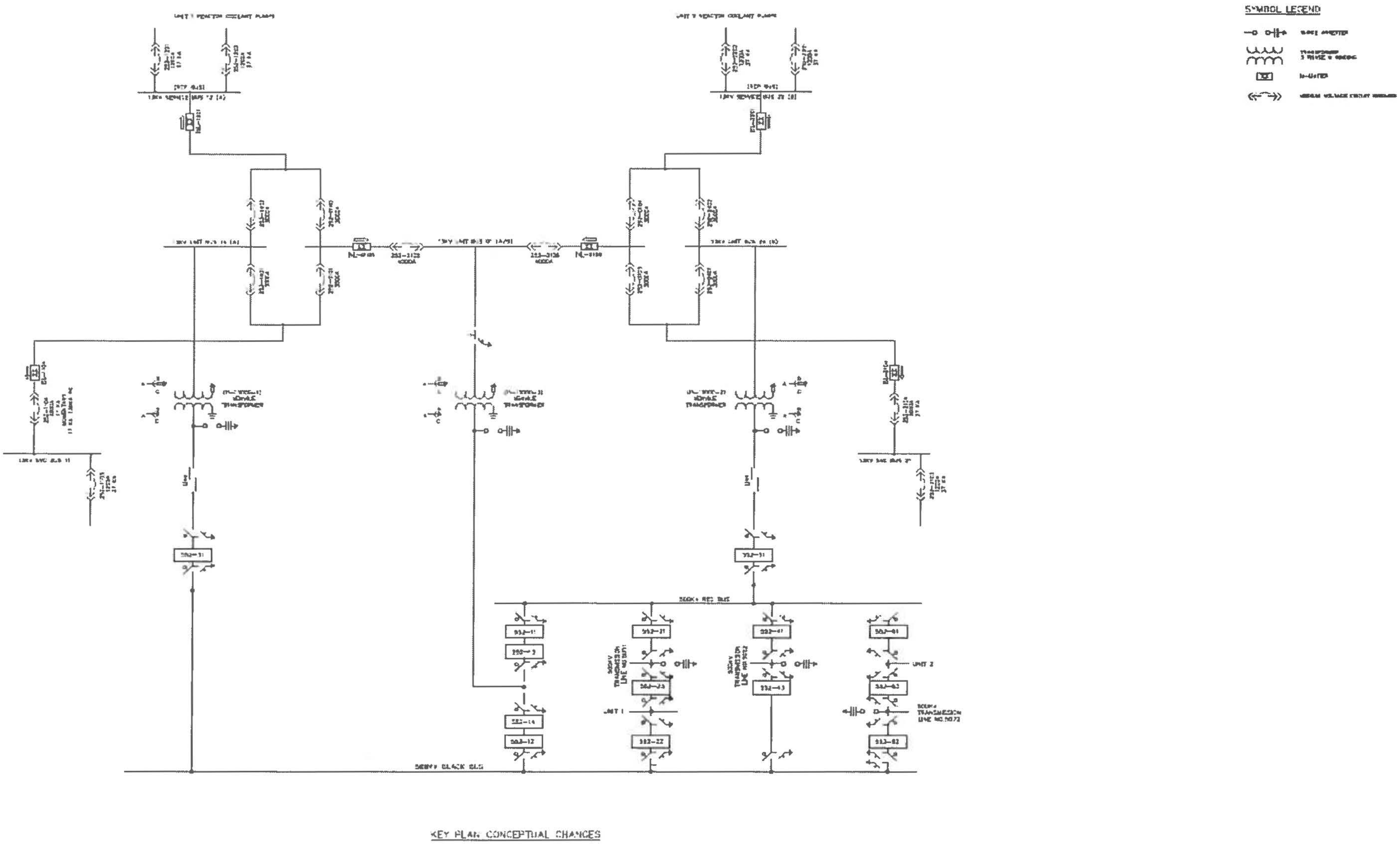
Breaker Positions are shown in the NORMAL Lineup

4 kV to 480 V Busses

4.16 KV Distribution

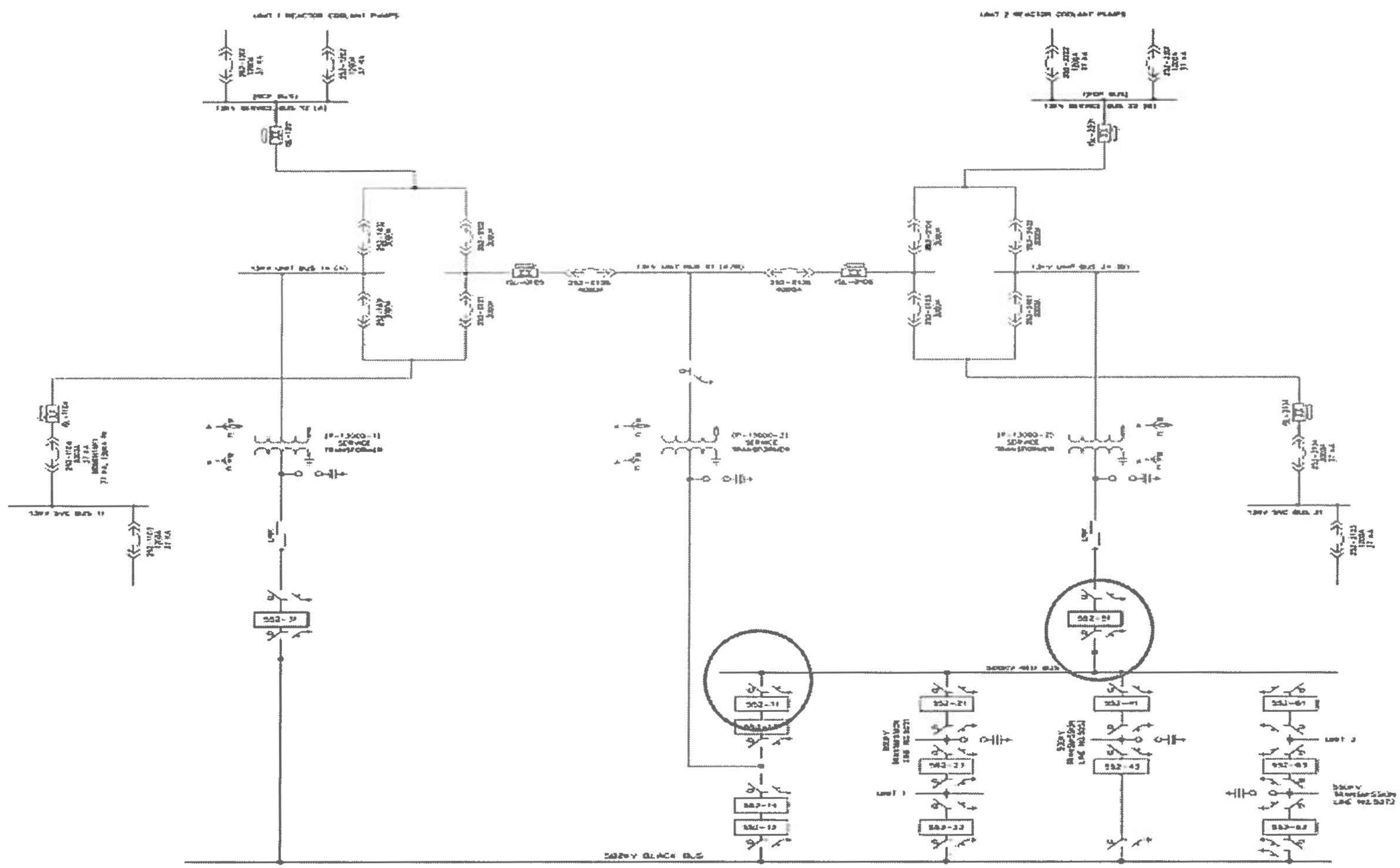


EDRIP Conceptual 13.8kV Ring Bus Single Line



Exelon Generation.

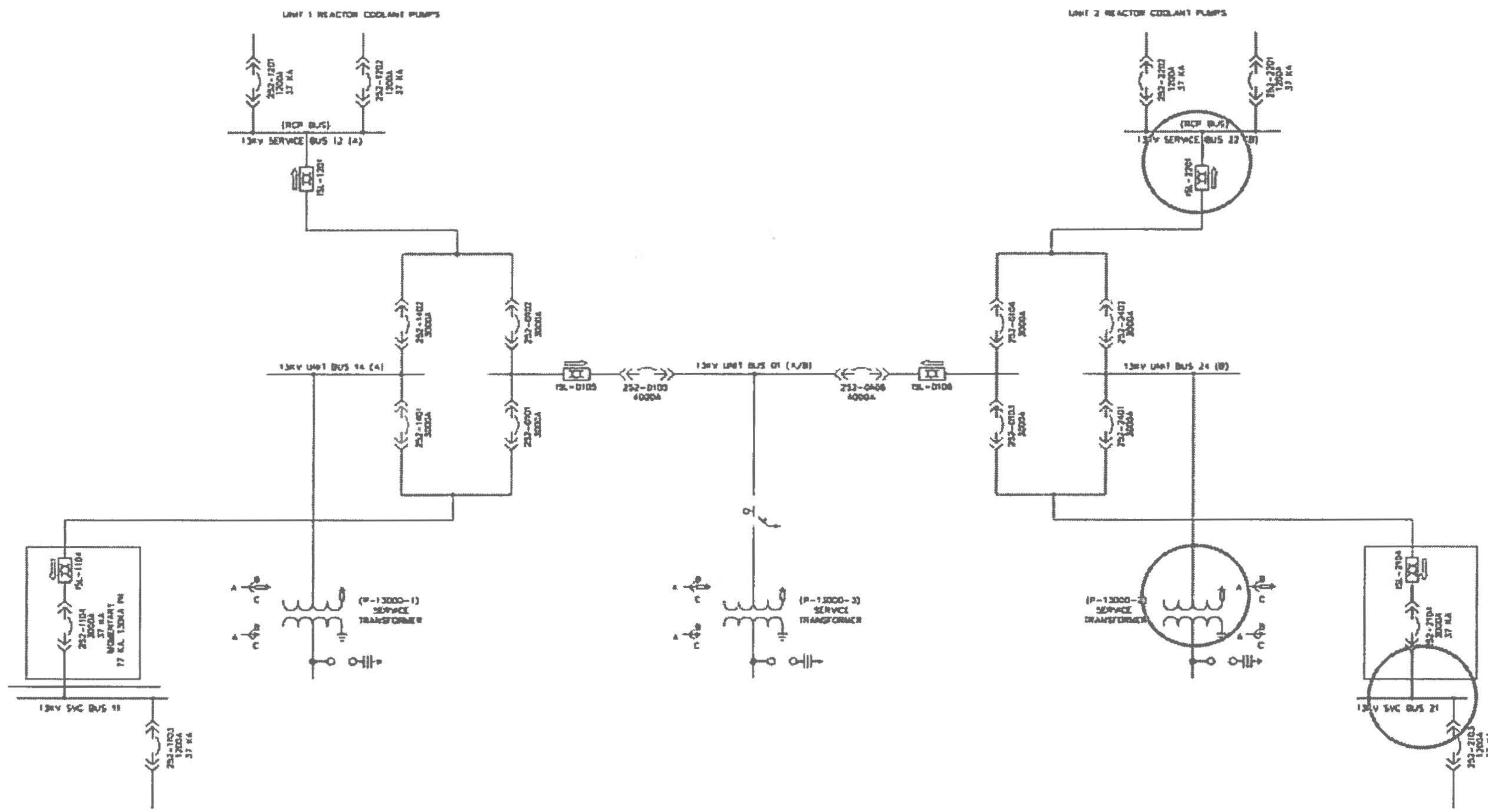
EDRIP Description - High Voltage Scope



Exelon

EDRIP Description – Medium Voltage Scope

Ring and Split Bus Arrangement.



ATTACHMENT 5

License Amendment Request

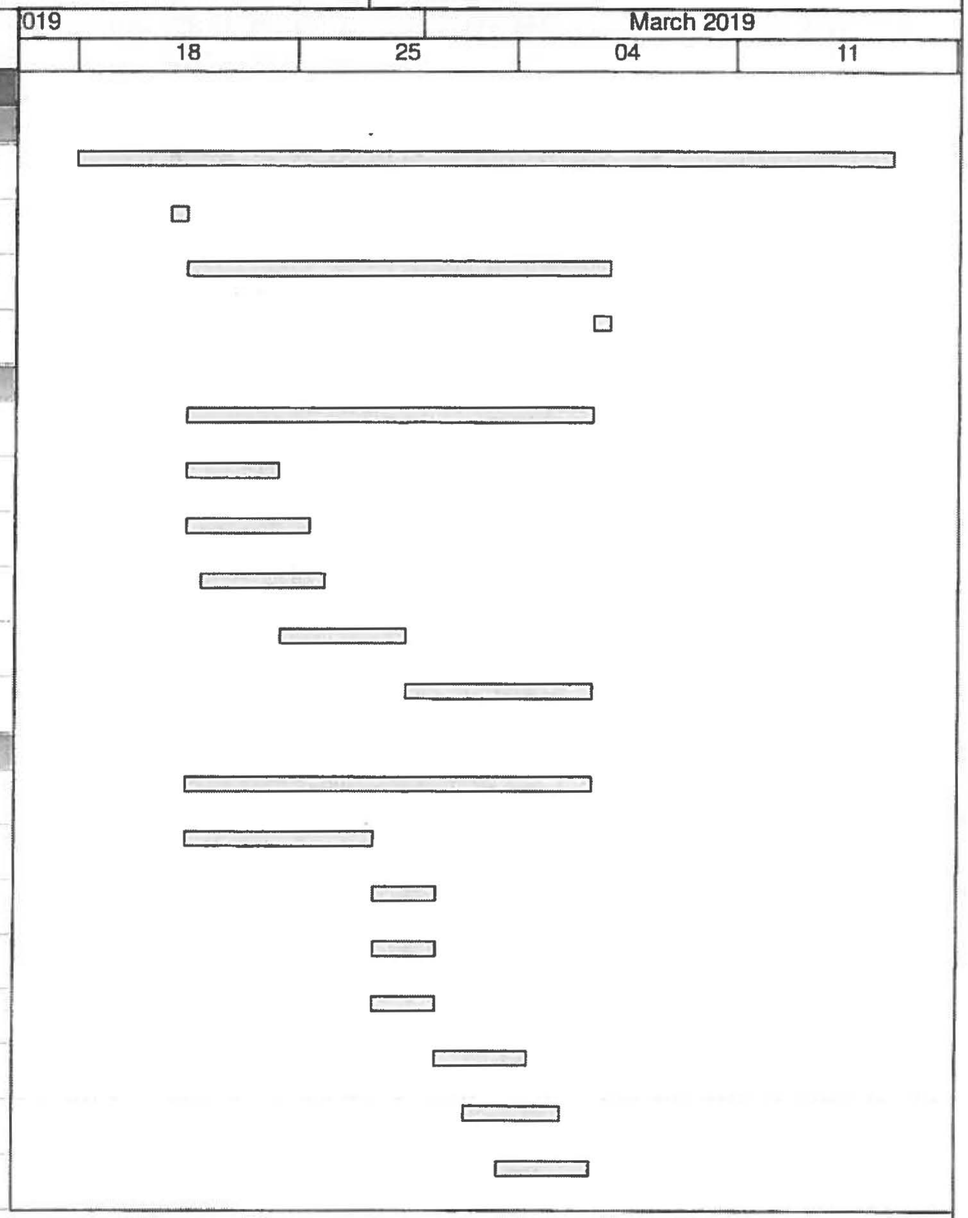
Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Docket Nos. 50-317 and 50-318

Proposed Changes to Technical Specification (TS) 3.8.1 Actions A.3 and D.3 to Extend the Offsite Circuit Inoperable Completion Times from 72 hours to 14 days on a One-Time Basis on each Unit

EDRIP Project Schedule during the 14 Day CT Period

EDRIP LAR 14 DAY LCO

Activity Name	Dur	Start	Finish
EDRIP LAR 14 DAY LCO			
2019 UNIT TWO REFUELING OUTAGE			
2019 Unit Two Refueling Outage	26	18-Feb-19	16-Mar-19
Hang System Tags	1	21-Feb-19	21-Feb-19
Offsite Power Unavailable	14	21-Feb-19	07-Mar-19
Clear System Tags	1	06-Mar-19	07-Mar-19
SWITCHYARD			
Switchyard	13	21-Feb-19	06-Mar-19
Hybrid Towers	3	21-Feb-19	24-Feb-19
Red Bus Expansion	4	21-Feb-19	25-Feb-19
Red Bus Relays	4	22-Feb-19	25-Feb-19
Hybrid Breaker Wiring	4	24-Feb-19	28-Feb-19
Relay Trip Path Testing	6	28-Feb-19	06-Mar-19
P13000-2			
P13000-2	13	21-Feb-19	06-Mar-19
P13000-2 Testing	6	21-Feb-19	27-Feb-19
Transformer Secondary	2	27-Feb-19	01-Mar-19
Bus 21 Non-Seg Connections	2	27-Feb-19	01-Mar-19
Bus 22 Non-Seg Connections	2	27-Feb-19	01-Mar-19
Non-Seg Bus Tests	3	01-Mar-19	04-Mar-19
Bus 01 and 14 Testing	3	02-Mar-19	05-Mar-19
DCS Testing	3	03-Mar-19	06-Mar-19



ATTACHMENT 6

License Amendment Request

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Docket Nos. 50-317 and 50-318

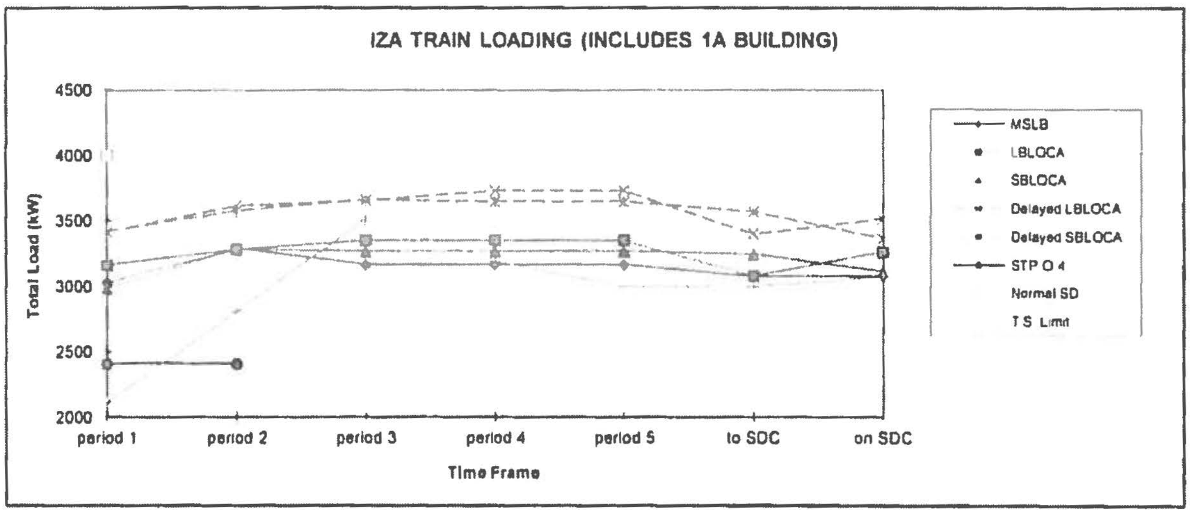
Proposed Changes to Technical Specification (TS) 3.8.1 Actions A.3 and D.3 to Extend the Offsite Circuit Inoperable Completion Times from 72 hours to 14 days on a One-Time Basis on each Unit

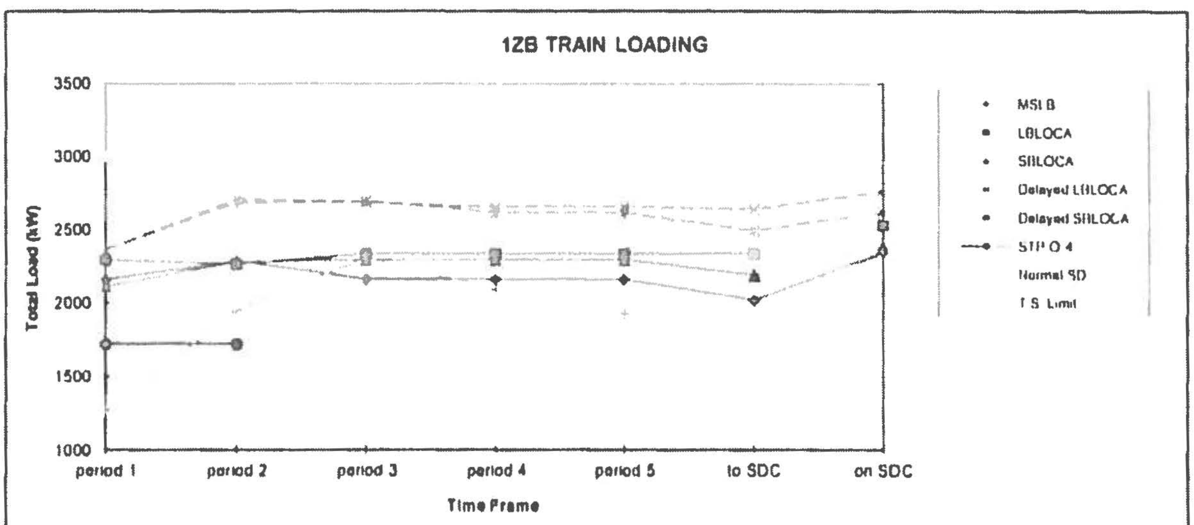
ESF Bus and SMECO Offsite Load Tables

SPREADSHEET
UNIT 1 SUMMARY

Power Train	Scenario	period 1	period 2	period 3	period 4	period 5	to SDC	on SDC		
		Total Bus Loading (KW)								
1ZA	MSLB	3027.2	3290.4	3164.1	3164.1	3164.1	3073.9	3076.0		
	LBLOCA	3161.9	3283.0	3350.7	3350.7	3350.7	3075.9	3263.0		
	SBLOCA	2981.6	3280.9	3267.8	3267.8	3267.8	3243.7	3113.5	DB Max	3512.7
11	Delayed LBLOCA	3416.6	3617.4	3662.6	3730.7	3730.7	3400.6	3516.5		
	Delayed SBLOCA	3416.6	3577.9	3660.7	3647.9	3647.9	3568.5	3367.0		
	STP-O-4	2409.3	2409.3							
	Normal SD	2115.5	2811.6	3512.7	3189.1	2995.4	2995.4	3070.9	Max	3730.7
	T.S. Limit	4000 0								

Power Train	Scenario	period 1	period 2	period 3	period 4	period 5	to SDC	on SDC		
1ZB	MSLB	2159.9	2287.1	2160.6	2160.6	2160.6	2018.0	2346.2		
	LBLOCA	2293.5	2267.3	2335.5	2335.5	2335.5	2334.5	2530.5		
	SBLOCA	2112.5	2277.8	2293.7	2293.7	2293.7	2190.1	2386.1	DB Max	2530.5
14	Delayed LBLOCA	2363.6	2711.2	2684.1	2655.7	2655.7	2639.9	2762.9		
	Delayed SBLOCA	2363.6	2684.2	2695.1	2613.5	2613.5	2495.1	2618.1		
	STP-O-4	1722.2	1722.2							
	Normal SD	1267.7	1949.7	2306.9	2089.5	1930.3	1930.3	2341.0	Max	2762.9
	T S. Limit	3000 0								



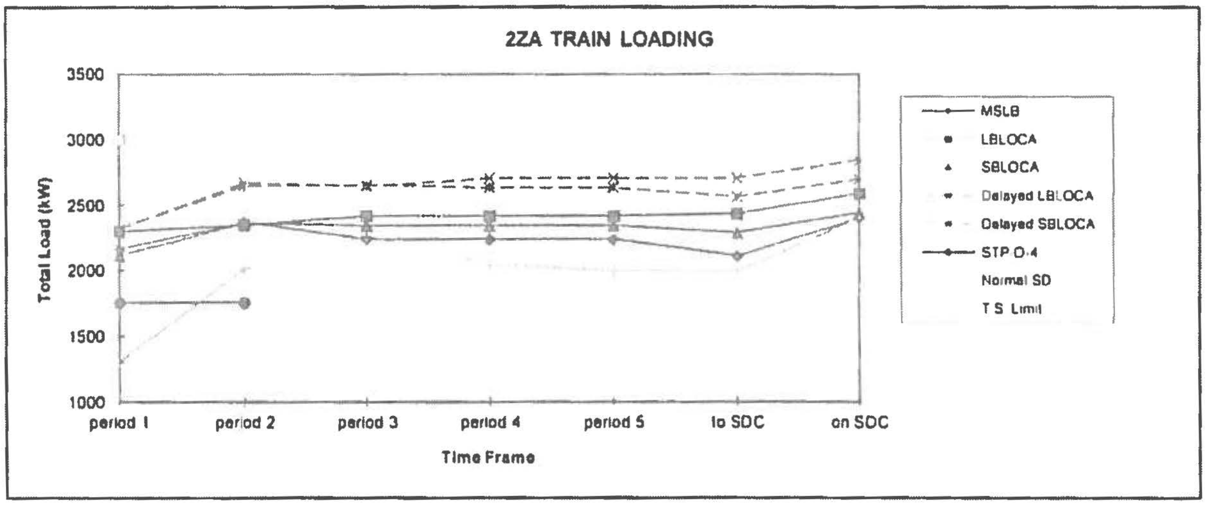


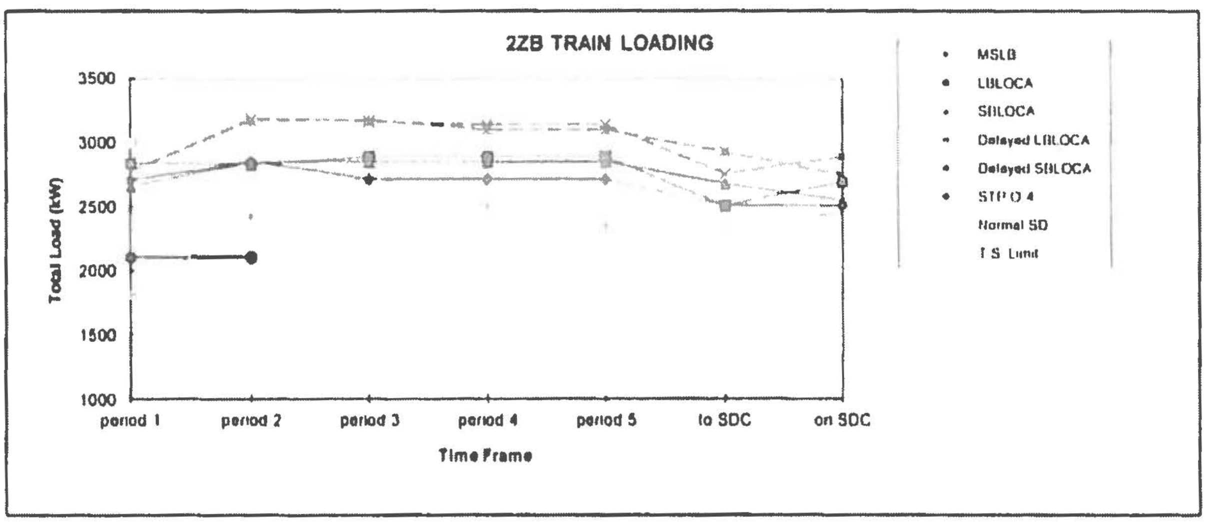
Orange color indicates changes due to Revision 0005

Total Bus Loading (KW)

Power Train	Scenario	period 1	period 2	period 3	period 4	period 5	to SDC	on SDC		
2ZA	MSLB	2164.3	2367.7	2238.9	2238.9	2238.9	2110.8	2399.8		
	LBLOCA	2297.9	2348.0	2414.3	2414.3	2414.3	2430.5	2587.1		
	SBLOCA	2117.0	2358.4	2342.8	2342.8	2342.8	2286.0	2442.6	DB Max	2587.1
21	Delayed LBLOCA	2321.7	2670.6	2643.4	2705.3	2705.3	2706.8	2843.0		
	Delayed SBLOCA	2321.7	2643.0	2653.8	2633.2	2633.2	2561.8	2697.9		
	STP-O-4	1753.6	1753.6							
	Normal SD	1302.1	2017.9	2264.7	2047.1	1995.2	1995.2	2406.2	All Max	2843.0
	T.S. Limit	3000.0								

Power Train	Scenario	period 1	period 2	period 3	period 4	period 5	to SDC	on SDC		
2ZB	MSLB	2703.3	2850.9	2713.5	2713.5	2713.5	2503.3	2506.2		
	LBLOCA	2836.8	2829.8	2888.3	2888.3	2888.3	2504.3	2691.6		
24	SBLOCA	2656.0	2841.5	2847.5	2847.5	2847.5	2677.8	2547.8	DB Max	2888.3
	Delayed LBLOCA	2778.3	3191.5	3164.3	3138.0	3138.0	2753.2	2889.5		
	Delayed SBLOCA	2778.3	3166.0	3176.6	3096.7	3096.7	2926.2	2745.1		
	STP-O-4	2105.4	2105.4							
	Normal SD	1810.8	2419.2	2734.9	2502.8	2352.0	2352.0	2446.1	All Max	3191.5
	T.S. Limit	3000.0								





Orange color indicates changes due to Revision 0005

SPREADSHEET
SMECO SUMMARY

Power Train	Scenario	KW period 1	KW period 2	KW period 3	KW period 4	KW period 5	KW to SDC	KW on SDC		
1ZA SD plus 2ZB accid	MSLB	3354.3	4202.3	4176.1	3965.5	3736 5	3959.2	4237.1		
	LBLOCA	3487.9	4181.2	4270.5	4059.8	3830.9	4277.6	4422.5		
	SBLOCA	3307.1	4192.9	4229.7	4019.0	3790.1	4134.0	4278.7	DB Max	4422 5
	Delayed LBLOCA	3359.6	4389.6	4556.3	4238.9	4116.7	4455.8	4592.1		
	Delayed SBLOCA	3359.6	4364.1	4568.6	4198.2	4129 0	4312.3	4448.4		
	Normal SD	2453.7	3821.7	4206 2	3763.4	3354.3	4168.9	4168.9	All Max	4592.1
	UFSAR Limit	5000 0								

Power Train	Scenario	KW period 1	KW period 2	KW period 3	KW period 4	KW period 5	KW to SDC	KW on SDC		
1ZA accid plus 2ZB SD	MSLB	3393.7	4206.4	4180.8	3948.6	3768.4	3964.0	4223.6		
	LBLOCA	3528.4	4199.0	4287.0	4054.8	3874.6	4283.4	4410.7		
	SBLOCA	3348.1	4196.9	4232.5	4000.3	3820.1	4134.0	4261.1	DB Max	4410.7
	Delayed LBLOCA	3386.4	4463.2	4626.9	4292.4	4214 5	4520.0	4635.9		
	Delayed SBLOCA	3386.4	4423.7	4625.0	4238.0	4212 6	4370.7	4486.4		
	Normal SD	2453.7	3821.7	4206.2	3763.4	3354.3	4168.9	4168.9	All Max	4635.9
	UFSAR Limit	5000 0								

CREVS/CRETS System Loads

CREV/CRET 1ZA LOAD (on ESF Bus 11)

BKR	NO	Description	KW
52-1108	11	Control Rm A/C Compressor	100.1
52-11427	114	Dist Xfmr 480-208/120V MCC #14	4.6
52-11447	11	Control Rm Filter Fan	20.2
	114	Reactor MCC 114R Control Power	1
52-11403	11	Control Room Condenser Fan	17.5
52-11435	11	Control Rm HVAC Unit Fan #11	44.6
52-11465	11	Control Rm Return Air Fan	23.8
Total			211.8

CREV/CRET 2ZB LOAD (on ESF Bus 24)

BKR	NO	Description	KW
52-2408	12	Control Rm A/C Compressor	100.1
52-20427	24	Dist Xfmr 480-208/120V MCC #24	5.5
52-20447	12	Control Rm Filter Fan	20,2
	204R	Reactor MCC 204R Control Power	0.9
52-20403	12	Control Room Condenser Fan	17.5
52-20410	12	Control Rm HVAC Unit Fan	35.6
52-20433	12	Control Rm Return Air Fan	23.8
Total			203.6

TABLE 8-7

LOAD SEQUENCING

SEQUENCER STEP NO.	TIME (Seconds)	SERVICE	EQUIPMENT NUMBER FED BY EACH 4 kV BUS 1ZA BUS 11	1ZB BUS 14	2ZA BUS 21	2ZB BUS 24
-	0(1)(3)	Reactor Motor Control Centers	114	104	214	204
		Turbine Bearing Oil Pump *(2)	-	-	21	-
		1E Battery Chargers	11 & 14	12 & 13	22 & 23	21 & 24
		Transformer for 208/120 Volt Instrumentation Busses	11	12	21	22
		Penetration Room Exhaust Fan	11	12	21	22
		Diesel Generator Room Exhaust Fan	-	1B	2A	2B
		Control Room HVAC Fans	11	-	-	12
		Control Room Air Conditioning Condenser Fans *	11	-	-	12
		Saltwater System Air Compressor	11	12	21	22
		Motor-Operated Valves	various	various	various	various
		Emergency Core Cooling System Pump Room Air Coolers	11	12	21	22
		Emergency Core Cooling System Pump Room Exhaust Fans	11	12	21	22
		Boric Acid Storage Tank Heaters *	two	two	two	two
		Heat Tracing System *	11	12	21	22
		Diesel Building 1A and Auxiliaries	1A	-	-	-
		Switchgear Room HVAC Fans	11	12	21	22
		1E Battery Room Fans	one Exhaust fan and one redundant Supply fan			
		Service Water Pump	11	12	21	22
		Containment Vent Isolation	6900	6901	6900	6901
1	5	High Pressure Injection Pump(6)	11	13	21	23
		High Pressure Injection Pumps Motor-Operated Valves	various	various	various	various
2	10	Charging Pumps	11 & 13	12 & 13	21 & 23	22 & 23
		Boric Acid Pump	11	12	21	22
		Boric Acid Motor-Operated Valve	508	-	508	-
		Saltwater Pump	11	12	21	22

TABLE 8-7

LOAD SEQUENCING

SEQUENCER STEP NO.	TIME (Seconds)	SERVICE	EQUIPMENT NUMBER FED BY EACH 4 kV BUS 1ZA BUS 11	1ZB BUS 14	2ZA BUS 21	2ZB BUS 24
3	15	Containment Air Coolers	11 & 12	13 & 14	21 & 22	23 & 24
		Containment Spray Pump	11	12	21	22
4	20	Component Cooling Pump	11	12	21	22
		Containment Filter Units	11 & 13	12 & 13	21 & 23	22 & 23
5	25	Low Pressure Injection Pump	11	12	21	22
6	30	Control Room Air Conditioning Compressor(7)	11	-	-	12
		Switchgear Room Air Conditioning Compressor *	11	12	21	22
6A	45	Auxiliary Feed Water Pump	13	-	-	23
6B	40	Computer Room HVAC Unit *	-	11	12	-

NOTES:

(1) At time 0 seconds, the generator breaker is closed and the loads listed for the 0-second time step are energized independent of sequencer action.

(2) The loads identified with * are process controlled. The load feeder breaker will be closed at the time listed but the equipment will not run until called for by the process signal.

(3) There are additional minor loads energized at time 0 not shown in table.

(4) Low voltage equipment is indirectly fed by 4 kV Busses through step-down transformers and low voltage busses.

(6) HPSI Pumps 12 and 22 are normally in pull-to-lock and will not start.

(7) The Control Room air conditioning compressor is normally process controlled. However, during load sequencing, the compressor is forced to start within a certain amount of time and then run continuously until after the auxiliary feedwater pump has been sequenced and started. The Control Room air conditioning compressor control then automatically reverts back to process control.