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Seabrook Station Unit 1
Pre-Submittal Meeting

License Amendment Request for Offsite AC Sources

December 9, 2024

NextEra Project Team

- Jeff Sobotka — Site Engineering, Seabrook
- Kyle Barry — Site Operations, Seabrook
- Matt Levander/Josh Greene — Site Licensing, Seabrook
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Meeting Agenda

- LAR Purpose / Benefits
- Electrical Distribution System (One-Line Diagram)
- Applicable Licensing Basis Requirements
- Current Technical Specifications (TS), TS Bases
- Proposed Change
- Industry Benchmarking
- Conclusions / Schedule
- Questions

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LAR Purpose / Benefits

- **Reduces number of UATs, RATs required to be OPERABLE.**
  - Supports UAT/ RAT online repair / replacement; Typically, 90 days to 2 yrs.
  - Current LCO interpretation overly restrictive; burdensome to maintain.
  - Current design exceeds GDC-17 criteria.
- **Proposed change maintains 2 independent offsite networks, each powering both emergency safeguards (ESF) busses. Each offsite network powers at least one ESF electrical train.**
- **Proposed change maintains LCO compliance with an operable UAT powering one ESF train and an operable RAT powering the other. [Minimum case]**
- **No change to current operating practice of 2 UATs and 2 RATs available, i.e., operable and/or standby. No change to base PRA.**
- **Seabrook's Supplemental Emergency Power System (SEPS) remains available as a manual backup power source to either ESF train under a LOAC conditions should one or both EDGs fail to load.**

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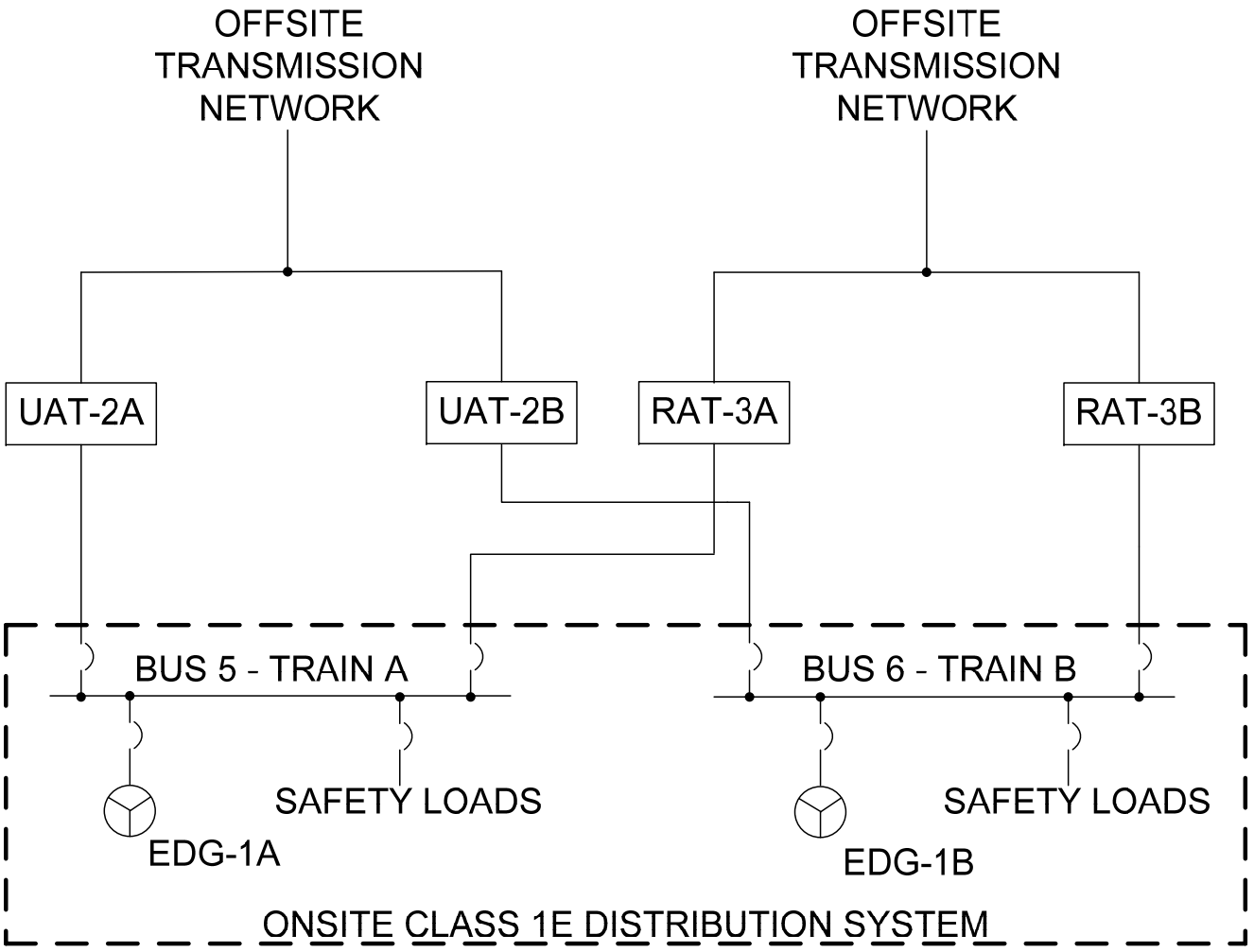
Electrical Distribution System (One-Line Diagram)



EDG - emergency diesel generator
UAT - unit auxiliary transformer
RAT - reserve auxiliary transformer

Applicable Licensing Basis Requirements

- **General Design Criteria (GDC) 17 relevant criteria:**
  - Electric power from the transmission network to the onsite electrical distribution system shall be supplied by two physically independent circuits
  - 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.
  - One of these circuits shall be designed to be available within a few seconds following a LOCA.
- **Institute of Electrical and Electronics Engineers (IEEE) Std. 308-1974**
  - Endorsed by RG 1.32 w/ limitations. Consistent with most GDC 17 requirements
- **Regulatory Guide 1.32**
  - GDC-17's "within an acceptable time'" => Within a few seconds.
- **Regulatory Guide 1.93, Availability of Electric Power Sources.**
  - Establishes conditions for continued power operation for varying levels of electric power system degradation.

Applicable Licensing Basis Requirements, con't.

- **UFSAR 8.2.1.3**
  - The UATs and GSUs provide an immediate access circuit from the preferred power supply (offsite source) to the onsite distribution system… when the generator circuit breaker is tripped. Each has the capacity to supply the power requirements of the connected load under all plant conditions.
  - [The RATs] provide a second immediate access circuit from the preferred power supply (offsite source) to the onsite distribution system. Each has the capacity to supply the power requirements of the connected load under all plant conditions.
- **UFSAR 8.2.1.5**
  - The minimum requirements of GDC 17 and RG 1.32 can be met with one UAT and one RAT inoperable if the operable UAT and RAT are connected to opposite emergency buses. This is acceptable since there are still two independent circuits from the transmission network to the onsite distribution system.
- **UFSAR 8.3.1.1**
  - The onsite AC power systems include the 13,800V Distribution System, including the connections from the UATs and RATs; the 4160V Distribution System, including the standby DGs, the SEPS and connections from the UATs and RATs; the 480V Distribution System; and the 120VAC Distribution System.

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Current Technical Specifications (TS), TS Bases.

- **TS 3/4.8.1 AC Sources - Operating**

  LIMITING CONDITION FOR OPERATION

  ==========

  3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

  a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E Distribution System, and …

- **TS Bases 3.8.1-1**
  - Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power System and separate and independent EDGs for each train ensure availability of the required power to shutdown the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA.
    - -- One of the required, independent offsite AC sources consists of the circuit from an offsite transmission line through the UATs to buses E5 and E6. Operability requires both UAT breakers closed, energizing emergency buses.
    - -- The second required independent offsite AC source consists of the circuit from a separate offsite transmission line through the RATs to buses E5 and E6. Operability requires each RAT supply breaker be either (1) closed, or (2) in standby with capability for automatic closure.

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Current Technical Specifications (TS), TS Bases, con't.

- **TS Bases 3.8.1-1**
  - Below are examples of the application of the TS to various configurations of the offsite AC sources:
    - The offsite source via the UATs is operable when both buses E5 and E6 are powered via the UATs.
    - The offsite source via the RATs is operable when the RAT is the standby power supply for both buses E5 and E6, and both buses have operable auto transfer capability to the RAT.
    - With one emergency bus powered from a UAT with capability for auto transfer to the RAT, and the other bus powered from a RAT, the offsite source via the UAT is inoperable. The source through the UAT is not available via auto transfer on the bus that is energized from the RAT. (TS 3.8.1.1 ACTION [a] applies a 72-hour Completion Time).
    - With both emergency buses powered from the RATs, the offsite source via the UATs is inoperable since no auto transfer capability to the UATs exists. (TS 3.8.1.1 ACTION [a] applies a 72-hour Completion Time).
    - With the UAT powering one emergency bus without auto transfer capability to the RAT coincident with the RAT powering the other emergency bus (no auto transfer from the RAT to the UAT exists), both offsite sources are inoperable. (TS 3.8.1.1 ACTION [e] applies a 24-hour Completion Time).

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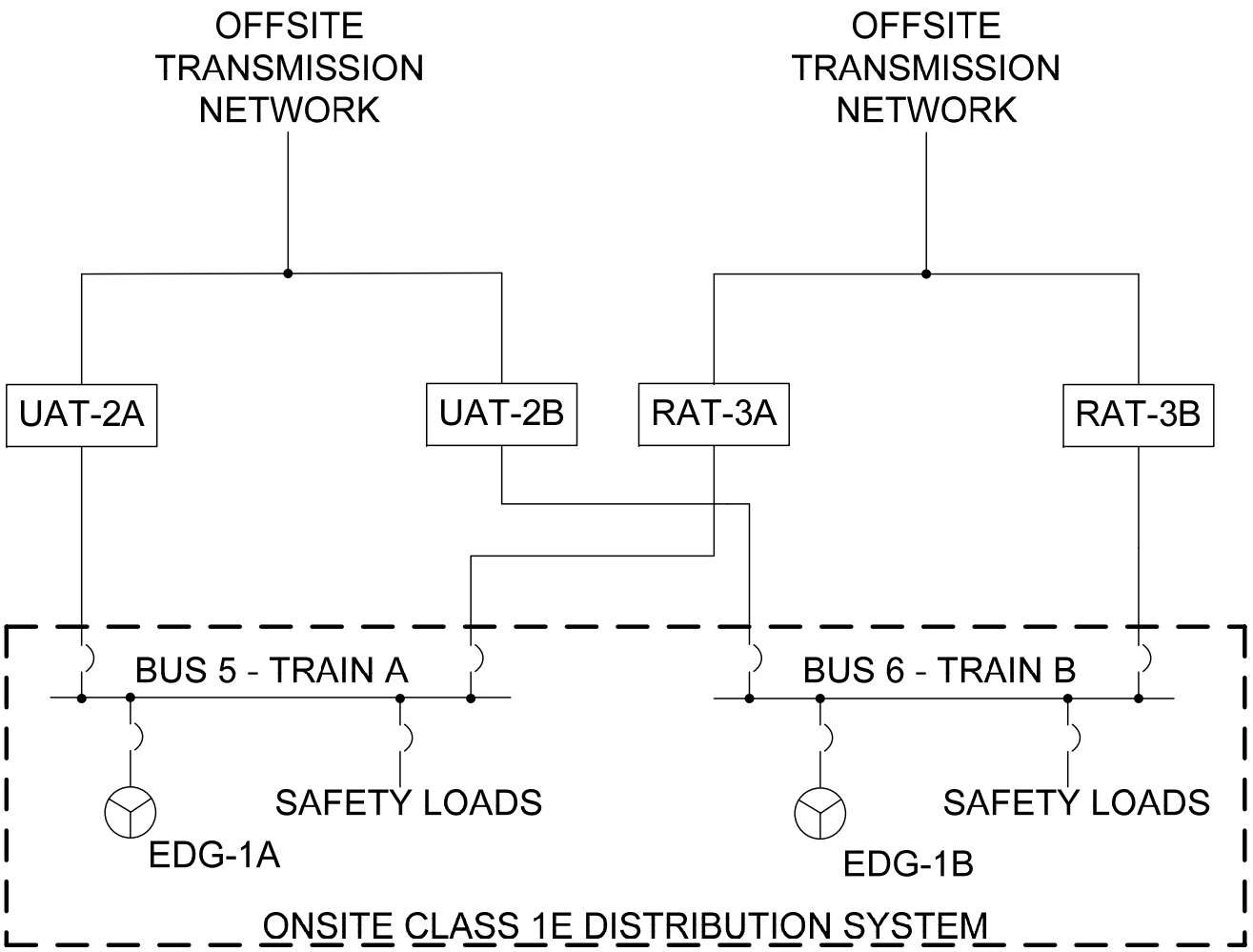
Current Technical Specifications (TS), TS Bases, con't.



EDG - emergency diesel generator
UAT - unit auxiliary transformer
RAT - reserve auxiliary transformer

72-hour CT
UAT-2A or UAT-2B inoperable

72-hour CT
RAT-2A or RAT-2B inoperable

72-hour CT
UAT-2A and UAT-2B inoperable, or
RAT-2A and RAT-2B inoperable

24-hour CT
UAT-2A and RAT-3B inoperable, or
UAT-2B and RAT-3A inoperable

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Proposed Change

- **Proposed change revises TS Bases to allow LCO 3.8.1.1 compliance (i.e. no TS ACTION entry) with…**
  - One inoperable RAT, or
  - One inoperable UAT, or
  - One inoperable UAT and one inoperable RAT provided the operable UAT and RAT are connected to opposite emergency buses.
- **No TS changes are proposed.**
- **Proposed Bases change is consistent with UFSAR 8.2.1.5, which states,**
  - … the minimum requirements of GDC 17 and RG 1.32 can be met with one UAT and one RAT inoperable if the operable UAT and RAT are connected to opposite emergency buses.
- **Note: TS LCO 3.8.1.1 requires two operable independent offsite power sources to the Class 1E busses but does not specify which UATs or RATs must be operable.**
- **Proposed Bases change would continue to assure the availability of two independent offsite power sources without jeopardizing safety, consistent with Seabrook accident analyses assumptions.**

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Industry Benchmarking

- **In 2022, NextEra commissioned a study to benchmark comparable nuclear stations.**
  - Study compared Seabrook configuration and design basis with 12 similar domestic PWRs.
  - Study examined number of UATs and RATs per nuclear unit, switchyard connections, cross-connections between nuclear units, and cross-connections between emergency busses.
- **Study concluded:**
  - Seabrook TS Bases are overly restrictive
  - Seabrook design complies with GDC 17, etc., with a UAT or a RAT removed from service.
  - Seabrook's offsite power system is equally or more robust than most other domestic PWRs.
- **Study recommended NextEra revise Seabrook TS Bases to lessen UAT and RAT restrictions, as proposed.**

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Conclusion / Schedule

- **Seabrook design satisfies GDC 17; however, current TS Bases is overly restrictive.**
- **Proposed change revises the TS Bases to accommodate extended UAT / RAT repair or replacement online, thereby minimizing outage resources.**
- **Proposed TS Bases change aligns with industry licensing basis.**
- **LAR submittal scheduled Spring 2025.**
  - Approval requested within 1 year of satisfactory LAR acceptance.

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Questions