JUN 2 8 2019

L-2019-118
10 CFR 50.90

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington D C 20555-0001

RE: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Renewed Facility Operating Licenses DPR-67 and NPF-16

Response to Request for Additional Information Regarding License Amendment Request to Allow Performance of Selected Emergency Diesel Generator (EDG) Surveillance Requirements (SRs) During Power Operation

References:

1. Florida Power & Light Company letter, L-2018-161, License Amendment Request to Allow Performance of Selected Emergency Diesel Generator (EDG) Surveillance Requirements (SRs) During Power Operation, December 20, 2018 (ADAMS Accession No. ML18354A901)

2. NRC electronic memorandum, St. Lucie Plant, Unit Nos. 1 and 2, Request for Additional Information Regarding Emergency Diesel Generator Surveillance Requirement Amendment Request (EPID L-2018-LLA-0574), May 31, 2019 (ADAMS Accession No. ML19151A831)

In Reference 1, Florida Power & Light Company (FPL) requested amendments to Renewed Facility Operating Licenses DPR-67 for St. Lucie Nuclear Plant Unit 1 and NPF-16 for St. Lucie Nuclear Plant Unit 2. The proposed license amendments modify the St. Lucie Unit 1 and St. Lucie Unit 2 (St. Lucie) Technical Specifications (TS) by allowing the performance of selected Emergency Diesel Generator (EDG) surveillance requirements (SRs) during power operation and by relocating to licensee control, two EDG SRs that are not necessary to demonstrate operability.

In Reference 2, the NRC requested additional information determined necessary to complete its review. The enclosure to this letter provides FPL's response to the NRC's request for additional information (RAI).

As described in the enclosure, FPL is revising TS changes previously proposed in Reference 1. Attachment 1 to the enclosure provides the St. Lucie Unit 1 TS pages marked up to show the proposed changes. Attachment 2 provides the St. Lucie Unit 2 TS pages marked up to show the proposed changes. The revised St. Lucie Unit 1 and Unit 2 TS marked up pages supersede the corresponding pages provided in Reference 1. No changes are proposed to the TS Bases marked up pages that were provided in Reference 1.

The changes proposed in this RAI response do not expand the scope of the application as originally noticed, and do not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register*.

The St. Lucie Onsite Review Group (ORG) has reviewed the TS changes proposed in this RAI response. In accordance with 10 CPR 50.91(b)(1), a copy of the proposed TS changes is being forwarded to the designee for the State of Florida.

This letter contains no new or revised regulatory commitments.

Should you have any questions regarding this submittal, please contact Mr. Ken Frehafer, St. Lucie Licensing, at (772) 467-7748.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 28, 2019

Sincerely,

Daniel DeBoer
Site Director - St. Lucie Nuclear Plant, Units 1 and 2
Florida Power & Light Company

Enclosure: FPL Response to Request for Additional Information

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, St. Lucie Nuclear Plant, Units 1 and 2
USNRC Senior Resident Inspector, St. Lucie Nuclear Plant, Units 1 and 2
Ms. Cindy Becker, Florida Department of Health

Enclosure

Florida Power & Light Company

Response to Request for Additional Information (RAI)
Regarding St. Lucie Unit 1 and 2 License Amendment Request to
Allow Performance of Selected Emergency Diesel Generator
Surveillance Requirements During Power Operation

In Reference 1, FPL requested a license amendment to modify the St. Lucie Unit 1 and Unit 2 TS by allowing the performance of selected EDG surveillance requirements (SRs) during power operation and by relocating to licensee control, two EDG SRs that are unnecessary to demonstrate operability. In Reference 2, the Electric Engineering Operating Reactors Branch (EEOB) of the Office of Nuclear Reactor Regulation (NRR) submitted a request for additional information (RAI) as indicated below. FPL's response follows:

EEOB-RAI-1

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A of Part 50, General Design Criterion (GDC) 17, "Electric Power Systems," states, in part, that an onsite electric power system and an offsite electric power system be provided to permit 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 shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

The St. Lucie 1 TS Bases 3/4.8 state, in part:

> The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least one of each of the onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. When one diesel generator is inoperable, there is an additional requirement to check that all required systems, subsystems, trains, components and devices (i.e., redundant features) that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. These redundant required features are those that are assumed to function to mitigate an accident, coincident with a loss of offsite power, in the safety analysis, such as the emergency core cooling system and auxiliary feedwater system. Upon discovery of a concurrent inoperability of required redundant features the feature supported by the inoperable EDG is declared inoperable. Thus plant operators will be directed to supported feature TS action requirements for appropriate remedial actions for the inoperable required features.

The St. Lucie 2 TS Bases 3/4.8 contains a similar statement.

The proposed changes in Subsections 2.3.3, 2.3.4, and 2.3.5 of the license amendment request (LAR) add three NOTEs to the several SRs. These NOTEs states, in part,

> *[portions of] the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.*

Section 3.3 of the LAR states

> the proposed change modifies the St. Lucie TS Bases to specify that (1) the assessment must consider the potential outcomes and transients associated with a failed surveillance, a successful surveillance, and a perturbation of the offsite or onsite system when tied together or when operated independently for the surveillance; as well as the operator procedures available to cope with these outcomes, (2) the assessment must be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the surveillance is performed in the normally restricted MODES, and (3) risk insights or deterministic methods may be used for the assessment.

It is not clear what criteria the assessment uses to determine whether the safety of the plant is maintained or enhanced. Please provide a discussion of what assessment will be used and what criteria the assessment would use to determine the safety of the plant is maintained or enhanced.

FPL Response:

In Reference 1, FPL proposed the addition of a NOTE to the subject SRs specifying that the SR can be performed during restricted MODES for the purpose of restoring operability provided an assessment is performed which demonstrates that plant safety will be maintained or enhanced. In such cases, SR performance in the restricted MODE would first require a determination of plant risk in accordance with FPL's Risk Management Program and work activity risk management (WARM) procedures which FPL employs to evaluate, plan and manage plant work activities, including post-maintenance testing. Risk significant activities are those that have the potential to affect personnel, nuclear, radiological safety or environmental regulations, or power generation. Enhanced activity preparation, execution and oversight are required for each risk category on a graded scale.

Additionally, if in MODE 1, an online aggregate risk assessment would be performed each shift in accordance with FPL's online aggregate risk procedures. The online aggregate risk assessment employs the use of the probabilistic safety analysis calculations in support of risk assessments for on-line maintenance activities, a safety train analysis to ensure adequate separation of out-of-service engineered safety features equipment, and consideration for environmental factors such as severe weather and other challenges to grid stability. Based on the online aggregate risk assessment, planned activities are adjusted as necessary to maintain acceptable levels of aggregate risk to the station.

In general, planned work activities, including post-maintenance testing, are evaluated as an integrated schedule prior to performance and the risk profile of those activities is part of the evaluation. The evaluation thereby provides a forward-looking risk-based assessment of planned plant activities which necessitates a reduction in operational impact(s) to acceptable levels (i.e. low-risk whenever feasible) typically weeks in advance and again each shift at the time of activity performance. Moreover, emergent conditions are evaluated as soon as possible after the condition is known and includes consideration for the risk impact of the emergent condition concurrent with planned activities. By procedure, as conditions change during the shift that cause deviation from the scheduled activities, such as unexpected equipment issues, the online aggregate risk determination is re-performed to maintain an accurate risk profile for the most limiting plant condition during the shift. If for example, the non-tested EDG were to become inoperable during EDG testing in a restricted MODE, the aggregate risk would be re-assessed at that time, including consideration for entry into the applicable TS ACTIONs, to determine specific actions to be taken up to and including aborting the testing in-progress.

In all cases, the decision to proceed with any restricted MODE testing is contingent upon an integrated evaluation of the impact on plant risk. Work schedule changes are considered for activities determined medium aggregate risk and above. High aggregate risk (HRA) activities require either work schedule changes to reduce risk or Operations Manager approval along with detailed work packages, resource commitments, enhanced protective measures and other activity controls and contingencies. Activities imposing a risk factor on the operating crew, such as risk mitigation actions, are considered HRA. Such would be the case, for example, when maintaining crew members nearby to assure prompt restoration of an EDG tripped on overcurrent in the unlikely event of a LOOP during testing in a restricted MODE while paralleled to the grid. This would be in addition to the availability of a redundant, operable EDG for the duration of the restricted MODE testing. The process established in plant procedures on work controls and operations procedures ensures that plant conditions are taken into account, that briefings are conducted, and that all parties are apprised of the risk impact(s) and their roles and responsibilities towards successful activity completion prior to and during performance. This includes ensuring that environmental and off-site power (e.g. switchyard) conditions are conducive and that equipment credited for supporting safe operation are protected. The culmination of these requirements is to

perform reviews and evaluations of work schedules before implementation; determine the safety implications for performance; and assess, monitor and maintain acceptable levels of on-line risk. The processes are in compliance with 10 CFR 50.65(a)(4), which requires licensees assess and manage the increase in risk that may result from a proposed maintenance activity prior to activity performance.

Since the proposed NOTE is limited to the restoration of operability, the EDG being tested would be inoperable at the time the SR is being considered for restricted MODE performance and the effect of the inoperability would have been evaluated pursuant to FPL's work activity risk management and online aggregate risk assessment processes. If not completed during planned scheduling, restricted MODE performance (or partial performance) would warrant a repeat of the above applications with risk factors added for SR performance in the restricted MODE. Consistent with the TS Bases changes proposed in Reference 1, the final assessment would consider the potential outcomes and transients associated with a failed surveillance, a successful surveillance, and a perturbation of the offsite or onsite system when tied together or when operated independently; as well as the operator procedures available to cope with these outcomes. Moreover, the assessment would employ risk insights to measure against the avoided risk of a plant shutdown and startup in determining whether plant safety would be maintained or enhanced. Any adverse operational impact(s) would be reduced to levels which assure operational and nuclear safety margins are maintained before proceeding with the restricted MODE testing.

EEOB-RAI-2

Section 3.1 of the LAR states, in part:

In MODES 1 and 2, receipt of a LOOP [loss of offsite power] signal with an EDG operating in parallel with offsite power results in the diesel output breaker not immediately tripping and separating the EDG from off-site power. The closed EDG output breaker blocks the under-voltage protective relays that initiate load shed on the associated emergency bus. As the only source of power for loads connected to the emergency (safety) and normal (non-safety) 4.16 kV busses, the EDG under test will likely trip on over-current protection. Tripping on overcurrent protection generates a lockout signal which causes the EDG to shut down and trip open the output breaker. Once the output breaker opens, the load-shed 4.16 kV [kilovolt] under-voltage protective relays automatically unblock, detect the loss of voltage, separate the emergency bus from the normal supply bus, and isolate the emergency bus by stripping its loads. During this time, the EDG is prevented from starting and the output breaker is prevented from closing and supplying power to the emergency bus. However, within minutes, operators stationed in the vicinity of the EDG would manually reset the lockout relay allowing the EDG to restart, and after reaching nominal frequency and voltage, automatically closing the output breaker. The required safe shutdown loads would then be sequenced onto the emergency bus as designed.

The NRC staff notes that since the main generator/UAT is typically the normal power source for both safety buses, the redundant trains are affected by connecting the EDG of one train to the UAT source. Under this operating mode, an undervoltage condition would not be detected on both ESF buses if the generator trips or a LOOP occurs, until the EDG is tripped on overcurrent (created by the undervoltage condition). It is not clear how ESF buses' undervoltage condition is detected under the above operating mode upon a generator trip or a LOOP occurrence. Please provide a discussion of whether the proposed EDG testing during power operation would cause any time delay or would impact the capability of detecting the ESF buses' undervoltage condition upon a generator trips or a LOOP occurrence.

FPL Response:

In Reference 1, FPL proposed modifying the St. Lucie TS to allow EDG 24-hour endurance testing during power operation for the purpose of satisfying SR 4.8.1.1.2.e.6 [Unit 1] and SR 4.8.1.1.2.e.7 [Unit 2].

It is important to note that the accident response descriptions provided in Reference 1 were relevant to the EDG under test during the 24-hour endurance run. As stated in Reference 1, the EDG under test is considered inoperable for the test duration and as such, no credit is taken for restoration of the tested EDG following an event (e.g. grid perturbation). Moreover, during the period of inoperability (i.e. TS ACTION 3.8.1.1.b) no single failure is postulated to occur. The redundant EDG remains available to respond to any accident or transient for the duration of the tested EDG's 24-hour endurance run.

In EEOB-RAI-2, the NRC staff suggests that paralleling the tested EDG to the "main generator/UAT", would prevent detection of an undervoltage condition on either safety bus until the tested EDG trips on overcurrent. Instead however, each Unit's main generator provides power to the electrical grid via two [trains "A" and "B"] main transformers and power to the auxiliary loads via two [trains "A" and "B"] auxiliary unit transformers (AUTs) when operating in MODE 1. Hence, electrical train independence is maintained within the Unit electrical distribution system such that paralleling the tested EDG to the grid does not affect the protective features (described below) associated with the redundant electrical train.

In the event of a Unit trip, power to the auxiliary sources is automatically and independently transferred from the "A" and "B" AUTs to the Unit's corresponding "A" and "B" start- up transformers (SUTs). To protect the 4.16 kV safety-related (SR) buses from main generator or offsite power fluctuations, each are provided with Class IE Nuclear qualified loss of voltage (LV) and degraded-voltage (DV) protection relays and isolation breakers which are connected to and monitor the 4.16 kV SR buses. Upon detection of an undervoltage, the relays will separate the 4.1.6 kV SR buses from the offsite power source and transfer the buses to the EDGs. The LV and DV relays are 100% independent between the "A" and "B" electrical trains such that protection of the 4.16 kV SR buses is unaffected by upstream interconnections of the AUTs, SUTs, main generator, main transformers, and switchyard. The LV relays actuate in ~1 second in response to a loss of voltage condition whereas the DV relays feature an ~20 second time delay before responding to a degraded-voltage condition. Both relay types respond in sufficient time to prevent damage to plant equipment. A secondary set of DV relays arms within 10 seconds of a degraded voltage condition such that upon a subsequent safety injection actuation signal (SIAS), the 4.16 kV SR buses automatically separate from offsite power. As required by SR 4.3.21.1.1 [Unit 1] and SR 4.3.2.1 [Unit 2], the LV and DV protective relays are subject to channel check, channel calibration and channel functional testing in accordance with the Surveillance Frequency Control Program (SFCP).

As noted in EEOB-RAI-2, when an EDG is paralleled to the grid the protective relaying associated with the electrical train are bypassed. For this reason, the tested EDG is declared inoperable for the duration of time paralleled to the grid. As described above however, the redundant electrical train, including the associated EDG and support systems, remains operable with 100% independence from the tested train such that a degraded or loss of voltage condition on the non-tested SR bus would be detected and the redundant, operable EDG would respond as required. As stated in Reference 1, performing the EDG 24-hour endurance run at power is reasonable since the EDG is electrically configured the same, i.e. paralleled to offsite grid, as during the monthly surveillance test required by SR 4.8.1.1.2.a.5, the only difference being the test duration. As such, the station would remain within its licensing basis in response to any design basis event for the duration of the EDG 24-hour endurance run while at-power.

EEOB-RAI-3

The proposed change removes the simulated signal requirement from SR 4.8.1.1.2.e.3/5/8/9 (Unit 1) and SR 4.8.1.1.2.e.4/6/9/10 (Unit 2) to accommodate the proposed NOTE crediting unplanned events that satisfy the SR. The above SRs currently require simulating a LOOP or a LOOP in conjunction with an Engineered Safety Feature actuation signal. However, it is not clear how the subject SRs will be performed without an unplanned event and simulated signal during their surveillance frequencies. It appears that the subjected SRs will not be performed if there is no actual event during their surveillance frequencies. Please provide a discussion of how the proposed change would ensure that the above SRs are met.

FPL Response:

In Reference 1, FPL proposed removing the simulated signal requirement from SRs 4.8.1.1.2.e.3/4/5/8/9 (Unit 1) and from SRs 4.8.1.1.2.e.4/5/6/9/10 (Unit 2) to accommodate the addition of a NOTE crediting unplanned events that satisfy the SRs. However, to assure the application of simulated signals remains an acceptable method of demonstrating operability, FPL hereby withdraws the request to remove the simulated signal requirement from the subject SRs and proposes instead to employ the phrase "actual or simulated". With this change, the SRs will continue to be performed by introducing simulated LOOP, ESF and LOOP coincident with ESF signals to the EDG actuation logic circuitry, as appropriate. The SRs will be deemed complete for the corresponding surveillance periods upon demonstration of satisfactory EDG performance in response to the simulated signals. In the unlikely event of a valid LOOP, ESF or LOOP coincident with ESF signal, the proposed NOTE in Reference 1 authorizes credit to be taken for completion of the applicable SRs provided satisfactory EDG performance is demonstrated during the event. However, crediting EDG performance during an unplanned event will neither affect performance of the next scheduled surveillance nor the introduction of simulated signals to verify EDG operability during the next scheduled surveillance. The proposed change is consistent with the Combustion Engineering STS (Reference 3) for the subject SRs whereby each specify the phrase "actual or simulated" and each contain the NOTE proposed in Reference 1 allowing credit for unplanned events that satisfy the SR.

To accommodate the addition of the phrase "actual or simulated" to the subject SRs, minor editing was necessary for grammatical correctness. Attachment 1 to this enclosure provides the revised St. Lucie Unit 1 TS marked up pages. Attachment 2 provides the revised St. Lucie Unit 2 TS marked up pages. The revised St. Lucie Unit 1 and St. Lucie Unit 2 TS marked up pages supersede the corresponding pages in Reference 1. The changes proposed in this response do not alter the conclusion in Reference 1 that the proposed change does not involve a significant hazards consideration pursuant to 10 CFR 50.92, and there are no significant environmental impacts associated with the change.

EEOB-RAI-4

Section 3.4.2 of the LAR states, in part, that:

The SR verifies the capability of the EDG fuel oil transfer pumps to transfer fuel oil from either diesel oil fuel storage tank (DOST) to the engine-mounted tanks of each EDG via normally isolated, cross-tie piping connecting the fuel oil transfer trains. The proposed change relocates the SR to licensee control. The SRs derive from RG 1.108, which established the recommendation for stations which rely on switching from one fuel oil system to another in order to satisfy the on-site 7-day (plus margin) fuel oil supply recommended ANSI N195-1976. Each fuel oil transfer pump is sized to supply fuel oil to both EDG sets simultaneously. Seismically qualified, safety-grade cross-tie piping lies between the suction and discharge headers to provide the capability of either pump to supply one EDG from both DOSTs. For St. Lucie Unit 2, TS 3/4.8.1.1 assures each DOST stores sufficient fuel to supply each EDG for 7-days. Hence the testing is unnecessary since reliance on the cross-tie piping is not needed to provide each EDG 7-days of fuel oil. For Unit 1, TS 3/4.8.1.1 assures each DOST stores sufficient fuel to supply either EDG for 7-days. Hence, <u>both DOSTs and the cross-tie piping are relied upon to supply either EDG 7-days of fuel oil</u> [emphasis added]. However, RG 1.108 has since been superseded by RG 1.9 which does not contain a fuel oil cross-connection testing requirement. Moreover, the cross- connection capability is a passive feature and cannot be changed without physical change to the station in accordance with FPL's design control process. Hence, the EDG fuel oil transfer cross-connection testing is unnecessary to demonstrate EDG operability and can be relocated to plant procedural control whereby future changes will be subject to the regulatory controls of 10 CFR 50.59.

The NRC staff notes that:

- The subjected SRs require verification of the capability of the EDG fuel oil transfer pumps to transfer fuel oil from either diesel oil fuel storage tank (DOST) to the engine-mounted tanks of each EDG via cross-tie piping connecting the fuel oil transfer trains. The LAR only addresses the verification of the cross-connection capability and does not address the verification of the EDG fuel oil transfer pumps capability.

- Based on the LAR, Unit 2 the cross-tie piping is not needed to provide each EDG 7-days of fuel oil. Therefore, the proposed change appears to be reasonable. However, both DOSTs and the cross-tie piping of Unit 1 are relied upon to supply either EDG 7-days of fuel oil. Therefore, verifying the capability of the EDG fuel oil transfer pumps and the cross-tie piping is needed to support the verification of the Unit 1 EDGs' operability.

Please provide a discussion demonstrating how the capability of the Unit 1 fuel oil transfer pumps and the cross-tie piping is verified to support the operability verification of the Unit 1 EDGs.

FPL Response:

In Reference 1, FPL proposed relocation of SR 4.8.1.1.2.e.10 [Unit 1] and SR 4.8.1.1.2.e.11 [Unit 2] to licensee control whereby future changes would be subject to 10 CFR 50.59. As stated in Reference 1, the basis for the proposed change is that the SRs are unnecessary to demonstrate EDG operability.

Regarding Unit 1, FPL concurs that both DOSTs and the associated fuel transfer cross-connection piping are necessary to assure the availability of a 7-day supply of diesel fuel to either EDG. The availability of a 7-day supply and the capability to transfer fuel from the DOST to the associated EDG day tank satisfy 10 CFR 50.36(c)(2)(ii), Criterion 3, as part of the primary success path for design basis accident or transient mitigation. However, the cross-connection piping is a passive design feature, verified during pre-operational and post-maintenance testing, that cannot adversely impact safety analysis assumptions without physical change to the system in accordance with FPL's design control program.

St. Lucie Unit 1 TS 3.8.1.1 requires that each EDG is provided with a separate fuel storage system containing a minimum of 19,000 gallons of fuel and a separate fuel transfer pump. When aligned to its normal fuel transfer train, the capacity of either DOST allows for re-alignment to the redundant fuel transfer train well before tank depletion (~3-1/2 days). The storage tank separation is required only to satisfy TS 3.8.1.1 and by design, extend to the auxiliary systems the GDC 17 concept of independence between standby power distribution systems to preclude passive and common mode electrical failures. However, the availability of a 7-day fuel supply is assured by the combined onsite capacity of the DOSTs and the considerable post-accident time available to re-align the non-depleted DOST.

The cross connection piping is isolated upstream and downstream of the fuel transfer pumps by locked closed manual valves. SR 4.8.1.1.2.e.10 [Unit 1] requires manipulating the valves fully open and then closed with little benefit other than to verify flow from the transfer pump to the opposite train's day tank via the few feet of additional cross-connection piping added to the transfer pump's normal flow path. As stated in Reference 1, each transfer pump is sized to supply fuel to both EDG sets simultaneously. Hence, flow to the opposite train is well within the pumps' capacity and any deterioration in performance would be detected during the normal alignment testing that satisfies SR 4.8.1.1.2.a.3. The existing SR 4.8.1.1.2.e.10 which demonstrates the capability to supply fuel oil from the opposite train storage tank is considered redundant because the active component (transfer pump) is already adequately tested.

As such, FPL believes that SR 4.8.1.1.2.e.1 0 [Unit 1] is unnecessary to demonstrate EDG operability and proposes instead relocation of the SR to licensee control whereby the performance aspects of the cross-connection piping and components can be evaluated for a maintenance plan which more closely aligns with the system's quality and safety implications.

References:

1. Florida Power & Light Company Letter L-2018-161, License Amendment Request to Allow Performance of Selected Emergency Diesel Generator (EDG) Surveillance Requirements (SRs) During Power Operation, December 20, 2018 (ADAMS Accession No. ML18354A901)

2. NRC Electronic Memorandum, St. Lucie Plant, Unit Nos. 1 and 2, Request for Additional Information Regarding Emergency Diesel Generator Surveillance Requirement Amendment Request (EPID L-2018-LLA-0574), May 31, 2019 (ADAMS Accession No. ML19151A831)

3. NUREG-1432, Standard Technical Specifications - Combustion Engineering Plants, Revision 4.0, Volume 1, Specifications (ADAMS Accession No. ML 12102A165)

Attachment 1

ST. LUCIE UNIT 1
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

(4 pages follow)

Attachment 1

ST. LUCIE UNIT 1
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

c. Verify fuel oil properties of new and stored fuel oil are tested in accordance with, and maintained within the limits of the Diesel Fuel Oil Testing Program.

d. DELETED

e. In accordance with the Surveillance Frequency Control Program ~~during shutdown~~ by:

1. DELETED

2. Verifying generator capability to reject the single largest post-accident load ~~a load of greater than or equal to 600 hp~~ while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz.

3. ~~Simulating a~~ Verifying that upon an actual or simulated loss of offsite power by itself, ~~and~~:

a) ~~Verifying de~~energization of the emergency busses and load shedding from the emergency busses.

INSERT A

INSERT B1

D

signal

Attachment 1

ST. LUCIE UNIT 1
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

b) T ~~Verifying the~~ diesel starts on the auto-start signal****, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 210 volts and 60 ± 0.6 Hz during this test.

4. Verifying that ~~on an~~ ESF actuation ~~test~~ signal (without loss-of-offsite power) the diesel generator starts**** on the auto-start signal, and: ← upon an actual or simulated

INSERT B1

a) Within 10 seconds, generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 1.2 Hz.

b) Operates on standby for greater than or equal to 5 minutes.

c) Steady-state generator voltage and frequency shall be 4160 ± 210 volts and 60 ± 0.6 Hz and shall be maintained throughout this test.

5. ~~Simulating a~~ loss-of-offsite power in conjunction with an ESF actuation ~~test~~ signal, ~~and~~ ← Add colon (:) ← Verifying that upon an actual or simulated

INSERT B1

a) D ~~Verifying de~~energization of the emergency busses and load shedding from the emergency busses.

b) T ~~Verifying the~~ diesel starts on the auto-start signal****, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through the auto-sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 210 volts and 60 ± 0.6 Hz during this test.

c) A ~~Verifying that all~~ automatic diesel generator trips, except engine overspeed and generator differential, are automatically bypassed upon loss of voltage on the emergency bus concurrent with a safety injection signal.

**** This test may be conducted in accordance with the manufacturer's recommendations concerning engine prelube period.

Attachment 1

ST. LUCIE UNIT 1
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

6. Verifying the diesel generator operates for at least 24 hours****. During the first 2 hours of this test, the diesel generator shall be loaded within a load band of 3800 to 3960 kW# and during the remaining 22 hours of this test, the diesel generator shall be loaded within a load band of 3300 to 3500 kW#. The generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test.

INSERT A

Add "DELETED"

7. ~~Verifying that the auto-connected loads do not exceed the 2000-hour rating of 3730 kW.~~

8. Verifying the diesel generator's capability to:

INSERT C

a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon ~~a simulated~~ restoration of offsite power.

actual or simulated

b) Transfer its load to the offsite power source, and

c) Be restored to its standby status.

an actual or

9. Verifying that with the diesel generator operating in a test mode (connected to its bus), ~~a~~ simulated safety injection signal overrides the test mode by (1) returning the diesel generator to standby operation and (2) automatically energizes the emergency loads with offsite power.

INSERT B1

10. ~~Verifying that the fuel transfer pump transfers fuel from each fuel storage tank to the engine-mounted tanks of each diesel via the installed cross-connection lines.~~

Add "Deleted"

11. Verifying that the automatic load sequence timers are operable with the interval between each load block within ± 1 second of its design interval.

INSERT B2

f. In accordance with the Surveillance Frequency Control Program or after any modification which could affect diesel generator independence by starting**** the diesel generators simultaneously, during shutdown, and verifying that the diesel generators accelerate to approximately 900 rpm in less than or equal to 10 seconds.

\# This band is meant as guidance to avoid routine overloading of the engine. Variations in load in excess of this band due to changing bus loads shall not invalidate this test.

**** This test may be conducted in accordance with the manufacturer's recommendations concerning engine prelube period.

Attachment 1

ST. LUCIE UNIT 1
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

INSERT A

---------- NOTE ----------
Credit may be taken for unplanned events that satisfy this SR.

INSERT B1

---------- NOTE ----------
This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines that the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR.

INSERT B2

---------- NOTE ----------
This Surveillance shall not normally be performed in MODE 1 or 2. However, the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines that the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR.

INSERT C

---------- NOTE ----------
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Attachment 2

ST. LUCIE UNIT 2
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

(5 pages follow)

Attachment 2

ST. LUCIE UNIT 2
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (continued)

c. Verify fuel oil properties of new and stored fuel oil are tested in accordance with, and maintained within the limits of the Diesel Fuel Oil Testing Program.

d. DELETED

e. In accordance with the Surveillance Frequency Control Program ~~during shutdown~~ by:

1. DELETED

2. Verifying generator capability to reject ~~a load of greater than or equal to 453 kW~~ the single largest post-accident load while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz.

3. Verifying the generator capability to reject a load of 3685 kW without tripping. The generator voltage shall not exceed 4784 volts during and following the load rejection.

INSERT A

INSERT A

Attachment 2

ST. LUCIE UNIT 2
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4. ~~Simulating a~~ Verifying that upon an actual or simulated loss-of-offsite power by itself, ~~and~~:
   INSERT B1
   a. ~~Verifying~~ De energization of the emergency busses and load shedding from the emergency busses.
   b. ~~Verifying~~ The diesel starts on the auto-start signal,**** energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 210 volts and 60 ± 0.6 Hz during this test.
5. Verifying that ~~on~~ upon an ESF actuation ~~test~~ actual or simulated signal (without loss-of-offsite power) the diesel generator starts**** on the auto-start signal, and:
   INSERT B1
   a) Within 10 seconds, generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 1.2 Hz.
   b) Operates on standby for greater than or equal to 5 minutes.
   c) Steady-state generator voltage and frequency shall be 4160 ± 210 volts and 60 ± 0.6 Hz and shall be maintained throughout this test.
6. ~~Simulating a~~ Verifying that upon an actual or simulated loss-of-offsite power in conjunction with an ESF actuation ~~test~~ signal, ~~and~~ Add colon (:)
   INSERT B1
   a) ~~Verifying~~ De energization of the emergency busses and load shedding from the emergency busses.
   b) ~~Verifying~~ The diesel starts on the auto-start signal,**** energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 210 volts and 60 ± 0.6 Hz during this test.

**** This test may be conducted in accordance with the manufacturer's recommendations concerning engine prelube period.

Attachment 2

ST. LUCIE UNIT 2
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

c) Verifying that all automatic diesel generator trips, except engine overspeed and generator differential, are automatically bypassed upon loss of voltage on the emergency bus concurrent with a safety injection actuation signal.

7. Verifying the diesel generator operates for at least 24 hours.**** During the first 2 hours of this test, the diesel generator shall be loaded within a load band of 3800 to 3985 kW# and during the remaining 22 hours of this test, the diesel generator shall be loaded within a load band of 3450 to 3685 kW#. The generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test.

INSERT A

Add "DELETED"

8. ~~Verifying that the auto-connected loads to each diesel generator do not exceed the 2000-hour rating of 3935 kW.~~

9. Verifying the diesel generator's capability to:

INSERT C

a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon ~~a simulated~~ restoration of offsite power.

actual or simulated

b) Transfer its load to the offsite power source, and

c) Be restored to its standby status.

10. Verifying that, with the diesel generator operating in a test mode (connected to its bus), an actual or ~~a~~ simulated safety injection signal overrides the test mode by (1) returning the diesel generator to standby operation and (2) automatically energizes the emergency loads with offsite power.

INSERT B1

11. ~~Verifying that the fuel transfer pump transfers fuel from each fuel storage tank to the engine-mounted tanks of each diesel via the installed cross-connection lines.~~

Add "Deleted"

This band is meant as guidance to avoid routine overloading of the engine. Variations in load in excess of this band due to changing bus loads shall not invalidate this test.

**** This test may be conducted in accordance with the manufacturer's recommendations concerning engine prelube period.

Attachment 2

ST. LUCIE UNIT 2
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

INSERT B2

12. Verifying that the automatic load sequence timers are operable with the interval between each load block within ±1 second of its design interval.

13. Performing Surveillance Requirement 4.8.1.1.2a.4 within 5 minutes of shutting down the diesel generator after it has operated within a load band of 3450 kW to 3685 kW# for at least 2 hours or until operating temperatures have stabilized.

f. In accordance with the Surveillance Frequency Control Program or after any modifications which could affect diesel generator interdependence by starting**** the diesel generators simultaneously, during shutdown, and verifying that the diesel generators accelerate to approximately 900 rpm in less than or equal to 10 seconds.

g. In accordance with the Surveillance Frequency Control Program by performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code in accordance with the Inservice Inspection Program.

4.8.1.1.3 Reports – (Not Used).

4.8.1.1.4 The Class 1E underground cable system shall be demonstrated OPERABLE within 30 days after the movement of any loads in excess of 80% of the ground surface design basis load over the cable ducts by pulling a mandrel with a diameter of at least 80% of the duct's inside diameter through a duct exposed to the maximum loading (duct nearest the ground's surface) and verifying that the duct has not been damaged.

This band is meant as guidance to avoid routine overloading of the engine. Variations in load in excess of this band due to changing bus loads shall not invalidate this test.

**** This test may be conducted in accordance with the manufacturer's recommendations concerning engine prelube period.

Attachment 2

ST. LUCIE UNIT 2
PROPOSED TECHNICAL SPECIFICATIONS PAGE (MARKUP)

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