

RS-10-090

10 CFR 50.90

May 13, 2010

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

LaSalle County Station, Units 1 and 2
Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

Subject: Additional Information Supporting Request for License Amendment Regarding
Measurement Uncertainty Recapture Power Uprate

- References:
1. Letter from M. D. Jesse (Exelon Generation Company, LLC) to U. S. NRC, "Request for License Amendment Regarding Measurement Uncertainty Recapture Power Uprate," dated January 27, 2010
 2. Letter from C. S. Goodwin (U. S. NRC) to J. A. Bauer (Exelon Generation Company, LLC), "LaSalle County Station, Units 1 and 2 – Request for Additional Information Related to Request for License Amendment Regarding Measurement Uncertainty Recapture Power Uprate," dated April 22, 2010

In Reference 1, Exelon Generation Company, LLC (EGC) requested an amendment to Facility Operating License Nos. NPF-11 and NPF-18 for LaSalle County Station (LSCS), Units 1 and 2, respectively. Specifically, the proposed changes revise the Operating License and Technical Specifications to implement an increase in rated thermal power of approximately 1.65%. In Reference 2, the NRC requested additional information to support review of the proposed changes. In response to this request, EGC is providing the attached information.

In addition, EGC is providing a correction to the information provided in Reference 1. The "2010 Power Grid Voltage Analysis for LaSalle Generating Station (Post MUR Power Uprate)," dated August 2009, was submitted as part of Attachment 12 to Reference 1. A revised report correcting the assumed scheduled voltage is being provided in Attachment 2, "2010 Power Grid Voltage Analysis for LaSalle Generating Station with MUR Power Uprate," dated May 2010. The revision does not affect the conclusions of the report.

EGC has reviewed the information supporting a finding of no significant hazards consideration, and the environmental consideration provided to the NRC in Reference 1. The additional information provided in this submittal and the revised power grid voltage analysis do not affect the bases for concluding that the proposed license amendment does not involve a significant

hazards consideration. In addition, the information provided in this submittal does not affect the bases for concluding that neither an environmental impact statement nor an environmental assessment needs to be prepared in connection with the proposed amendment.

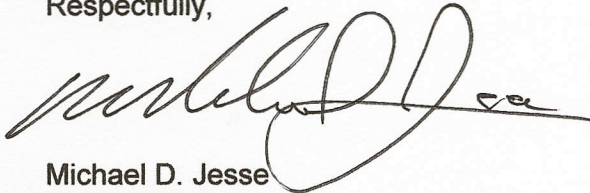
In accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," paragraph (d)(1), EGC requests withholding of Attachment 2 as it contains critical energy infrastructure information related to the Commonwealth Edison power grid.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this letter, please contact Mr. Joseph A. Bauer at (630) 657-3376.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 13th day of May 2010.

Respectfully,

A handwritten signature in black ink, appearing to read 'Michael D. Jesse', with a stylized flourish at the end.

Michael D. Jesse
Manager, Licensing - Power Uprate

Attachments: 1. Response to Request for Additional Information
2. Revised Power Grid Voltage Analysis for LaSalle Generating Station with MUR Power Uprate, May 2010

cc: NRC Regional Administrator, Region III
NRC Senior Resident Inspector – LaSalle County Station
Illinois Emergency Management Agency – Division of Nuclear Safety

ATTACHMENT 1
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

ELECTRICAL ENGINEERING BRANCH

NRC Request 1

The licensee states in Attachment 6, Section 1.1 of the license amendment request (LAR) that the power uprate will result in an increase in electrical power from 1190 MWe to 1223 MWe (33 MWe increase). Also, Table 6-1 states that the generator output is 1170 MWe. In addition, Section 1.1 of the Updated Final Safety Analysis Report states that the gross electric output of each unit is 1183 MWe and the net output is 1154 MWe. Furthermore, the licensee states in Attachment 12, Section 1 of the LAR that the proposed modifications at LaSalle consist of an output increase of 20 MW. Discuss the contradictory information presented and provide the existing and uprated power level in MW(e).

Response

The various power levels cited are based on different assumptions regarding core thermal power, condenser backpressures, secondary plant cycle isolation (i.e., thermal efficiency), and main generator reactive load. Section 1.1 of the LAR provided the current maximum generator gross output of 1190 MWe, which is based on current licensed thermal power, current secondary plant cycle isolation, condenser backpressure associated with winter temperatures, and low reactive loading. The value of 1223 MWe for the uprated output is based on a bounding licensed thermal power (i.e., 102% of current licensed thermal power (CLTP)), ideal secondary plant cycle isolation, condenser backpressure associated with winter temperatures, and low reactive loading. The described output increase of 20 MWe noted in Attachment 12 of the LAR is based on the expected increase due to the proposed power uprate. An additional electrical power output of up to approximately 13 MWe (for a total of 33 MWe) could be gained by improving cycle efficiency, but these efficiency gains are unrelated to the proposed uprate. The bases for the values cited above are provided in Table 1 below.

Table 1: Generator Output Values

Power Level (MWe)	% CLTP	Core Power (MW_t)	Basis
1170			This is the equipment rating of the existing 1300.3 MVA generator operating at .90 PF. This value is a point on the generator capability curve which is used to describe the generator rating. This rating is independent of core power.
1190	100%	3489	Winter, benchmark with existing cycle isolation.
1223	102%	3559	Winter, 100% cycle isolation.
1183	100%	3489	Based on a GEH Thermal Kit evaluation at a conservative condenser backpressure.
1154	100%	3489	The net electric output, as described in the UFSAR, was determined in a study for the 1183 MWe above. This is the net power being injected into the grid after considering the load requirements for the station's auxiliary power system.

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NRC Request 2

Provide a detailed comparison of existing ratings with uprated ratings and the effect of the power uprate on the following equipment:

- a. Isophase bus
- b. Class 1E buses
- c. Emergency diesel generator
- d. Class 1E batteries, chargers and inverters

Response

a. Isophase Bus

The MVA rating of the generator will not change as a result of the Thermal Power Optimization (TPO) uprate, the existing rating of the isophase bus duct is acceptable for uprated conditions. The isophase bus duct ratings are summarized in Table 2 below.

Table 2: Summary of Isophase Bus Duct Operating Ratings

Description	Self Cooled Rating (amps)	Forced Air Cooling Rating (amps)	Maximum predicted current at uprated conditions (amps)	Current vs. Rating	Existing Rating Acceptable for Uprate Conditions
Rating	17,750	32,000	31,609	98.8%	Yes

b. Class 1E Buses

As noted below in Table 3, the Class 1E bus design loading under TPO uprate conditions remains unchanged from CLTP conditions. The design loading reflects the current modeling of the buses using conservative loads. No change is required to the design bus loading for TPO conditions because the actual bus loads remain below the design loads. As noted in Table 3, the Heater Drain Pumps (HDPs) are the only components on the safety-related buses (i.e., 141Y, 241Y, 142Y and 242Y) for which the actual loading will increase under TPO uprate conditions. Note that buses 143 and 243 are unaffected by TPO. Power to the HDPs is supplied from non-Class 1E buses that are normally aligned and fed from the Class 1E buses. Total Class 1E bus loading at TPO conditions remains within the existing (i.e., CLTP) design load and the bus rating.

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Table 3: Loading of the Class 1E ESF Divisions 1, 2 and 3 Buses Under TPO Conditions

Bus Number	Bus Rating (Amps)	Bus Design Load (Amps) ¹	TPO Load Increase (Amps) ²
<u>Division 1</u>			
141Y	3000	2090.7	7.48
241Y	3000	1934.6	7.48
<u>2</u>			
142Y	3000	1536.4	7.48
242Y	3000	1364.7	7.48
<u>Division 3</u>			
143	1200	411.5	0
243	1200	413	0

Note 1: The bus design load is unchanged for TPO conditions. This is based on using conservative loads for the components. These values do not change for TPO conditions.

Note 2: The small increase in actual loading (i.e., 7.48 amps) due to the HDP motor duty increase remains within the HDP design load. Therefore the bus design loading remains unchanged.

c. Emergency Diesel Generator (EDG)

As shown in Table 4, EDG loading does not change for TPO conditions, because the accident analyses involving the EDG are performed at power levels that bound the TPO conditions.

Table 4: Loading of the Emergency Diesel Generators

	CLTP EDG Demand (kW)	TPO EDG Demand (kW)	Generator Continuous rating, kW	Generator 2000-hour rating, kW
D/G 0: U1, Div 1	2599.1	2599.1	2600	2860
D/G 1A: U1, Div 2	2491	2491	2600	2860
D/G 1B: U1, Div 3	2592	2592	2600	2860
D/G 0: U2, Div 1	2597.7	2597.7	2600	2860
D/G 2A: U2, Div 2	2434	2434	2600	2860
D/G 2B: U2, Div 3	2593	2593	2600	2860

d. Class 1E Batteries, Chargers and Inverters

The ampere-hour ratings and remaining capacity for the Class 1E batteries for both station blackout (SBO) and loss of coolant accident (LOCA) are presented in Table 5. The loads on the Class 1E batteries do not change for TPO. Thus, the remaining capacity is unaffected. The ratings and continuous loads on the Class 1E battery chargers are presented in Table 6. The loads do not change for TPO conditions. There are no Class 1E inverters.

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Table 5: Class 1E Batteries

Class 1E Battery	Ampere Hour Rating (8 hour rating; 1.81 End Voltage @ 77 °F)	SBO		LOCA	
		CLTP Battery Capacity Remaining (%)	TPO Battery Capacity Remaining (%)	CLTP Battery Capacity Remaining (%)	TPO Battery Capacity Remaining (%)
U1 125 VDC Battery Div 1 1DC07E	1,128 Ah	7.9 %	7.9 %	10.4 %	10.4 %
U1 125 VDC Battery Div 2 1DC14E	1,128 Ah	20.9 %	20.9 %	9.0 %	9.0 %
U1 125 VDC Battery Div 3 1DC18E	308 Ah	15.1 %	15.1 %	15.1 %	15.1 %
U1 250 VDC Battery 1DC01E	1,832 Ah	10.3 %	10.3 %	4.3 %	4.3 %
U2 125 VDC Battery Div 1 2DC07E	1,128 Ah	8.9 %	8.9 %	10.5 %	10.5 %
U2 125 VDC Battery Div 2 2DC14E	1,128 Ah	19.8 %	19.8 %	7.7 %	7.7 %
U2 125 VDC Battery Div 3 2DC18E	308 Ah	15.0 %	15.0 %	15.0 %	15.0 %
U2 250 VDC Battery 2DC01E	1,832 Ah	11.2 %	11.2 %	5.5 %	5.5 %

Table 6: Class 1E Battery Chargers

Class 1E Battery Chargers	Battery Charger Amp Rating	CLTP Continuous DC Load Amps	TPO Continuous DC Load Amps
U1 1DC09E Main Battery Charger Div 1 1DC07E	200 Amps	92.58 Amps	92.58 Amps
U1 1DC23E Back-up Battery Charger Div 1 1DC07E	200 Amps	92.58 Amps	92.58 Amps
U1 1DC17E Main Battery Charger Div 2 1DC14E	200 Amps	65.65 Amps	65.65 Amps
U1 1DC16E Back-up Battery Charger Div 2 1DC14E	200 Amps	65.65 Amps	65.65 Amps
U2 2DC09E Main Battery Charger Div 1 2DC07E	200 Amps	74.89 Amps	74.89 Amps
U2 2DC23E Back-up Battery Charger Div 2 2DC07E	200 Amps	74.89 Amps	74.89 Amps
U2 2DC17E Main Battery Charger Div 2 2DC14E	200 Amps	58.34 Amps	58.34 Amps
U2 2DC16E Back-up Battery Charger Div 2 2DC14E	200 Amps	58.34 Amps	58.34 Amps
U1 1DC19E Main Battery Charger Div 3 1DC18E	50 Amps	5.0 Amps	5.0 Amps
U2 2DC19E Back-up Battery Charger Div 3 2DC18E	50 Amps	5.0 Amps	5.0 Amps
U1 1DC03E Main Battery Charger 250 VDC 1DC01E	200 Amps	28.4 Amps	28.4 Amps
U2 2DC03E Main Battery Charger 250 VDC 2DC01E	200 Amps	28.4 Amps	28.4 Amps

NRC Request 3

For the current uprate, please address and discuss the following:

- a. Quantity and nature of mega volt ampere reactive (MVAR) support necessary to maintain post-trip loads and minimum voltage levels. Address the effects of the power uprate on MVAR support.
- b. How the power uprate changes the MVAR contributions credited by the Transmission System Operator (TSO).

Response

- a. Exelon Nuclear requested ComEd Transmission and Planning to perform an assessment of the preferred power supply system (i.e., the grid) to determine if the capacity and capability of the grid is consistent with the design and licensing basis for LaSalle Generating Station.

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This assessment was presented in Attachment 12 to Reference 1 and revised in Attachment 2 to this submittal. For operations following the TPO uprate implementation, the results of the study show a robust local grid with substantial margin to maintain grid and station bus voltage following a trip of one LSCS unit. The adequacy of the grid is determined by verification of the transmission system's capability to maintain the design basis minimum switchyard voltage of 352kV. The following information, summarized in Table 7, regarding the Unit's generator MVAR capability was provided to ComEd.

Table 7: Generator MVAR Capability

Loading Condition	Unit 1	Unit 2
Current Expected Full Load Main Generator Output	1205.8 MW 486.6 MVAR 1300.3 MVA	1205.8 MW 486.6 MVAR 1300.3 MVA
Expected Full Load Main Generator Output following TPO Uprate	1225.8 MW ¹ 433.8 MVAR 1300.3 MVA	1225.8 MW ¹ 433.8 MVAR 1300.3 MVA

Note 1: 1225.8 MW generator output is derived from adding 20 MW to 1205.8 MW which is taken from the General Electric "105% Core Thermal Power Uprate Thermal Kit," for LSCS. This is conservative for the grid study.

The results of the study show that the worst case switchyard voltage remains above the design basis minimum switchyard voltage of 352 kV, as noted in Reference 1, Attachment 1, Section 3.4.5, "Grid Studies."

- b. As shown in Table 7, the generator MVAR capability decreased from 486.6 MVARs (pre-TPO) to 433.8 MVARs (post-TPO). This change in MVAR contribution will be credited by the TSO following the power uprate.

NRC Request 4

Provide a summary of the evaluations and the accident profiles performed to confirm the validity of the environmental qualification of electrical equipment, post power uprate.

Response

The safety-related electrical equipment was reviewed to ensure that the existing qualification for the normal and accident conditions expected in the area where the devices are located remain adequate. Conservatisms in the equipment qualifications were originally applied to the environmental parameters at CLTP conditions. Electrical equipment, both inside and outside of containment, was reviewed. No changes to the electrical equipment are needed due to the TPO uprate as described below.

Inside Containment

The current temperature, pressure, humidity and radiation conditions applied to electrical equipment inside containment are based on the results of accident analyses and associated profiles initiated from $\geq 102\%$ of CLTP. Therefore, the current environmental evaluations bound

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the TPO uprate conditions. This is discussed in Reference 1, Attachment 6, “NEDC-33485P, ‘Safety Analysis Report for LaSalle County Station, Units 1 and 2 Thermal Power Optimization,’” Section 10.3.1.1, “Inside Containment.”

Outside Containment

The evaluation of electrical equipment outside containment is addressed in Reference 1, Attachment 6, Section 10.3.1.2, “Outside Containment.” This included the main steam line break and the feedwater (FW) line rupture.

As part of this evaluation, the expected operating conditions in the main steam system outside of containment are calculated in the PEPSE™ model. As a result of a constant pressure power uprate, the main steam pressure upstream of the turbine throttle valve is slightly reduced. This is due to an increase in differential pressure resulting from higher steam flow velocity. Main steam temperature is not expected to change, as the calculated steam enthalpy remains constant with TPO conditions. The summary of operating changes from CLTP to TPO conditions is shown in Tables 8 and 9. Since temperature remains unchanged and pressure decreases with the TPO uprate, the existing HELB analysis and associated accident profile for the main steam line break is bounding for uprated conditions.

Table 8: Main Steam Operating Conditions Unit 1

	Dome Pressure (psia)	Main Steam Header Pressure (psia)	Main Steam Enthalpy (btu/lbm)
CLTP	1015.8	980.2	1192.3
TPO	1015.8	978.5	1192.3

Table 9: Main Steam Operating Conditions Unit 2

	Dome Pressure (psia)	Main Steam Header Pressure (psia)	Main Steam Enthalpy (btu/lbm)
CLTP	1016.2	980.6	1192.2
TPO	1016.2	978.9	1192.2

The effects of a FW line break on the turbine building ventilation system were also evaluated. Current and uprated FW operating conditions are presented in Table 10 below. Temperatures are taken from the Unit 2 PEPSE heat balances while pressures are taken from supporting analysis for Reference 1, Attachment 6. The FW piping rupture analysis is performed at a design pressure of 1,165 psia outside containment, and a FW temperature of 426.5°F, which was used in the previous stretch power uprate (SPU) HELB and MELB analyses.

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Table 10: Final Feedwater Temperature and Pressures

	Final Feedwater Temperature (°F)	Final Feedwater Pressure Outside Containment (psia)	Design Pressure Outside Containment (psia)	Final Feedwater Pressure Inside Containment (psia)	Design Pressure Inside Containment (psia)
CLTP	423	1,117.1	1,165.0	1046.8	1,075.0
TPO	425	1,121.9	1,165.0	1047.2	1,075.0

The increase in FW temperature and pressure do not impact the FW line rupture analysis because the steady state forces are based on the design temperature and pressure.

CORRECTION TO PREVIOUSLY SUBMITTED INFORMATION

The “2010 Power Grid Voltage Analysis for LaSalle Generating Station (Post MUR Power Uprate),” dated August 2009, was submitted to the NRC as part of Attachment 12 in Reference 1. A revision to this report incorporating a correction to the assumed scheduled voltage is provided in Attachment 2 to this letter, “Power Grid Voltage Analysis for LaSalle Generating Station with MUR Power Uprate,” dated May 2010.

The grid voltage analysis submitted in Reference 1, Attachment 12 was based on LaSalle County Station (LSCS) regulating the 345kV bus to a scheduled voltage of 362kV. However, in accordance with the current System Planning Operating Guide, the LSCS 345 kV bus is regulated to 359 kV (± 3 kV). Therefore, the grid voltage analysis was re-performed to reflect the current Operating Guide and is presented in the revised report in Attachment 2 to this document.

The results of the study show that the worst case voltage remains above the design basis minimum switchyard voltage of 352 kV, as noted in Reference 1, Attachment 1, Section 3.4.5, “Grid Studies.”

REFERENCES

1. Letter from M. D. Jesse (Exelon Generation Company, LLC) to U. S. NRC, "Request for License Amendment Regarding Measurement Uncertainty Recapture Power Uprate," dated January 27, 2010
2. Letter from C. S. Goodwin (U. S. NRC) to J. A. Bauer (Exelon Generation Company, LLC), "LaSalle County Station, Units 1 and 2 – Request for Additional Information Related to Request for License Amendment Regarding Measurement Uncertainty Recapture Power Uprate," dated April 22, 2010