



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

April 11, 2000

Mr. Oliver D. Kingsley, President  
Nuclear Generation Group  
Commonwealth Edison Company  
Executive Towers West III  
1400 Opus Place, Suite 500  
Downers Grove, IL 60515

SUBJECT: LASALLE - ISSUANCE OF AMENDMENTS REGARDING UPDATED FINAL  
SAFETY ANALYSIS REPORT (TAC NOS. MA4704 AND MA4705 )

Dear Mr. Kingsley:

The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment No. 139 to Facility Operating License No. NPF-11 and Amendment No. 124 to Facility Operating License No. NPF-18 for the LaSalle County Station, Units 1 and 2, respectively.

Your application for license amendments dated May 5, 1999, as supplemented on October 8, 1999, seeking to revise your Updated Final Safety Analysis Report (UFSAR), presented an unreviewed safety question concerning the methodology and acceptance criteria for masonry walls subjected to transient high energy line break pressurization loads. The staff has completed its review and has found your proposal acceptable.

These amendments were necessitated by the requirements of 10 CFR 50.59(c) because the review by Commonwealth Edison Company identified the changes as an unreviewed safety question. No changes to the Technical Specifications are required by these amendments.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Donna M. Skay, Project Manager, Section 2  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-373, 50-374

Enclosures: 1. Amendment No. 139 to NPF-11  
2. Amendment No. 124 to NPF-18  
3. Safety Evaluation

cc w/encls: See next page

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Units 1 and 2

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- 2 -

LaSalle County Station  
Units 1 and 2

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

COMMONWEALTH EDISON COMPANY

DOCKET NO. 50-373

LASALLE COUNTY STATION, UNIT 1

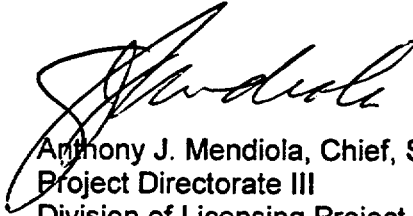
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 139  
License No. NPF-11

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by the Commonwealth Edison Company (the licensee), dated May 5, 1999, as supplemented on October 8, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended to authorize revision of the Updated Final Safety Analysis Report (UFSAR) as set forth in the application for amendment by Commonwealth Edison Company dated May 5, 1999, as supplemented October 8, 1999. Commonwealth Edison Company shall update the UFSAR to reflect the revised description authorized by this amendment in accordance with 10 CFR 50.71(e).

3. This license amendment is effective as of the date of its issuance and shall be implemented during the next scheduled Final Safety Analysis Report update.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'A. Mendiola', is written over the typed name and title.

Anthony J. Mendiola, Chief, Section 2  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Date of Issuance: April 11, 2000



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

COMMONWEALTH EDISON COMPANY

DOCKET NO. 50-374

LASALLE COUNTY STATION, UNIT 2

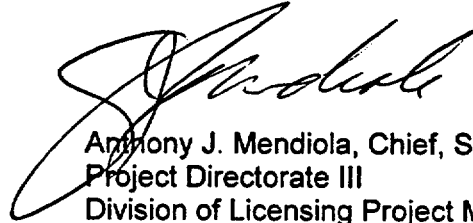
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 124  
License No. NPF-18

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by the Commonwealth Edison Company (the licensee), dated May 5, 1999, as supplemented on October 8, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended to authorize revision of the Updated Final Safety Analysis Report (UFSAR) as set forth in the application for amendment by Commonwealth Edison Company dated May 5, 1999, as supplemented October 8, 1999. Commonwealth Edison Company shall update the UFSAR to reflect the revised description authorized by this amendment in accordance with 10 CFR 50.71(e).

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FOR THE NUCLEAR REGULATORY COMMISSION



Anthony J. Mendiola, Chief, Section 2  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Date of Issuance: April 11, 2000





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 139 TO FACILITY OPERATING LICENSE NO. NPF-11  
AND AMENDMENT NO. 124 TO FACILITY OPERATING LICENSE NO. NPF-18  
COMMONWEALTH EDISON COMPANY  
LASALLE COUNTY STATION, UNITS 1 AND 2  
DOCKET NOS. 50-373 AND 50-374

1.0 INTRODUCTION

By letter dated May 5, 1999, as supplemented on October 8, 1999, Commonwealth Edison Company (ComEd, the licensee) requested NRC approval of a license amendment for LaSalle, Units 1 and 2, to permit the use of a methodology that differs from the licensing basis requirements for the reassessment of certain masonry walls subject to transient high energy line break pressurization loads. The October 8, 1999, submittal provided additional clarifying information that did not change the initial proposed no significant hazards consideration determination. In the original design at LaSalle, the masonry walls in the area adjacent to the main steam tunnel (MST) were considered protected from over-pressurization caused by a main steamline break (MSLB) by the use of check dampers and isolation dampers. Closure times of these dampers were assumed to be "instantaneous." However, the licensee determined that the assumption of instantaneous closure was invalid as documented in LER 98-007. The licensee added additional dampers and recalculated the transient load on the masonry walls with a non-instantaneous damper closure. The masonry walls form an enclosure that houses the Reactor Building Ventilation System (VR) exhaust fans, filters, and heat recovery coils. None of the VR components in the enclosure are safety-related. The masonry walls, however, are designated as safety-related only because their failure could impact adjacent safety-related components. Therefore, the masonry walls' safety-related function is to remain in place and not impact or affect any adjacent safety-related components. The purpose of the reassessment was to evaluate the ability of the masonry walls to withstand pressurization effects without losing their integrity.

2.0 EVALUATION

2.1 Pressurization Analysis

2.1.1 Transient Pressurization Calculation

The licensee used the computer code, COMPARE, to perform the subcompartment analyses calculating a transient pressure load on the masonry walls. A postulated MSLB in the MST would result in transient pressurization of the MST and interfacing ventilation ducts. All ducts are equipped with check dampers, which will close either on reverse flow for ducts supplying air

to the MST, or on excess flow for ducts with airflow leaving the MST. The closure time of these check dampers determines the amount of steam released past the dampers and subsequent pressurization of the ducts and interfacing areas. The flow areas as a function of time for the dampers were provided in Figures O-4 and O-6 of the submittal.

According to the Standard Review Plan (SRP) Section 6.2.1.2, the computer code COMPARE is acceptable and has been used by the staff for the subcompartment pressurization analyses. The staff's review of the licensee's pressurization analyses focused on assumptions, initial conditions, nodalization, and other inputs to the computer code. The results of the mass and energy release calculation were used as an input to the COMPARE code and are discussed below.

### 2.1.2 Mass and Energy Release

In its letter dated October 8, 1999, the licensee provided information on the assumptions and methodology used for its mass and energy release calculation as discussed below.

A full guillotine MSLB in the MST was assumed to cause the rupture of one feedwater line and the compound mass and energy releases were considered as the source for the pressurization transient. The main steam forward flow was calculated according to Moody critical flow rate of pipe initial conditions. The release flow area was assumed to be equal to the ruptured pipe area initially and equal to the flow limiter area after the initial depletion of the mass between the break and the flow limiter. The forward flow rate gradually decreased to zero when the main steam isolation valve (MSIV) was fully closed. The reverse flow from the main steamline header was calculated similarly. Additional liquid flow resulting from the level swell in the reactor vessel up to the main steam line nozzles was assumed to release according to the Moody critical flow model for saturated liquid past the flow limiters. The initial conditions for the blowdown of the main steamline were assumed as saturated vapor at 1050 psia and 550 degrees Fahrenheit. The free flow area of the main steam lines is 3.16 ft<sup>2</sup>.

The feedwater line break was assumed to release at the Moody flow rate for saturated liquids. The forward feedwater flow was assumed to last until the end of calculation; the reverse flow was assumed to last until the mass between the down stream check valve and the break was depleted. The initial condition for feedwater was assumed as saturated liquid at 425 degrees Fahrenheit. The feedwater line area (i.e., the flow area) was assumed to be 2.337 ft<sup>2</sup>. The total isolation time following the break for the MSIVs to close was assumed as 5.5 seconds. Based on its review of the above information, the staff finds that the licensee's methodology and assumptions used for the mass and energy calculation are acceptable.

### 2.1.3 Single Failure Analysis for Dampers

The licensee provided a single failure analysis for pressure relief dampers and excess flow check dampers to support its assumption that these dampers are not subject to single active failure. The pressure relief damper is opened by differential pressure and gravity, which are not subject to single active failure. The excess flow check damper is closed by differential pressure, which is not subject to single active failure. The staff finds the licensee's evaluation acceptable.

#### 2.1.4 Conclusion

Based on the above review, the staff finds that the results of the licensee's pressurization analyses, including differential pressure, maximum pressure, and temperature, are acceptable.

#### 2.2 Wall Construction and Modulus of Rupture

All of the walls addressed by this amendment are 12-inch nominal width, single wythe, running bond, hollow concrete masonry blocks. The walls are reinforced with continuous truss type horizontal joint reinforcement at every other course, but with no vertical reinforcement. The cells of the walls are not grouted. Steel columns are provided to support the walls for out-of-plane loads. The walls were designed to span horizontally between the steel columns.

The licensee stated that the walls at LaSalle were built identically to those at Clinton Power Station and, therefore, it had used a value for the modulus of rupture obtained from tests of masonry walls at Clinton for the evaluation of the masonry walls at LaSalle. The results from the Clinton testing was approved for LaSalle per Supplement 5 of LaSalle's Safety Evaluation Report, NUREG-0519, dated August 1983. The staff finds the use of the Clinton test value of the modulus of rupture for LaSalle acceptable.

#### 2.3 Loads, Load Factors, and Load Combinations

The differential pressures due to MSLB only affect the abnormal, abnormal/severe environmental, and abnormal/extreme environmental load combinations. The licensee used a load factor of one for all loads. For the abnormal load condition, the load combinations used for analysis are dead load plus live load plus differential pressure load. For the abnormal/severe load condition, the load combinations are dead load plus live load plus the square root of the square of the Operating Basis Earthquake (OBE) and the square of the differential pressure. For the abnormal/extreme environmental load condition, the load combinations are dead load plus live load plus the square root of the square of the Safe Shutdown Earthquake (SSE) and the square of the differential pressure. The staff finds that the loads, load factors, and load combinations used by the licensee are reasonable and acceptable.

#### 2.4 Analysis Methods

The licensee stated that the response spectra were generated for the pressure time histories for each of the masonry walls of the VR exhaust plenum. Based on the computed frequency of the wall, a dynamic load factor (DLF) was then determined for the pressure loading using these response spectra. All DLFs exceed 1.0. A design pressure was then calculated by multiplying the peak pressure from the pressure time history by the DLF. This design pressure was then applied to the walls as a static load to calculate bending moments and shear forces on the walls. This same load without reduction was then applied on the steel columns in assessing the adequacy of the columns. The staff finds the licensee's analysis method acceptable.

## 2.5 Analysis Results

### 2.5.1 Masonry Walls

The licensee calculated the maximum flexural stress for each of the walls. Wall A2-786-20 has the highest flexural stress of 95 psi among all walls. The licensee's acceptance criteria for flexural tensile stress is the modulus of rupture of masonry (as determined by Clinton Power Station testing) divided by a safety factor of 2.5. The value of modulus of rupture for horizontally spanned walls tested at Clinton is 250 psi. Therefore, the highest flexural stress calculated for LaSalle of 95 psi is within the acceptance criteria of 100 psi. The licensee also calculated the maximum shear force at the supports for each of the walls. Wall A2-786-20 has the highest shear force of 892.6 lbs/ft which is less than the calculated shear strength for the walls of 2052 lbs/ft. The licensee concluded that the masonry walls will remain elastic and uncracked during the applied loads. The staff concurs with the licensee's conclusion.

### 2.5.2 Steel Columns

The stresses in the steel support columns were limited to American Institute of Steel Construction (AISC) allowable stresses increased by a factor of 1.6. The licensee calculated the maximum flexural stress for each of the columns by elastic analysis and determined that the maximum flexural stresses for all of the columns are less than the design allowable stress with the exception of two columns in Wall A2-786-13. For these two columns, the stresses cause formation of a plastic hinge and the behavior is no longer elastic. Therefore, the licensee qualified these columns using elasto-plastic methodology. The computed flexural stresses considering elastic behavior are 50.90 ksi and 54.13 ksi for these columns. The values of these two stresses are still less than the steel ultimate strength. The calculated flexural stresses for these two columns using elasto-plastic methodology are 33.28 ksi and 35.39 ksi, which are less than the yield stress. The staff finds that the licensee has used appropriate methodology for calculating the stresses in the structural steel columns that the stresses in the structural steel supporting the masonry walls are within allowable limits.

## 2.6 Conclusion

Based on the above review, the staff finds that the licensee's analysis methods, assumptions, and acceptance criteria are acceptable and that the masonry walls in the areas adjacent to the main steam tunnel will maintain their integrity following the transient pressurization due to a high energy line break.

## 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendments. The State official had no comments.

## 4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has

determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (64 FR 32286). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

## 5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Ma  
C. Li

Date: April 11, 2000