



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

COMMONWEALTH EDISON COMPANY

DOCKET NO. 50-295

ZION NUCLEAR POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 157  
License No. DPR-39

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Commonwealth Edison Company (the licensee) dated April 15, 1994, as supplemented July 26, 1994, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act); and the Commission's rules and 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 rules and 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;
  - 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 by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-39 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 157 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*Robert A. Capra*

Robert A. Capra, Director  
Project Directorate III-2  
Division of Reactor Projects - III/IV  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: September 8, 1994



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

COMMONWEALTH EDISON COMPANY

DOCKET NO. 50-304

ZION NUCLEAR POWER STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 145  
License No. DPR-48

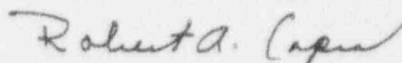
1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Commonwealth Edison Company (the licensee) dated April 15, 1994, as supplemented July 26, 1994, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and 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 rules and 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;
  - 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 by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-48 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 145, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert A. Capra, Director  
Project Directorate III-2  
Division of Reactor Projects - III/IV  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: September 8, 1994

ATTACHMENT TO LICENSE AMENDMENT NOS. 157 AND 145

FACILITY OPERATING LICENSE NOS. DPR-39 AND DPR-48

DOCKET NOS. 50-295 AND 50-304

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

<u>Remove Pages</u>	<u>Insert Pages</u>
127	127
127a	-
128	128
129	129
130	130
130a	130a
131a	-
131b	-
132	132
144	144

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
<p>3.4 <u>SAFEGUARDS INSTRUMENTATION AND CONTROL</u></p> <p><u>Applicability:</u></p> <p>Applies to safeguards instrumentation and control channels per unit.</p> <p><u>Objective:</u></p> <p>To establish the limiting conditions of operation for safeguards instrumentation and controls.</p> <p><u>Specification:</u></p> <ol style="list-style-type: none"> <li>1. The setpoints for the engineered safeguards systems are presented in Table 3.4-1.</li> <li>2. For on line testing or instrumentation failure unit operation shall be permitted to continue as follows: <ol style="list-style-type: none"> <li>a. In accordance with Table 3.4-1.</li> <li>b. Only one channel of a particular protection set shall be tested at a time.</li> <li>c. Failed channels or channels being tested shall be placed in the tripped mode with the exception of the High-High Containment Pressure channels.</li> <li>d. During testing of each Automatic Actuation Channel of Table 3.4-1, the channel may be bypassed for up to 8 hours for actuation logic and master relay testing and 12 hours for slave relay testing provided the remaining Automatic Actuation Channel is OPERABLE.</li> </ol> </li> </ol>	<p>4.4 <u>SAFEGUARDS INSTRUMENTATION AND CONTROL</u></p> <p><u>Applicability:</u></p> <p>Applies to the testing and calibration of safeguards instrumentation and control channels per unit.</p> <p><u>Objective:</u></p> <p>To establish the testing and surveillance requirements for safeguards instrumentation and control channels.</p> <p><u>Specification:</u></p> <ol style="list-style-type: none"> <li>1. Not Applicable.</li> <li>2. The Instrument CHANNEL CHECK, Instrument and Control CHANNEL FUNCTIONAL TEST and Instrument CHANNEL CALIBRATION frequency requirements for the various safeguards instrumentation and control channels are specified in Table 4.4-1.</li> </ol>

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
<p>3.4. 3. The safeguards instrumentation and control channels shall be operable when the engineered safeguards equipment actuated by them are required to be operable.</p>	<p>4.4 3. Not Applicable.</p>
<p>4. In the event the number of channels, other than Automatic Actuation Channels, of a particular function in service falls below the limits given in Table 3.4-1 Column 3 or 4 plant operation shall be as specified in Column 5 of Table 3.4-1.</p>	<p>4. Not Applicable.</p>
<p>5. With the exception of the testing allowance of Specification 3.4.2.d, should the number of Automatic Actuation Channels of a particular function fall below the limits given in Table 3.4-1 Column 3 or 4, the limits of Column 3 or 4 shall be restored within 6 hours or plant operation shall be as specified in Column 5 of Table 3.4-1.</p>	

Actuation Channel Description (Per Unit)	1. No. of Channels	2. No. Of Channels to Trip	3. Minimum Operable Channels	4. Minimum Degree of Redundancy	5. Operator Action if Column 3 or 4 cannot be met +	6. Setpoint
<b>I. SAFETY INJECTION</b>						
1. Manual Actuation	2	1	1	0	Maintain Hot Shutdown***	N.A.
2. Automatic Actuation	2	1	2	1	Maintain Hot Shutdown***	N.A.
3. Low Pressurizer Pressure	3	2	2	1	Maintain Hot Shutdown***	1815 psig++
4. High Steam Line Differential Pressure Interlocked with loop isolation valve positions	3 per loop	2 per loop	2 per loop	1.	Maintain Hot Shutdown***	100 psig++
5. High Steam Line Flow in Coincidence with	4	2	3	2	Maintain Hot Shutdown***	A function defined as follows: A $\Delta P$ corresponding to 40.0% of $3.495 \times 10^6$ lbs/hr (full steam flow) between 0% and 20% load and then a $\Delta P$ increasing linearly to a $\Delta P$ corresponding to 110.0% of $3.495 \times 10^6$ lbs/hr (full steam flow at full load).++
Low-Low $T_{avg}$ or Low Steam Line Press., 4 loops	4	2	3	2	Maintain Hot Shutdown***	540°F++
	4	2	3	2	Maintain Hot Shutdown***	600 psig ++
6. High Containment Pressure	4	2	3	2	Maintain Hot Shutdown***	4.5 psig++
<b>II. CONTAINMENT SPRAY</b>						
1. Manual Actuation	**2	2	2	0	Maintain Hot Shutdown***	N.A.
2. Automatic Actuation	2	1	2	1	Maintain Hot Shutdown***	N.A.
3. High-High Containment Pressure	4	2	3	1	Maintain Hot Shutdown***	23 psig++

ENGINEERED SAFEGUARDS ACTUATION SYSTEM - LIMITING CONDITIONS FOR OPERATION AND SETPOINTS  
Table 3.4-1

Actuation Channel Description (Per Unit)	1. No. of Channels	2. No. of Channels to Trip	3. Minimum Operable Channels	4. Minimum Degree of Redundancy	5. Operator Action if Column 3 or 4 cannot be met +	6. Setpoint
<u>III. CONTAINMENT ISOLATION</u>						
A) Phase A						
1. Manual Actuation	2	1	1	0	Maintain Hot Shutdown***	N.A.
2. Safety Injection (any trip)	2	1	2	1	Maintain Hot Shutdown***	N.A.
B) Phase B						
1. Manual Actuation	**2	2	2	0	Maintain Hot Shutdown***	N.A.
2. Automatic Actuation	2	1	2	1	Maintain Hot Shutdown***	N.A.
3. High-High Containment Pressure	4	2	3	1	Maintain Hot Shutdown***	23 psig++
<u>IV. STEAMLINE ISOLATION</u>						
1. Manual Actuation	1 per loop	1 per loop	1	0	Maintain Hot Shutdown***	N.A.
2. Automatic Actuation	2	1	2	1	Maintain Hot Shutdown***	N.A.
3. High-High Containment Pressure	4	2	3	1	Maintain Hot Shutdown***	23 psig++
4. High Steam Line Flow in Coincidence with	4	2	3	2	Maintain Hot Shutdown***	A function defined as follows: A $\Delta P$ corresponding to 40.0% of $3.495 \times 10^6$ lbs/hr (full steam flow) between 0% and 20% load and then a $\Delta P$ increasing linearly to a $\Delta P$ corresponding to 110.0% of $3.495 \times 10^6$ lbs/hr (full steam flow at full load).++
Low-Low Tavg	4	2	3	2	Maintain Hot Shutdown***	540°F++
or Low Steam Line Press., 4 loops	4	2	3	2	Maintain Hot Shutdown***	600 psig++

ENGINEERED SAFEGUARDS ACTUATION SYSTEM - LIMITING CONDITIONS FOR OPERATION AND SETPOINTS

TABLE 3.4-1 (Continued)

Actuation Channel Description (Per Unit)	1. No. of Channels	2. No. of Channels to Trip	3. Minimum Operable Channels	4. Minimum Degree of Redundancy	5. Operator Action if Column 3 or 4 cannot be met +	6. Setpoints
<u>V. Auxiliary Feedwater</u>						
1. Manual	1/pump	1/pump	1/pump	0	Maintain Hot Shutdown***	N.A.
2. Automatic	2	1	2	1	Maintain Hot Shutdown***	N.A.
3. Steam Generator (S/G) Water Level low-low						
I. Start Motor Driven Pumps	3 per S/G	2 per S/G any 1/4 S/G	2 per S/G	1 per S/G	Maintain Hot Shutdown***	10% Narrow Range++
II. Start Turbine Driven Pumps	3 per S/G	2 per S/G any 2/4 S/G	2 per S/G	1 per S/G	Maintain Hot Shutdown***	10% Narrow Range++
4. Undervoltage-RCP busses Start Turbine Driven Pump	4-1/bus	2	3	1	Maintain Hot Shutdown***	75% RCP Bus Voltage*
5. S.I. Start Motor and Turbine Driven Pumps	2	1	2	1	Maintain Hot Shutdown***	N.A.
6. Station Blackout Start Motor and Turbine Driven Pump	3-1/bus	2	2	1	Maintain Hot Shutdown***	Time Dependent on Voltage*
7. Secondary Undervoltage	2/bus	2	2	0	N.A.	3846 ±2% volts for 5 ± 5% min. with inherent time delay of 8 ±2 sec.*
<u>VI. Steam Generator Overfill Protection</u>						
1. Steam Generator (S/G) Water Level Hi-Hi	3 per S/G	2 per S/G	2 per S/G	1 per S/G	Maintain Hot Shutdown***	70% Narrow Range

SEE FOOTNOTES ON PAGE 131b.

ENGINEERED SAFEGUARDS ACTUATION SYSTEM - LIMITING CONDITIONS FOR OPERATION AND SETPOINTS

Table 3.4-1 (Continued)  
130a

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- + If minimum conditions are not met within 24 hours, the unit shall be in the COLD SHUTDOWN condition within an additional 24 hours.
- ++ Setpoints are  $\pm$  established tolerances for instrument channel and setpoint errors as specified in "Zion NSSS Setpoint Evaluation. Protection System Channels, Eagle 21 Version," Revision 2, March 1993. The instruments shall not be set to exceed a Limiting Safety System Setting.
- \* Setpoints are  $\pm$  established tolerances for instrument channel and setpoint errors as specified in "Channel Accuracies, Overall Channel Accuracies and Setpoint Tolerances for W NES Process I and C Reactor Protection and Control Systems" August 30, 1971 - CEW-652. The instruments shall not be set to exceed a Limiting Safety System Setting.
- \*\* Requires simultaneous actuation of two switches.
- \*\*\* 'Maintain Hot Shutdown' means maintain or be in HOT SHUTDOWN within four hours if the unacceptable condition arises during power operation.

ENGINEERED SAFEGUARDS ACTUATION SYSTEM - LIMITING CONDITIONS FOR OPERATION AND SETPOINTS

(Footnotes to Table)

TABLE 3.4-1 (Continued)

## Bases

3.4 The engineered safety features instrumentation measure temperatures, pressures, flows, levels in a reactor coolant system, steam system, reactor containment and auxiliary systems. It actuates the engineered safety features and monitors their operation. Process variables required on a continuous basis for the start-up, operation, and shutdown of a unit are indicated, recorded and controlled from the control room. The quantity and types of process instrumentation provided ensure safe and orderly operation of all systems and processes over the full operating range of a unit. (1)

The engineered safety features instrumentation monitors parameters to detect failures in the Reactor Coolant and Steam Flow Systems and to initiate engineered safety features equipment operation.

The engineered safety features systems are actuated by redundant logic and coincidence networks similar to those used for reactor protection. Each network actuates a device that operates the associated engineered safety features equipment, motor starters and valve operators. The channels are designed to combine redundant sensors, and independent channel circuitry, and coincident trip logic. Where possible, different but related parameter measurements are utilized.

This ensures a safe and reliable system in which a single failure will not defeat the intended function. The Engineered Safety Features Instrumentation System actuates (depending on the severity of the condition) the Safety Injection System, Containment Isolation, Containment Spray System and the Diesel Generators. This system also provides a feedwater system isolation to prevent Steam Generator overfill.

Availability of control power to the engineered safety features trip channels is continuously monitored. In general, the loss of instrument power to the sensors, instruments, or logic devices in the engineered safety features instrumentation, places that channel in the trip mode. The one exception is the containment spray initiating channels which require instrument power for actuation.

The engineered safety features actuation channels are designed with sufficient redundancy to provide the capability for channel calibration and test during power operation. Testing of an actuation channel is accomplished by placing that channel in a tripped mode, i.e., a two out of three matrix logic becomes a one out of two matrix logic. Testing does not trip the system unless a trip condition occurs in a concurrent channel (2). The High-High Containment Pressure channels are not placed in trip during testing to reduce the probability of an inadvertent containment spray event.

When testing an Automatic Actuation Channel, the channel is bypassed. The specified allowed outage times for bypassing an Automatic Actuation Channel for surveillance testing are based on WCAP-10271-P-A, Supplement 2, Revision 1.

The engineered safety features actuation system setpoints specified in Table 3.4-1 are the nominal values at which the trips are set. The setpoint for an engineered safety features actuation system or interlock function is considered to be set consistent with the nominal value when the "as measured" setpoint is within the band (established tolerance) allowed for calibration accuracy.

The high steam line flow set point is maintained at a level which will trip with a steam line break as analyzed in the Zion FSAR. (3) At zero power level, the postulated steam flow for a large break is > 40% steam flow. For the spurious opening of a safety valve, the safety injection and steam line actuation result from low pressurizer pressure.

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- (1) FSAR Section 7.5.1
  - (2) FSAR Section 7.5.2
  - (3) FSAR Section 14.2.5