

ATTACHMENT B

ZION NUCLEAR GENERATING STATION  
ANNOTATED TECHNICAL SPECIFICATION PAGES  
FOR PROPOSED CHANGES TO APPENDIX A  
TECHNICAL SPECIFICATIONS OF  
FACILITY OPERATING LICENSES DPR-39 AND DPR-48  
FOR  
LICENSE AMENDMENT REQUEST NO. 93-11

REVISION OF THE ESFAS AUTOMATIC ACTUATION CHANNEL  
ALLOWED OUTAGE AND RESTORATION TIMES

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LIMITING CONDITION FOR OPERATION

SURVEILLANCE REQUIREMENT

3.4 SAFEGUARDS INSTRUMENTATION AND CONTROL

Applicability:

Applies to safeguards instrumentation and control channels per unit.

Objective:

To establish the limiting conditions of operation for safeguards instrumentation and controls.

Specification:

1. The setpoints for the engineered safeguards systems are presented in Table 3.4-1.
2. For on line testing or instrumentation failure unit operation shall be permitted to continue as follows:
  - a. In accordance with Table 3.4-1.
  - b. Only one channel of a particular protection set shall be tested at a time.
  - c. Failed channels or channels being tested shall be placed in the tripped mode with the exception of the ~~Containment High~~ Pressure channels. *High-High*
  - 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.

4.4 SAFEGUARDS INSTRUMENTATION AND CONTROL

Applicability:

Applies to the testing and calibration of safeguards instrumentation and control channels per unit.

Objective:

To establish the testing and surveillance requirements for safeguards instrumentation and control channels.

Specification:

1. Not Applicable.
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.

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 In Link	3 Minimum Operable Channel	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 $T_{sup}$ or Low Steam Line Press. 4 loops	4	2	3	2	Maintain Hot Shutdown***	140**
	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 Tagv 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**

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)

- + 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.
- ~~+++ This channel may be placed in the bypass mode during periods of active testing during safeguards equipment testing as specified in Section 4.4.2.~~
- \* 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. ~~By-pass removal of one~~ <sup>Testing</sup> 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). ~~Insert 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



## Insert 1

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.

**ATTACHMENT C**

**SIGNIFICANT HAZARDS CONSIDERATION  
FOR PROPOSED CHANGES TO APPENDIX A  
TECHNICAL SPECIFICATIONS OF  
FACILITY OPERATING LICENSES**

**DPR-39 AND DPR-48**

**FOR**

**LICENSE AMENDMENT REQUEST NO. 93-11**

**REVISION OF ESFAS AUTOMATIC ACTUATION CHANNEL  
ALLOWED OUTAGE AND RESTORATION TIMES**

CECo has evaluated this proposed License Amendment and determined that it involves no significant hazards considerations. According to 10CFR50.92(c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability of occurrence or consequences of an accident previously evaluated;
2. Create the possibility of a new or different kind of accident from any previously analyzed; or,
3. Involve a significant reduction in a margin of safety.

The following evaluation is provided for the three categories of the significant hazards consideration standards:

- a. Proposed changes to allow 8 hours for master relay and logic testing, 12 hours for slave relay testing and 6 hours to restore an inoperable ESFAS Automatic Actuation Channel prior to entering the shutdown action clock.
  - 1) The determination that these changes are within all acceptable criteria was established in the NRC's SER prepared for WCAP-10271, Supplement 2, Revision 1. The Technical Specification changes proposed by this license amendment request conform to NRC guidance contained in the SER. The NRC found that implementation of the proposed changes is expected to result in a small and acceptable increase in ESFAS unavailability. This increase in probability results in a small increase in calculated core damage frequency and public risk. The calculated increase in core damage frequency was judged to be acceptable since the increase was small and well within the range of uncertainty associated with the analysis. The values presented in WCAP-10271 Supplement 2 Revision 1 for increase in core damage frequency were verified by Brookhaven National Laboratory as part of an audit and sensitivity analyses performed for the NRC Staff.

Based on the small increase in core damage frequency as compared with the range of uncertainty in the analysis, the NRC agreed that the calculated increase is acceptable. This conclusion was documented in the NRC's SER dated February 22, 1989. The applicability of these conclusions has been verified through a plant specific review of the generic analysis in WCAP-10271, Supplement 2, Revision 1. The ESFAS Automatic Actuation Channel allowed outage and restoration times included in this license amendment request are consistent with the generic analysis. In addition, the NRC stated that the majority of the increase in unavailability was due to the decrease in frequency of surveillance testing vice the changes in allowed outage and restoration times. Therefore, considering the above information, the proposed allowed outage and restoration time changes do not involve a significant increase in the probability of occurrence or consequences of an accident previously evaluated.

- 2) The proposed changes do not involve the physical alteration of any plant system and do not result in a change in the manner in which the ESFAS system performs its function. The increases in allowed outage and restoration times only affects the probability of the ESFAS Automatic Actuation Channel functioning properly as described above. Therefore, the allowed outage and restoration time changes proposed in this license amendment request do not create a new or different type of accident from any previously evaluated.
- 3) The proposed allowed outage time and restoration time changes do not alter the manner in which safety limits, limiting safety system setpoints or limiting conditions for operation are determined. The impact of the revised ESFAS Automatic Actuation Channel allowed outage and restoration times is addressed above. Implementation of the proposed changes is expected to result in an overall improvement in safety by allowing adequate time for required ESFAS testing and quality repairs leading to improved equipment reliability due to a more appropriate restoration time. Therefore, it may be concluded that the proposed allowed outage and restoration time changes do not involve a significant reduction in margin of safety.

b. Proposed change to the minimum required degree of redundancy for the High-High Containment Pressure channels in Table 3.4-1.

- 1) Changing the minimum required degree of redundancy in Table 3.4-1 for the High-High Containment Pressure Channels (Table 3.4-1 items II.3, III.B.3, and IV.3) provides consistency with Technical Specification 3.4.2.c which allows an inoperable High-High Containment Pressure channel to be placed in bypass. Placement of an inoperable High-High Containment Pressure Channel in bypass is preferred to reduce the probability of an inadvertent containment spray event. Also, these channels are designed with a two out of four logic so that the failed channel may be bypassed rather than tripped. With the failed channel bypassed, single failure criterion is still met because the logic is now a two out of three. Furthermore, with the one channel bypassed, a single channel failure will not inadvertently initiate a containment spray. Therefore, this change can be considered an administrative change to correct Table 3.4-1 to agree with the Action requirements of Technical Specification 3.4.2.c. As such this proposed change does not involve an increase in the probability of occurrence or consequences of an accident previously evaluated.
- 2) Correcting the minimum required degree of redundancy in Table 3.4-1 for the High-High Containment Pressure channels is an administrative change which does not involve the physical alteration of any plant system and does not result in a change in the manner in which the ESFAS system performs its function. Therefore, the proposed correction to Table 3.4-1 does not create the possibility of a new or different kind of accident from any previously analyzed.
- 3) Correcting the minimum required degree of redundancy in Table 3.4-1 to be consistent with the Actions of Technical Specification 3.4.2.c is an administrative change and as such does not involve any reduction in a margin of safety.

c. Proposed change to the delete footnote +++ from Table 3.4-1.

- 1) Deleting footnote +++ from Table 3.4-1 removes the inconsistency between it and Technical Specification 3.4.2.c which states that channels other than the High-High Containment Pressure channels shall be placed in trip during testing. The change does not affect the manner in which ESFAS provides plant protection. In addition the change does not affect the functioning of ESFAS or the way Zion Station conducts channel testing. Instrument channel testing will continue to be conducted in the tripped mode with the exception of the High-High Containment Pressure channels, which can be tested in bypass because of the risk of a spurious Containment Spray event. Automatic Actuation Channel testing will be performed in accordance with the allowed outage times of new Specification 3.4.2.d. As such this proposed change does not involve any significant increase in the probability of occurrence or consequences of an accident previously evaluated.
- 2) Deleting footnote +++ from Table 3.4-1 does not involve the physical alteration of any plant system and does not result in a change in the manner in which ESFAS performs its function. Therefore this change does not involve the physical alteration of any plant system and does not result in a change in the manner in which the ESFAS system performs its function. Therefore, the proposed correction to Table 3.4-1 does not create the possibility of a new or different kind of accident from any previously analyzed.
- 3) Deleting footnote +++ from Table 3.4-1 does not alter the manner in which safety limits, limiting safety system setpoints or limiting conditions for operation are determined. Implementation of this change will not alter ESFAS testing. Therefore implementation of this change does not involve any reduction in a margin of safety.

d. Proposed editorial change to Technical Specification 3.4.2.c.

The editorial change to Technical Specification 3.4.2.c to change "Containment Hi-Hi pressure channels" to "High-High Containment Pressure channels" is purely an administrative change which has no affect on plant safety.

e. Summary

The foregoing analyses demonstrate that the proposed License Amendment to the Zion Station Technical Specifications does not involve a significant increase in the probability of occurrence or consequences of a previously evaluated accident, does not create the possibility of a new or different kind of accident and does not involve a significant reduction in a margin of safety.

Based upon the above, Commonwealth Edison Company concludes that the proposed License Amendment satisfies the no significant hazards consideration standards of 10CFR50.92(c) and, accordingly a no significant hazards consideration finding is justified.

**ATTACHMENT D**

**ENVIRONMENTAL ASSESSMENT FOR PROPOSED**

**CHANGES TO APPENDIX A TECHNICAL SPECIFICATIONS OF**

**FACILITY OPERATING LICENSES DPR-39 AND DPR-48**

**FOR**

**LICENSE AMENDMENT REQUEST 93-11**

**REVISION OF THE ESFAS AUTOMATIC ACTUATION CHANNEL**

**ALLOWED OUTAGE AND RESTORATION TIMES**



The changes proposed by this License Amendment Request have been evaluated against the criteria for and identification of licensing and regulatory actions requiring environmental assessment in accordance with 10CFR51.21. It has been determined that the proposed changes meet the criteria for categorical exclusion as provided for under 10CFR51.22(c)(9). The following is a discussion of how the proposed changes meet the criteria for categorical exclusion.

10CFR51.22(c)(9):

Although the proposed request changes a requirement with respect to the use of facility components located within the restricted area:

- (i) The proposed change involves no significant hazards consideration as evaluated in Attachment C of this License Amendment Request;
- (ii) There is no significant change in the types, or significant increase in the amount, of any effluents that may be released offsite; and
- (iii) There is no significant increase in individual or cumulative occupational radiation exposure associated with this proposed change.

Accordingly, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10CFR51.22(c)(9). Based on the aforementioned and pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of this amendment to the licenses incorporating the proposed changes.