8005190 043

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

SAFETY EVALUAT BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMEND NT NO. 54 TO FACILITY OPERATING LICENSE NO. DPR-39
AND AMENDMENT NO. 51 TO FACILITY OPERATING LICENSE NO. DPR-48
COMMONWEALTH EDISON COMPANY
ZION STATION, UNITS 1 AND 2
DOCKET NOS. 50-295 AND 50-304

Introduction

By letter dated September 2, 1977, supplemented by letters dated February 26 and September 26, 1979, and applications dated September 28 and November 7, 1979, Commonwealth Edison Company (CECO) proposed changes to the Appendix A Technical Specifications and proposed adding a license condition for Zion Station, Units No. 1 and 2. The proposals included the following:

1. Addition of Technical Specifications for the Overpressure Mitigating System (OMS) and request for approval of the system as the long-term solution to this generic issue.

2. Addition of a license condition requiring a secondary water chemistry monitoring program in response to previous NRC concerns.

3. A revision to Zion Station Unit No. 2 Technical Specifications for rod insertion limits to make them in agreement with existing Unit No. 1 requirements.

Some modifications to CECO's proposals were necessary to meet our requirements. These modifications were discussed with and agreed to by the CECO staff.

DISCUSSION AND EVALUATION

1. Overpressure Mitigating System (OMS)

Introduction

By letter dated September 2, 1977 (Reference 1), CECO submitted to the NRC a plant specific analysis in support of the proposed reactor vessel OMS for Zion Station Units 1 and 2. This information supplements other documentation submitted by CECO (References 4-10).

Staff Review of all information submitted by CECO in support of the proposed OMS is complete. A detailed safety evaluation follows.

Background

Over the last few years, incidents identified as pressure transients have occurred in pressurized water reactors. This term "pressure transients," as used in this report, refers to events during which the temperature-pressure limits of the reactor vessel, as shown in the facility Technical Specifications, are exceeded. All of these incidents occurred at relatively low temperature (less than 200 degrees F) where the reactor vessel material toughness (resistance to brittle failure) is reduced.

The "Technical Report on Reactor Vessel Pressure Transients" in NUREG 0138 (Reference 2) summarizes the technical considerations relevant to this matter, discusses the safety concerns and existing safety margins of operating reactors, and describes the reguatory actions taken to resolve this issue by reducing the likelihood of future pressure transient events at operating reactors. A brief discussion is presented here.

Reactor vessels are constructed of high quality steel made to rigid specifications, and fabricated and inspection in accordance with the time-proven rules of the ASME Boiler and Pressure Vessel Code. Steels used are particularly tough at reactor operating conditions. However, since reactor vessel steels are less tough and could possibly fail in a brittle manner if subjected to high pressures at low temperatures, power reactors have always operated with restrictions on the pressure allowed during startup and shutdown operations.

At operating temperatures, the pressure allowed by Appendix G to 10 CFR Part 50 limits is in excess of setpoint of currently installed pressurizer code safety valves. However, most operating Pressurized Water Reactors (PWRs) did not have pressure relief devices to prevent pressure transients from exceeding the Appendix G limit during cold conditions.

By letter dated August 11, 1976 (Reference 3), the NRC requested that CECO begin efforts to design and install plant systems to mitigate the consequences of pressure transients at low temperatures. CECO was also requested to examine operating procedures and to change administrative procedures to guard against initiating overpressure events. It was felt by the staff that proper administrative controls were required to assure safe operation for the period of time prior to installation of the proposed overpressure mitigating hardware.

CECO responded (References 4 and 5) with preliminary information describing interim measures to prevent these transients along with some discussion of proposed hardware. The proposed hardware change was to install a low pressure actuation setpoint on the pressurizer air operated relief valves.

CECO participated as a member of a Westinghouse user's group formed to support the analysis effort required to verify the adequate of the proposed system to prevent overpressure transients. Using input data generated by the user's group, Westinghouse performed transient analyses (Reference 9) which are used as the basis for plant specific analysis.

The NRC requested additional information concerning the proposed procedural changes and the proposed hardware changes. CECO provided the required responses (References 6 and 7). Reference 1 transmitted the plant specific analysis for Zion Units 1 and 2.

Through a series of meetings and correspondence with PWR vendors and licensees, the staff developed a set of criteria for an acceptable OMS. The basic criterion is that the system will prevent reactor vessel pressures in excess of these allowed by Appendix G. Specific criteria for system performance are:

1) Operator Action: No credit can be taken for operator action for ten minutes after the operator is aware of a transient.

2) Single Failure: The system must be designed to relieve the pressure transient given a single failure in addition to the failure that initiated the pressure transient.

3) Testability: The system must be testable on a periodic basis consistent with the system's employment.

4) Seismic and IEEE 279 Criteria: Ideally, the system should meet seismic Category I and IEEE 279 criteria. The basic objective is that the system should not be vulnerable to a common failure that would both initiate a pressure transient and disable the OMS. Such events as loss of instrument air and loss of offsite power must be considered.

   The staff also instructed CECO to provide an alarm which monitors the position of the pressurizer relief valve isolation valves, along with the low setpoint enabling switch, to assure that the system is properly aligned for shutdown conditions.

Design Basis Events

The incidents that have occurred to date have been the result of operator errors or equipment failures. Two varieties of pressure transients can be identified: a mass input type from charging pumps, Safety Injection (SI) pumps, SI accumulators; and a heat addition type which causes thermal expansion from sources such as steam generators or decay heat.

On Westinghouse designed plants, the most common cause of the overpressure transients to date has been isolation of the coolant letdown path. Letdown during low pressure operations is via a flowpath through the Residual Heat Removal (RHR) system. Thus, isolation of RHR can initiate a pressure transient if a charging pump is left running. Although other transients occur with lower frequency, those which result in the most rapid pressure increases were identified by the staff for analysis. The most limiting mass input transient identified by the staff is inadvertent injection by the largest safety injection pump. The most limiting thermal expansion transient is the start of a reactor coolant pump with a 50 degree F temperature difference between the water in the reactor vessel and the primary coolant in the steam generator.

Based on the historical record of overpressure transients and the imposition of more effective administrative controls, the staff believes that the limiting events identified above form an acceptable bases for analyses of the proposed OMS.

Evaluation

System Description

CECO adopted the "Reference Mitigating System" developed by Westinghouse and the user's group. The licensee proposed to modify the actuation circuitry of the existing air operated pressurizer relief valves to provide a low pressure setpoint at 435 psig during startup and shutdown conditions. When the reactor vessel is at low temperatures, with the low pressure setpoint selected, a pressure transient is terminated below the Appendix G limit by automatic opening of these relief valves. A manual switch is used to enable and disable the low setpoint of each relief valve. An enabling alarm which monitors system pressure, the position of the enabling switch and the upstream isolation valve is provided. The system low setpoint is enabled at a temperature of 250 degrees F during plant cooldown and is disabled at the same temperature during plant heatup. The staff finds the pressurizer relief valves with a manually enabled low pressure setpoint to be an acceptable concept for an OMS. Discussion and evaluation of the system proposed by CECO follows.

Air Supply

The power operated relief valves (PORVs) are spring-loaded-closed, air required to open valves. Air is supplied by a control air source. To assure operability of the valves upon loss of control air, a backup air supply is provided. The backup air supply consists of a seismically qualified passive air accumulator for each PORV. Each tank contains enough air to assure that it will still provide the required number of cycles for ten minutes. The staff finds the backup air supply to be acceptable.

Single Failure, Seismic Design, and IEEE Std-279 Criteria

System Electrical and Control Description

The review of the CECO proposed system with regard to the electrical, instrumentation, and control systems aspects has been completed utilizing the referenced letters (listed at the end of this evaluation) and staff discussions with CECO.

The proposed overall approach to eliminating low temperature overpressure transients incorporates administrative, procedural and hardware changes with reliance upon the plant operator for the principal line of defense. Preventatve administrative and procedural measures include:

1. Procedural precautions, including the deenergizing of non-essential SI components during the cold shutdown mode of operation and maintaining a non-water-solid Reactor Coolant System (RCS) condition whenever possible.

2. Installation of a low temperature OMS. The proposed low temperature OMS includes sensors, actuating mechanisms, alarms and valves to prevent an RCS transient from exceeding the pressure-temperature limits included in the Zion Units 1 and 2 Technical Specifications as required by Appendix G to 10 CFR Part 50.

To assure the proper operation of the OMS and compliance with the procedural precautions, the staff requested CECO to submit proposed changes to the Technical Specifications that are in accordance with the staff's requirements as presented later in this evaluation.

The staff position with regard to the inadvertent operation of SI components during cold shutdown and startup operations requires the deenergizing of SI pumps and closure of SI header/discharge valves. Zion Station procedures currently require that at RCS temperatures of 100 degrees F or below: (1) the SI pumps are turned off and their breakers racked-out and tagged-out of service; (2) the accumulator discharge valves are closed and tagged-out of service; (3) the safeguards actuation system is placed in a blocked mode; and (4) the SI pump discharge valves are closed.

The SI pump and valve control switches, located at the main control board, have a pull-to-lock position. The switches are placed in this position when the equipment is taken out of service. When the circuit breakers for the pumps or valves are racked-out or the control switches are in the pull-to-lock position, all status indication is lost. The loss of status indication and/or the position of the control switches indicates to the operator that the equipment is out of service.

The staff position with regard to the procedures for startup from cold shutdown to hot standby and from hot standby to cold shutdown requires that the ΔT between the RCS and the shell side of the steam generator be less than 50 degrees F before starting (jogging) a reactor coolant pump. This position will not apply when a steam bubble exists in the pressurizer.

The operator utilizes existing instrumentation to alert him that a RCS overpressure transient is in progress. These include PORV position indication lights, relief tank level, temperature alarms, and the RCS pressure recorder.

Pressure Transient Reporting and Recording Requirements

The staff position on pressure transients which cause the OMS to function, thereby indicating the occurrence of a serious pressure transient, is a 30-day reportable event. In addition, pressure and temperature recording instrumentation are required to provide a permanent record of the pressure transient. The response time of the recorders shall be compatible with pressure transients increasing at a rate of approximately 100 psig per second. This instrumentation shall be operable whenever the OMS is enabled.

Design Criteria

The design basis criteria and CECO's OMS proposed design used to determine the acceptability of the electrical, instrumentation and control aspects of the OMS are:

1. Operator Action - "No credit can be taken for operator action for ten minutes after the operator is aware, through an action alarm, that a overpressure transient is in progress."

   The CECO OMS, when manually enabled, is designed to automatically perform its function for at least ten minutes after the operator is aware of the transient through an action alarm.

2. Single Failure - "The system shall be designed to protect the reactor vessel given a single failure in addition to the failure that initiated the overpressure transient."

   The Zion Station OMS provides complete redundancy and meets the single failure criterion. One of two pneumatically operated PORV's provides the required relief capacity for the OMS; the second PORV provides redundant relief capacity. Each OMS channel has an air accumulator tank that provides a 10-minute backup air supply to operate the PORV when there is a loss of the primary air supply. Each OMS channel includes sensors, actuating mechanisms, alarms and valves to prevent a RCS overpressure transient. Complete electrical independence and separation are maintained in both OMS channels.

3. Testability - "The system must be testable on a periodic basis consistent with the frequency that the system is relied upon for low temperature overpressure protection."

   The OMS is designed to allow testing prior to its use. The system will be calibrated during each refueling outage and a functional test will be performed before each use. The functional test will include stroking the PORV's at the required pressure setpoint.

4. Seismic and IEEE 279 Criteria - "The system should meet both seismic Category I and IEEE 279 criteria. The basic objective is that the system should not be vulnerable to a common failure that would both initiate a pressure transient and disable the overpressure mitigating system. Such events as loss of instrument air and loss of offsite power must be considered."

   The circuitry of each OMS channel is electrically and physically separated from each other. The seismic design of equipment presently installed is maintained for the OMS. The OMS has been designed such that no common mode failure will disable the system.

5. Isolation Valve Alarm - "The licensee was requested to provide an alarm that monitors the position of the pressurizer relief valve isolation valves, associated with the low setpoint enabling switch, to assure that the overpressure mitigating system is properly aligned."

   The licensee has provided the required alarm. The "Low Temp Over-pressurization Protection Not in Service" alarm is annunciated whenever the RCS temperature is below 250 degrees F and both OMS channels are not enabled. The alarm monitors the positions of the selector switches and the PORV isolation valves to insure that both channels are enabled.

Electrical Design Conclusions

The CECO design of the low temperature OMS meets the staff requirements in the areas of electrical, instrumentation, and control. It is acceptable on the basis that: (1) the proposed system complies with IEEE Std. 279-1971 criteria and is designed as a seismic Category I system; (2) the system is redundant and satisfies the single failure criterion; (3) the design is such that the system requires no operator action for ten minutes after receipt of an overpressure transient action alarm; (4) the system is testable on a periodic basis; and (5) an alarm is included to verify that both OMS channels are operational.

Appendix G to 10 CFR Part 50

The Appendix G curve submitted by CECO for purposes of overpressure transient analysis is based on eight effective full power years irradiation. We approved the Appendix G curve in License Amendment Nos. 50 and 47, respectively, on June 18, 1979. The zero degree heatup curve is allowed since most pressure transients occur during isothermal metal conditions. Margins of 60 psig and 10 degrees Fahrenheit are included for possible instrument errors. The Appendix G limit at 100 degrees F according to this curve is 520 psig. The staff finds that use of this curve is acceptable as a basis for the OMS performance.

Setpoint Analysis

The one loop version of the LOFTRAN (Reference WCAP 7907) code was used to perform the mass input analyses. The four loop version was used for the heat input analysis. Both versions require some input modeling and initialization changes. LOFTRAN is currently under review by the staff and is judged to be an acceptable code for treating problems of this type.

The results of this analysis are provided in terms of PORV setpoint overshoot. The predicted maximum transient pressure is simply the sum of the overshoot magnitude and the setpoint magnitude. The PORV setpoint is adjusted so that given the setpoint overshoot, the resultant pressure is still below that allowed by Appendix G limits.

CECO presented the following Zion Units 1 and 2 plant characteristics to determine the pressure reached for the design basis pressure transients:

SI Pump Flowrate @ 500 psig	107 lb/sec
RCS Volume	11,990 ft^3
SG Heat Transfer area	58,000 ft^2
Relief Valve Setpoint	435 psig

Westinghouse identified certain assumptions and input parameters as conservative with respect to the analysis. Some of these are listed here.

1) One PORV was assumed to fail.

2) The RCS was assumed to be rigid with respect to expansion.

3) Conservative heat transfer coeffients were assumed for the steam generator.

The staff agrees that these are conservative assumptions.

Mass Input Case

The inadvertent start of a safety injection pump with the plant in a cold shutdown condition was selected as the limiting mass input case. For this transient, a relief valve opening time of 2.5 seconds was used. CECO has verified that this time is conservative.

Westinghouse provided the licensee with a series of curves based on the LOFTRAN analysis of a generic plant design which indicates PORV setpoint overshoot for this transient as a function of system volume, relief valve opening time and relief valve setpoint. These sensitivity analyses were then applied to the Zion Units 1 and 2 plant parameters to obtain a conservative estimate of the PORV setpoint overshoot. The staff finds this method of analysis to be acceptable.

Using the Westinghouse methodology, the Zion Units 1 and 2 PORV setpoint overshoot was determined to be 84 psi. With a relief valve setpoint of 435 psig, a final pressure of 519 psig is reached for the worst case mass input transient. Since the eight EFPY Appendix G limit at temperatures above 100 degrees F is above 520 psig, the staff concluded that the system performance was acceptable with a 435 psig low pressure relief valve setpoint.

Heat Input Case

Inadvertent startup of a reactor coolant pump with a primary to secondary temperature differential across the steam generator of 50 degrees F, and with the plant in a water solid condition, was selected as the limiting heat input case. For the heat input case, Westinghouse provided the licensee with a series of curves based on the LOFTRAN analysis of a generic plant design to determine the PORV setpoint overshoot as a function of RCS volume, steam generator UA and initial RCS temperature. For this transient, a relief valve opening time of three seconds was assumed.

The calculated final pressure for the heat input transient for a fixed ΔT of 50 degrees F depends on the initial RCS temperature and is given here:

RCS Temperature (F)	Maximum Pressure (psig)
100	463
140	487
180	507
250	558

In all these cases, for the given RCS temperature, the Appendix G limits are not exceeded.

The staff finds that the analyses of the limiting mass input and heat input cases show a maximum pressure transient below that allowed by Appendix G limits and is therefore acceptable.

Implementation Completion

CECO installed the necessary equipment for the long-term OMS on Unit 1 during the refueling outage in September 1977. However, no shutdown or system depressurization was required for Unit 2 until the refueling outage of February 1978. Installation was completed during that outage. Because the plant was not susceptible to overpressure transients when operating at normal temperatures and because administrative controls were available, the staff found the proposed installation schedule acceptable.

Administrative Controls

To supplement the hardware modifications and to limit the magnitude of postulated pressure transients to within the bounds of the analysis provided by the licensee, a defense-in-depth approach is adopted using procedural and administrative controls. Those specific conditions required to assure that the plant is operated within the bounds of the analysis are spelled out in the Technical Specifications.

Procedures

A number of provisions for prevention of pressure transients are contained in the Zion Unit 1 and 2 operating procedures. The procedures for startup (and jogging) of a reactor coolant pump require that at RCS temperatures above 140 degrees F a steam bubble be established in the pressurizer prior to pump start. Otherwise, the RCS temperature is heated by decay heat to the temperature required for bubble formation or the steam generator shell-side temperature is monitored to assure that it is in equilibrium with the RCS temperature. Also, at least one RCP is operated throughout a normal cooldown to 140 degree F to assure that the steam generator follows the RCS temperature.

Both high pressure coolant injection pumps are de-energized by procedure below 250 degrees F to prevent inadvertent starts and the discharge valves are closed and power removed. Above 250 degrees F the maximum allowable pressure by Appendix G is above the shutoff head of the SI pumps. Thus, it is acceptable to have both SI pumps on line above 250 degrees F. Also, two of the three charging pumps are tagged out of service immediately following initiation of RHR.

The staff finds that the procedural and administrative controls described are acceptable.

Technical Specifications

It is the staff's position that, when administrative controls are used to limit overpressurization scenarios, that administrative controls shall appear in the Technical Specifications as Limiting Conditions for Operation. The licensee was, therefore, required to submit Technical Specification changes for the Zion Station Units 1 and 2 licenses consistent with the following:

1. Both low temperature OMS channels must be operable whenever the RCS temperature is less than the minimum pressurization temperature, except one may be inoperable for seven days.

2. Operability of each low temperature OMS channel requires the control switch to be in the proper position, the pressure point set, the PORV isolation valves open, instrument and solenoid power on, and the PORV backup air supply charged.

3. No more than one of three charging pumps, no high head SI pumps, and no accumulates shall be operable at RCS temperatures below 250 degrees F, unless the reactor vessel head is removed.

4. A reactor coolant pump may be started (or jogged) only if there is a bubble in the pressurizer or the steam generator/reactor coolant system temperature differential is less than 50 degrees F.

5. The OMS shall be tested on a periodic basis consistent with the need for its use. A system functional test and a setpoint verification test shall be performed prior to enabling the overpressure protection system during cooldown and startup. This test shall be repeated monthly when te RCS temperature is below 250 degrees F. The system shall be calibrated at refueling intervals. The system verification test shall include verification of the backup air supply.

We have completed our review of the licensee's proposed Technical Specifications provided in CECO letters dated February 26 and September 26, 1979. We modified the proposals to include an 18 month channel check (Section 4.3.2.G) in addition to the licensee's proposed channel functional test once per 31 days. We have also added a reporting requirement for the OMS operation to Section 6.6.3.c. With these modifications, the Technical Specifications are acceptable.

Conclusion for OMS

The administrative controls described herein and hardware changes completed by CECO provide protection for Zion Station Units 1 and 2 from pressure transients at low temperatures by reducing the probability of initiation of a transient and by limiting the pressure of such a transient to below the limits set by Appendix G. The staff finds that the overpressure mitigating system meets the criteria established by the NRC and is acceptable as a long-term solution to the problem of overpressure transients. However, any future revisions of Appendix G limits for Zion Station Units 1 and 2 must be considered and the overpressure mitigating system setpoint adjusted accordingly with corresponding adjustments in the license.

References for OMS Evaluations

1. Commonwealth Edison (CECO) letter (Bolger) to NRC (Schwencer) dated September 2, 1977.

2. "Staff Discussion of Fifteen Technical Issues listed in Attachment G November 3, 1976 Memorandum from Director NRR to NRR Staff." NUREG-0138, November 1976.

3. NRC letter (Schwencer) to CECO (Bolger) dated August 11, 1976.

4. CECO letter (Pliml) to NRC (Schwencer) dated September 2, 1976.

5. CECO letter (O'Brien) to NRC (Schwencer) dated November 9, 1976.

6. CECO letter (O'Brien) to NRC (Schwencer) dated December 20, 1976.

7. CECO letter (Bolger) to NRC (Schwencer) dated March 4, 1977.

8. CECO letter (Bolger) to NRC (Schwencer) dated March 31, 1977.

9. "Pressure Mitigating System Transient Analysis Results" prepared by Westinghouse for the Westinghouse user's group on reactor coolant system overpressurization, dated July 1977.

10. CECO letter (Bolger) to NRC (Schwencer) dated December 15, 1977.

11. CECO letter (Reed) to NRC (Denton) dated February 26, 1979.

12. CECO letter (Peoples) to NRC (Denton) dated September 26, 1979.

2. SECONDARY WATER CHEMISTRY MONITORING PROGRAM (LICENSE CONDITION 2.C.(8) AND SPECIFICATION 6.5.B.14)

Introduction

By letter dated September 28, 1979 in response to our letter dated August 1, 1979, CECO proposed a license condition to implement a secondary water chemistry monitoring and control program.

Discussion and Evaluation

The NRC staff recognizes that different utilities use different secondary water treatment methods to limit steam generator tube corrosion. Moreover, we recognize that a licensee's choice of a particular water treatment method, including specific values of operating limits for chemistry parameters, is governed by plant and site characteristics that are unique to each facility. In addition, we do not believe at this time that sufficient service experience exists to conclude that any particular method is superior to another for controlling impurities that may be introduced into the secondary coolant. Such experience would be necessary to assure that a specific secondary water chemistry control method would ensure minimum tube degradation.

Restricting the amount of chemical additions to control the water chemistry parameters would not ensure the desired steam generator operating conditions. Realizing that meeting the secondary coolant water quality criteria would not be possible during all periods of operation, it is necessary that the most effective procedure for reestablishing out-of-specification chemistry parameters be available without unduly restricting plant operations. This can be accomplished most rapidly by continuing to operate the Zion Station so that chemical additives to the secondary water can be made to achieve a balanced chemistry. During discussions with CECO personnel, we were advised that permanent records are kept of all chemical additives used. Such records would be available if needed for our future evaluations. We consider that these permanent plant records on a sampling program may be useful in the future. Thus, Specification 6.5.B.14 was added identifying records of secondary water sampling and water quality for retention. The CECO staff agreed to this addition since they already retain such records for the life of the plant.

We believe that certain methods exist for reducing the impurity concentration in the steam generator such as periodic chemical cleaning for long-term solution, flushing or free surface boiling for an intermediate term solution, or the use of chelating agents for the control of secondary water purity are more practical. These methods are likely to be more effective in limiting corrosion than specific control methods that may lack the flexibility needed for proper control of secondary water chemistry. The NSSS vendors are now considering these alternate methods in lieu of restrictive secondary water chemistry for assuring steam generator tube integrity.

In addition, existing Technical Specification Limiting Conditions for Operation and surveillance requirements for Zion Station provide assurance that steam generator tube integrity is not reduced below an acceptable level for adequate margins of safety. These specifications are:

1. Techical Specification 3.3.3E - Limiting Conditions on Primary to Secondary Leakage

2. Technical Specification 4.3.1.B - Surveillance Requirements for Steam Generator

However, we have also added License Condition 2.C.(8) requiring CECO to implement a secondary water chemistry monitoring program to inhibit steam generator tube degradation. The CECO staff has agreed to the program.

Conclusion for Secondary Water Chemistry Monitoring Program

We have concluded that the Licensing Condition 2.C.(8) proposed by CECO in conjunction with existing Technical Specifications on steam generator tube leakage would provide the most practical and comprehensive means of assuring steam generator tube integrity. At the same time our action provides the licensee the needed flexiblity to effectively deal with any off-normal conditions that may arrive. The staff finds that Licensing Condition 2.C.(8) meets the Model Licensing Condition contained in our letter dated August 1, 1979, and is acceptable. Further, we find that Technical Specification 6.5.B.14 will ensure adequate record retention at Zion Station and is acceptable.

3. Rod Insertion Limits (Zion Unit No. 2 Figure 3.2-4)

Introduction

By letter dated November 7, 1979, CECO proposed a Technical Specification change to revise the Zion Unit No. 2 Control Rod Insertion Limits (Figure 3.2-4) to be identical to the previously approved Zion Unit No. 1 values.

Discussion and Evaluation

For each Zion reload fuel cycle, the rod insertion limits are reviewed by CECO using the following criteria to verify that either the limits are applicable or require modification:

1. The shutdown margin is maintained for the control rods at the revised insertion limits;

2. The Technical Specification limit on the enthalpy rise hot channel factor, $F_{\Delta H}$, is maintained for rod positions allowed in normal operation;

3. The consequences of an ejected control rod assembly from the revised insertion are within design limits; and

4. Statically misaligning a control assembly will not violate the thermal design basis with respect to DNBR.

The licensee has determined that the Zion Unit 2 Cycle 4 reload analysis remains valid since all the affected values have been determined to be conservative with respect to the revised limits of the proposed change to

Figure 3.2-4. In addition, the total peaking factor during control maneuvers with the revised limits will be no greater than that with the current limits.

The proposed insertion limits, which are currently being used in the Zion Unit 2 Cycle 5 reload analysis, have been judged by the licensee applicable for succeeding cycles, i.e., bounding. Less restrictive limits may be applicable for future cycles. However, in lieu of modifying the plant license each cycle, the revised limits of Figure 3.2-4 will be used provided that they meet the criteria stated above. If the criteria are not met, a new set of rod insertion limits will be selected and verified, thus necessitating a license modification.

Conclusion for Rod Insertion Limits

The proposed Figure 3.2-4 Control Rod Insertion Limits to the Technical Specifications are conservative when compared to the existing Figure 3.2-4. In addition, the new control rod insertion limits proposed for Unit 2 were approved for Zion Unit No. 1 by the NRC staff in our letter dated August 15, 1978, transmitting License Amendment No. 39 to License DPR-39. Therefore, since the proposed specification is more conservative than previously approved and is the same as that approved for use on Unit No. 1, the change is acceptable for Unit No. 2.

Environmental Consideration

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: February 28, 1980