

TECHNICAL EVALUATION REPORT

BEAVER VALLEY POWER STATION UNIT 1

Deletion of Reactor Trip on
Turbine Trip Below 50 Percent Power

Docket Number 50-334

August 1979

Prepared By:

Wayne E. Reeves

Lawrence Livermore Laboratory

991 326
79092402981

~~0000000000~~

August 4, 1979

1.0 INTRODUCTION:

The Duquesne Light Co., the holder of License #35, in its letter dated October 27, 1978, submitted a license amendment request for the deletion of reactor trip on turbine trip below 50% power for the Beaver Valley Power Station, Unit No. 1. Their present criteria states that they will trip the reactor any time the power turbine trips when they are operating above 10% of rated power.

2.0 PROPOSED CHANGES:

Pursuant to 10 CFR 50.59, the holders of operating license 35 propose the following changes to Appendix A Technical Specifications:

1. Add Section 7, 3.3-1, which reads

"P-9 - With 2 of 4 power range neutron flux channels > 51% of rated thermal power, P-9 prevents or defeats the automatic blocks of reactor trip on turbine trip."

2. Add on limiting safety settings B2-7, which reads,

"Turbine Trip - A turbine trip causes a direct reactor trip when operating above P-9. Each of the turbine trips provide turbine protection and reduces the severity of the ensuing transient. Their functional capability at the specified trip settings is required to enhance the overall reliability of the reactor protection system.

3.0 REASON FOR CHANGES:

Presently, the reactor protection system provides for a reactor trip upon a turbine trip when above 10% power. Since both units will accept a 50% load rejection, a reactor trip is not necessary because of a turbine trip until at or above 50% power. A pending design change will initiate a reactor trip upon a turbine trip when at or above 50%. Two-of-four channels logic will be used to detect 50% power and yield permissive P-9. This permissive will be developed in the reactor protection logic racks, and will be wired into the reactor trip matrices. The P-9 logic will be testable, using the same design techniques as for other protection logic relays. An associated logic change will modify the steam dump logic.

4.0 REVIEW OF LICENSEE'S SUBMITTAL

The review showed that:

1. The proposed P-9 interlock would block a reactor trip due to turbine trip when the unit is below the setpoint. The block action occurs when three out of four neutron flux power range signals are below the setpoint. Thus, below P-9, the reactor will be allowed to operate and the turbine trip transient will ride out as a load rejection and with reactor power dissipated by steam dump. When two out of four signals measure above the P-9 setpoint, the reactor would be tripped.

991 327

4.0 REVIEW OF LICENSEE'S SUBMITTAL:

2. The low feedwater flow trip is actuated by steam/feedwater flow mismatch (one out of two logic). No interlocks are associated with this trip.
3. The low low steam generator water level trip (two out of three logic) will initiate a low feedwater flow reactor trip.
4. The turbine trip-reactor trip is actuated by two out of three logic from low autostop oil pressure signals or by all closed signals from the turbine steam stop valves. Therefore, a turbine trip causes a direct reactor trip above P-9 (50% thermal power).
5. A reactor trip occurs when the Emergency Core Cooling System (ECCS) is actuated.
6. The manual trip has no interlocks to block the reactor trip operation.
7. The power range high flux reactor trip provides safety from reactivity excursions during startup.
8. The high and low pressure trips limit the pressure operating range of the system.
9. The overtemperature Δt reactor trip provides for core protection against DNB for combination of pressure, power, coolant, temperature, and power distribution excursions.
10. The system is designed with a steam dump function which is capable of bypassing up to 50% of rated load steam.
11. The safety analysis does not take the credit for the steam dump system.

5.0 CONCLUSION:

I have reviewed the technical aspects of the licensee's submittal which shows:

1. No degradation of the engineered safety features occurs due to this change.
2. The system has the capability to bypass 50% of rated power steam around the turbine.
3. No credit is taken for the steam dump system in the FSAR.

Based on this review, I recommend that NRC approve this proposed change.

991 528

August 4, 1979

6.0 REFERENCES:

1. Letter, C. Dunn of Duquesne Light to A. Schwencer of DOR, October 27, 1978
2. Enclosed submittal
 - a. Beaver Valley Power Station Unit I FSAR amended draft July 27, 1978
 - b. Deletion of reactor trip on turbine trip below 50 percent power analysis - G. Narasimhan
 - c. Section 7 - Changes to the Technical Specifications
Section 8 - Precautions, Limitation and Setpoints document

991 329