



potential generic aspects of the accident on other reactors, the NRC staff initiated prompt action to: (1) assure that other reactor licensees, particularly those plants such as Rancho Seco which have a similar design to TMI-2, took the necessary actions to substantially reduce the likelihood of future TMI-2-type events from occurring, and (2) start comprehensive investigations into the potential generic implications of this accident on other operating plants. To accomplish some of this work, the Bulletins and Orders Task Force (B&OTF) was established within the Office of Nuclear Regulator Regulation (NRR) in May 1979. The B&OTF was responsible for reviewing and directing the TMI-2-related staff activities associated with loss of feedwater transients and small break loss-of-coolant accidents (LOCAs) for all operating plants to assure their continued safe operation.

The initial priority of the B&OTF was placed on evaluating the actions taken by the B&W operating plant licensees in response to the Confirmatory Shutdown Orders issued in May 1979. We were assigned to the Task Force in mid-June 1979. Upon assuming those positions, we participated in the final preparation of the Staff Safety Evaluation which documented our evaluation of SMUD's compliance with the immediate requirements of the May 7, 1979 Order. On the basis of this report, issued on June 27, 1979, the Rancho Seco Facility was authorized to return to power operation.

Q.4 What is the purpose of your testimony?

A. The purpose of our testimony is to respond to California Energy Commission Issues 1-1 and 1-12 which read:

1-1 "Despite the modifications and actions of subparagraphs (a) through (e) of Sections IV of the Commission's Order, will reliance upon the High Pressure Injection System to mitigate pressure and volume control sensitivities in the Rancho Seco Primary system result in increased challenges to safety systems beyond the original design and licensing basis of the facility?"

1-12 "Despite or because of the modifications and actions of Subparagraphs (a) through (e) of Section IV of the Commission's Order of May 7, will Rancho Seco experience an increase in reactor trips resulting from feedwater transients that will increase challenges to safety systems beyond the original design and licensing basis of the facility?"

Q.5 Have the actions of the May 7 Order resulted in increased challenges to safety systems, an increased number of reactor trips, or an increased actuation of the high pressure injection system?

A. Probably yes.

Q.6 If so, describe the nature of that increase.

A. A review of the operating history of B&W plants indicates the presence of some reactor trips and actuations of the reactor protection system which probably would not have occurred prior to the modifications of the May 7 Order. Therefore, the evidence does support the hypothesis that the frequency of reactor trips and safety system actuation has increased. This effect appears to largely be due to the lowered high pressure reactor trip set point and anticipatory trip system. A study submitted by the Midland plant reports that while the trip frequency has increased, there is not an excessive increase. The limited data base shows the trip frequency increased from 0.56 to 0.65 per month. This is in agreement with staff observations; however, it should be noted that the staff has not performed a detailed statistical study of post-TMI trip frequency and post-TMI operating experience is limited, so it is not possible to arrive at definitive findings.

Since there has been an increase in reactor trips, an increase in HPI actuation is also likely.

Q.7 If an increase in challenges to the safety system, and increase in number of high pressure injection actuations and reactor trips has taken place, are these events beyond the original design and licensing basis of the facility?

A. No.

Q.8 If not, provide the basis for that answer.

A. Plant events such as reactor trips, high pressure injection initiation, and other safety system responses are of interest inasmuch as they subject the reactor coolant pressure boundary to various levels of thermal stress. During a reactor trip, or safety injection operation, temperature changes take place in the reactor coolant pressure boundary. Due to material properties of the piping system and other structures, these temperature changes cause thermal stresses to occur. During the course of the Rancho Seco design, certain criteria were established for the allowable number of plant transients which would result in thermal cycles and stress on the reactor coolant pressure boundary. These criteria are detailed in design information supplied to the Rancho Seco operating staff. These reports describe how many transients of each category are allowed for in the basic plant design and include such plant responses as reactor trip and high pressure safety injection.

An increased number of reactor trips, high pressure injection, or other safety system injection is acceptable to the staff, as long as the design criteria in regard to thermal stress cycling are not violated. At present, none of the thermal cycle limits have been approached. During the course of plant operation, all events and operating conditions are monitored and recorded to assure that an accurate account is being maintained regarding the thermal cycling and stresses to which Rancho Seco has been subjected. If at some time in the future the applicant believes that the limits for thermal cycles and stress for any events (including trips and safety system actuation) will be exceeded, it is expected to notify the staff. At that time, before any limits are exceeded, the staff will determine what additional analysis or plant modifications are required to assure that continued operation will not violate the plant's design basis.

In addition to the safety concern on thermal stress, a concern may exist that the increased challenges to the safety systems may degrade their performance and reduce the availability of these systems. This concern is considered since these safety systems are subjected to periodic testing and maintenance to assure that they are capable of performing their function when required.