

15122

QUICK LOOK REPORT

FOR A

REACTOR TRIP/OVERSPEED TURBINE TRIP

WHICH OCCURRED AT

13:24:21 HOURS

MARCH 6, 1979

AT

THREE MILE ISLAND, UNIT 2

Prepared by

Nuclear Power Generation Division
Babcock & Wilcox Company
Lynchburg, Virginia

Report No. 1 Rev. 0

Date 22 Aug 79

Released by M.E. Newton

Reviewed by C. White

8307020183 901210
PDR ADCK 05000289 P



TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
I.	Event Synopsis	1
II.	Performance Evaluation and Recommendations	2
	A. Expected Plant Performance	2
	B. Performance Deviations	2
	C. Recommendations for Corrective Action	3
III.	Event Details and Input Data	5
	A. Initial Conditions	5
	B. Plots of Major Parameters	6
IV.	Operating Transient Classification	7
V.	References	8
Appendix A	Plots of Selected Parameters	
Appendix B	Input Data from Plant Computer	

REF ID: A11111

I. EVENT SYNOPSIS

At 13:24:21 on March 6, 1979, TMI-2 experienced a turbine overspeed trip (Independent Emergency Overspeed Protection System) while operating at 98% steady state power. Later, at 13:26:23, the reactor tripped on negative imbalance (Power/Imbalance/Flow).

The integrated control system began reducing primary power at 20% per minute immediately after the turbine trip. During the 20%/minute runback, core negative power imbalance began increasing and after two minutes tripped the reactor when power imbalance exceeded - 36.1%.

The reactor trip caused RC pressure to immediately drop to 1720 psig, but RC pressure quickly stabilized and returned to normal (>1500 psig) within 10 minutes. Pressurizer level never went below 50 inches.

At 13:27:57, feedwater pump FW-P-1B was manually tripped.

According to site personnel, the yoke on two turbine bypass valves MS-V26A and MS-V25B were found broken after the event. In addition, the counter weight on the steam extraction valve EX-V23A was discovered disconnected from the valve. Both bypass yokes were repaired and the counterweight replaced.

Criticality was achieved on March 7, 1979, at 0500 and returned to 98% full power by 1700 hours on March 7, 1979.

II. PERFORMANCE EVALUATION AND RECOMMENDATIONS

A. Expected Plant Performance

Following the turbine trip at 13:24:21 the expected plant response would be a successful runback to 15% reactor power. In the event of a reactor trip, three key system responses would be expected. They are:

1. Reactor Coolant System temperatures should level out at about 545-550F within 1½ to 2 minutes after the reactor trip and stabilize at that value.
2. Steam pressure should level out at about 1000 psig following the reactor trip and stabilize at that point until return to critical, or reduced by the operator, and
3. Steam generator level control point of 24 to 30" should be reached and maintained within 1½ to 2 minutes after reactor trip.

B. Performance Deviations

1. Turbine Trip

As reported in SPR No. 212, Unit 2 turbine tripped due to an incorrect signal to the Independent Emergency Overspeed Trip System. (Most likely the source was power supply problems in the DC System. Overspeed trip was initiated when the generator breakers closed in the network. This proved to be a false signal. This information is taken from Reference 1.)

2. Reactor Trip During Runback

The I.C.S. ran back reactor power as designed. However, since both CRD groups 6 and 7 are ganged together in this system, a large reactivity insertion at the top of the core resulted in a negative power imbalance which initiated a reactor trip approximately two minutes after the turbine trip.

EST 1253

EST 15126

3. Poor Feedwater Control After Reactor Trip

The feedwater was controlled correctly for approximately the first two and ½ minutes of the transients. The only deviation was that the steam generator level leveled out at about 20 to 25 inches too high.

After the first 2½ minutes, the steam generators were both overfed. The "A" steam generator level was being corrected to the proper value (25 to 30") at 15 minutes. However, the "B" generator level was held at a very high value. (190 inches)

C. Recommendations for Corrective Action and/or Further Study

1. Turbine Trip

Site personnel report that exact cause of turbine trip cannot be determined. Therefore, no recommendations for corrective action and/or further study will be made.

2. Reactor Trip During Runback

As suggested by G. A. Kunder in a letter to L. Rogers on March 8, 1979 (Ref.-2), the following analysis is recommended before corrective action is specified.

- a. Evaluate alternatives which might help prevent imbalance trips.
Consider different positioning of Group 8, etc.
- b. Evaluate the requirements for converting to a sequential operation of Group 6 & 7. For example: What would be the analysis costs and impact of converting to sequential operation of Group 6 & 7 during the rod swap outage and what would be the licensing impact of the change.

3. Poor Feedwater Control After Reactor Trip

The feedwater was controlled correctly for approximately the first two and ½ minutes of the transients. The only deviation was that the steam generator level leveled out at about 20 to 25 inches too high.

After the first 2½ minutes, the steam generators were both overfed. The "A" steam generator level was being corrected to the proper value (25 to 30") at 15 minutes. However, the "B" generator level was held at a very high value. (190 inches)

C. Recommendations for Corrective Action and/or Further Study

1. Turbine Trip

Site personnel report that exact cause of turbine trip cannot be determined. Therefore, no recommendations for corrective action and/or further study will be made.

2. Reactor Trip During Runback

As suggested by G. A. Kunder in a letter to L. Rogers on March 8, 1979 (Ref.-2), the following analysis is recommended before corrective action is specified.

- a. Evaluate alternatives which might help prevent imbalance trips. Consider different positioning of Group 8, etc.
- b. Evaluate the requirements for converting to a sequential operation of Group 6 & 7. For example: What would be the analysis costs and impact of converting to sequential operation of Group 6 & 7 during the rod swap outage and what would be the licensing impact of the change.

EST 91
E 15 124

c. What experiences have other B&W customers had concerning imbalance trips during upsets?

3. Poor Feedwater Control After Reactor Trip

The following analysis is recommended before any final conclusions or corrective actions are specified. The analysis will consist of a study of past transient data and the present data.

- a. Evaluate why both steam generator "A" and "B" level leveled off 20 to 25 inches too high at 2½ minutes.
- b. Evaluate what caused the overfeeding after 2½ minutes. Determine if this was caused by improper operator or control system action.

EST 613
E 1, 9 1 2 7