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THE BABCOCK & WILCOX COMPANY
POWER GENERATION GROUP

cc: G. J. Breall
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To	R. I. Lutz, Monitoring Equipment		File No. or Ref.
From	<i>R. I. Lutz</i>		
Cust.	D. B. Fairbrother, Plant Integration (3200)	80% 643.1	Date
Subj.	Ex. <i>6PU 288</i> 301 For ID Def'n 6-4-81 J.R. Danyo	Plant Computer Post Trip Requirements	
<small>This form is to cover one customer and one subject only</small>			June 11, 1979

Ref: R. I. Lutz to D. B. Fairbrother, "PCS Post Trip Functional Requirements," dated May 29, 1979

The referenced letter contains requirements for the Plant Computer Post Trip Monitoring functions. This memo has been reviewed with-in Plant Design with the following comments:

- One of the problems discussed by the ACRS was that the operator was provided too much information, much of it not relevant at the time. One way to help reduce the problem is to provide a more focused set of information in several priority levels. The comments from Safety Analysis (attached) suggest three categories of information: minimum information needed during the transient; backup information needed for recovery; and data needed to reconstruct the event. We suggest that you develop lists of parameters in these categories. These lists can be reviewed by Plant Design in light of the Event Scenarios that are being developed for the major accident sequences.
- Your memo listed several specific calculations to be added. We have the following comments on these calculations:
 - Thermocouple Monitoring and Loop Saturation Margin - These requirements have been reviewed previously. There are no further comments.
 - Natural Circulation - The parameters used by the operator to determine that natural circulation has been established should be monitored. With the addition of the incore thermocouples this information will be available. It is not recommended that the plant computer be used to determine if natural circulation has been established. The information should be provided to the operator and he should make the determination.
 - Reactor Coolant System Inventory - The addition of measurements of HPI flow per line and total flow, LPI flow per line and total flow and letdown flow would be a very useful addition. This information was missing at TMI.
 - Reactor Vessel Water Level - It is premature to attempt

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Amended to List
Plant Computer Post Trip Requirements

June 19, 1972

to add this measurement to the plant computer.

3. Additional comments from Safety Analysis are contained in the attachment.

If you have any questions on these comments, please contact me.

DBF/rw
Attachment

D4619:010

COMMENTS - POST TRIP FUNCTIONAL REQUIREMENTS

1. Consideration should be given to three types of data monitoring:
 - A. Type 1 - Minimum data important to the operator during a transient.
 - B. Type 2 - Backup data which could be crucial to event diagnosis or event recovery process if needed by operator.
 - C. Type 3 - Data which is not needed during the event but which is important to followup actions and detailed understanding of what occurred during the event.
2. The operator should be provided with a voice actuated tape log to supplement his written log.
3. The operator should have early confirmation of APW flow to each OTSG to supplement his current indications of APW pump discharge pressure.
4. Long term data monitoring recorder should show HPI flow rate and letdown flow with time.
5. Operators should have a ready backup status of the PCRV open/close status which is confirmatory in nature. It is also important that he have positive information on RC drain tank level, pressure, temperature and rupture disk blown.
6. A faster alarm printer may be missing the point. The operator needs a restricted alarm package which is always available. This should be an actual continuous summary addressing a minimal number of parameters related to core protection. A console TV display or similar listing of information would be suitable.
7. RC flow measurement range should include natural circulation flow levels and a means of indicating reverse flow in the coolant loops.
8. Consideration should be given in the requirements to location of the various data system such that operator is not normally forced to scan too broad a data display.
9. Present alarm printouts are hard to read. The following should be avoided for example:

DO NOT USE

"TRIP"

"??"

USE

"OFF" OR "ON"

"OFF SCALE HIGH"
OR "OFF SCALE LOW"

COMMENTS - POST TRIP FUNCTIONAL REQUIREMENTS CONT'D

DO NOT USE

USE

"+"
"

"HIGH LIMIT" OR "LOW LIMIT"

"822XXX"

"822XXX" (LIMITS)

10. Operator should have time plot capability for key input versus time.
11. Initial data available to operator should not include system status input but system dynamics information reflective of system operation.
12. For thermocouple monitoring the highest T/C should not be depended on for T_{sat} comparison since this may mislead operator if T/C is faulty and operator thinks conditions are worse than they are. He should have means to confirm response by switching to other T/C's.
13. Data accumulation should not necessarily be triggered off of only reactor trip and turbine trip. Transients may go for a long time before reading either condition.
14. Quick backup display of major system status conditions for active valves and pumps.
15. Event followup could have benefited from pressurizer pressure measurement.