

GPU 592

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THE BABCOCK & WILCOX COMPANY
POWER GENERATION GROUP

GPU 592
LRC

To |
W. H. Spangler, Nuclear Service

TERRY
Chuck
FRED.

From
E. W. Swanson, Plant Integration

SDS 453.5

Cust.
Toledo-NSS-14

File No.
or Ref.

Subj.
Auxiliary Feedwater Setpoints

Date

November 15, 1978

This letter is cover and customer and one tabbed only.

Our recent discussions with Toledo personnel regarding their need to reduce the steam generator level setpoint for natural circulation, and B&W's need to maintain a high level because of ECCS small break have led to an impasse.

Both B&W and Toledo are in a "risk" position because the Toledo small break topical was based on a 32' level position; any change to that position may require re-analysis and re-licensing. Nevertheless, a steam generator level value has not been reported to NRC, and the ECCS Unit believes that a 10' level setpoint will be adequate.

Toledo's needs to lower the setpoint are genuine and I offer the following suggestion which you should pursue with Toledo:

1. Alter the control logic of the SFRCS so that it will provide two setpoints. Since a control function cannot be readily placed in an ESFAS system, the SFRCS must be modified. In the presence of an ESFAS signal, the ESFAS sets a priority for operation over any SFRCS signal and directs the SFRCS to provide a high setpoint level control. In the absence of an ESFAS signal, but with an SFRCS generated signal, the SFRCS control setpoint is directed to a low level. A general schematic is attached; other methods of implementing are possible, but this purveys the concept.
2. ESFAS could also initiate auxiliary feedwater and isolate main feedwater. Further investigation needs to be made as to the actual sequence of events. I believe it is now possible for two conditions to exist because the TSCC systems do not initiate AFW by ESFAS. These are:

Current Design

<u>Site Condition</u>	<u>Systems Sequence</u>	<u>Control Setpoint</u>
1. Offsite Power Available	ESFAS → ICS	2' (Main Feedwater)
2. Offsite Power Unavailable	ESFAS → SFRCS	10' (Aux. Feedwater)

If my reasoning is correct, the first condition will only provide a 2' control (of main feedwater); no SFRCS signal will occur and the ICS will control. The other condition will cause the SFRCS to respond to a loss of level (most likely) or to a loss of pump power. At any rate, SFRCS will initiate AFW and control to the high setpoint.

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The first condition may or may not be acceptable to ECCS Analysis; they have not investigated small breaks with RC pumps running. If such an analysis were to be made, the results would probably be unfavorable.

I suggest that TECo confirm that the above sequences are correct before a decision is made to initiate AFW with ESFAS.

3. I believe that further analytical effort will probably be needed by ECCS to confirm that the 10' setpoint is acceptable even though their judgement says it is. I think that some documentation on file will be required to substantiate their claim, but I do not recommend analyses at this time.
4. An additional thought might be considered for limiting the pressurizer draining. Recent investigations for the 205 plants have shown us that the rate of addition of feedwater has a substantial effect on RC temperature drop. The Toledo plant power level only requires about 500 gpm (at about 30-40 seconds after trip) to remove decay heat. Yet the pumps are capable (at design) of about 800 gpm each; with reduced steam generator pressure the addition rate increases by about 25% to 30%. The total flow rate possible tends to introduce subcooled water into the generator, fill to a preset level (possibly as a subcooled inventory—I don't know the effect of heat pickup as the water falls through the tube nest), and then heat up to boiling. A more preferable mode would be to introduce flow at a rate more equal to the decay heat load. An investigation into rate limiting (valve opening restrictions, cavitating venturis) may be worthwhile. Rate limiting may be a full or partial tradeoff for level limiting.
5. Further discussions with TECo about these suggestions are desirable; we will support efforts in this area.

EWS

EWS:dh
Attach

cc: H. A. Bailey
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B. M. Dunn
B. A. Karrasch
D. E. Leinhart
R. C. Luken
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R. O. Vosburgh
R. W. Winks
E. A. Womack

ESFAS/SFRAB MOD. IS PROBABLY
THE BEST FIX IN THAT FIELD
CHANGES WOULD BE LESS EXPENSIVE &
IMPACT ON ECCS WOULD BE
OF LESS RISK. THAT IS, ONE WOULD
AT LEAST GET A 10-H⁺ LEVEL DURING
POST-LOCA CONDITIONS. → IS A LEVEL
CONTROL FOLLOWING ESFAS ACTUATION
MANDATORY? LLL.

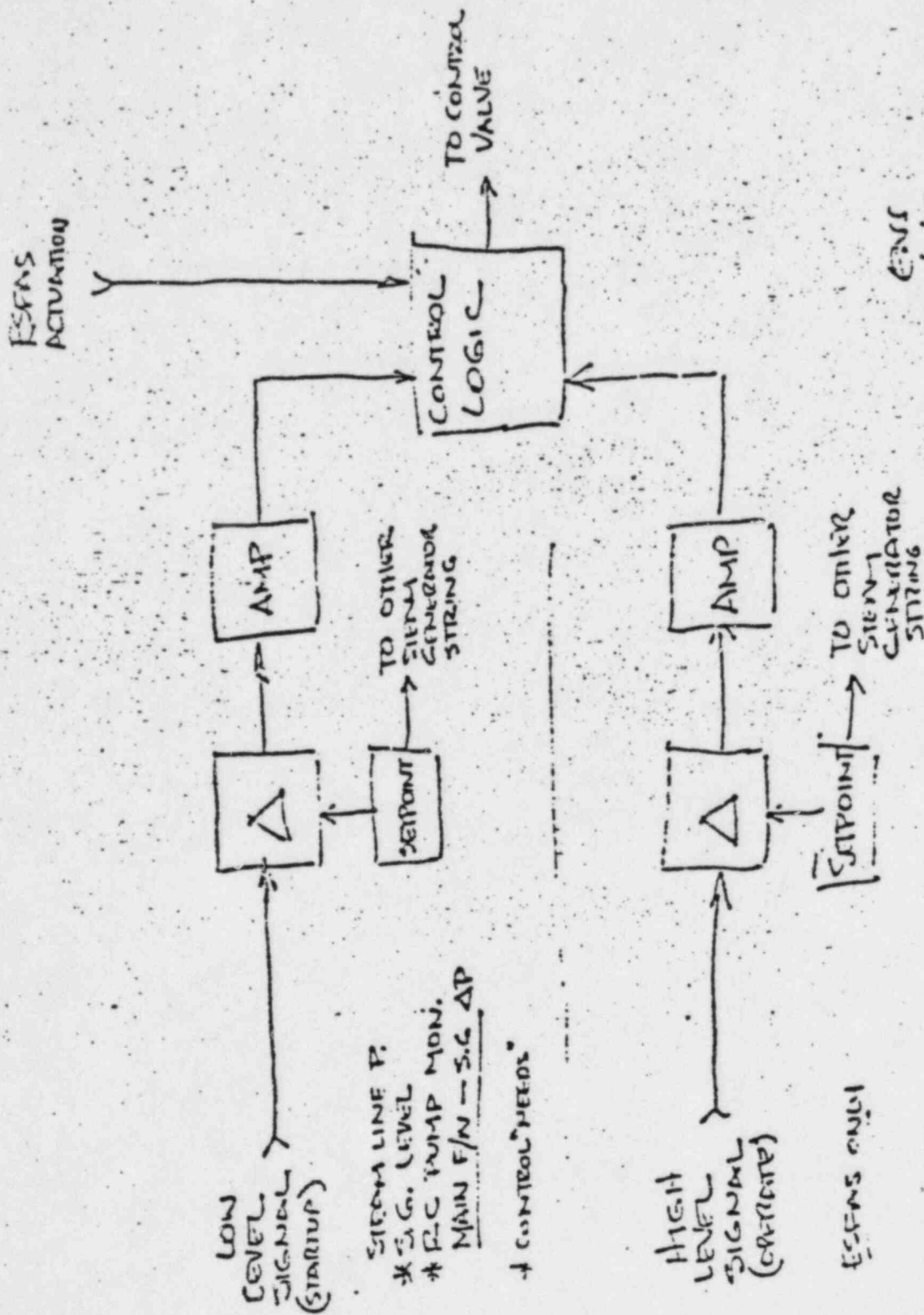
ESFAS
↓
APW ACT.
↓
NO LEVEL
CONTROL
↓
OPERATOR
MAY INTER.
TO TERMINATE
AFW FLOW

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High/Low SFZCS Control



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END 11/5/78