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CLARK,R.A. Operating Reactors Branch 3

SUBJECT: Forwards response to NRC 810526 ltr re asymmetric steam generator transient protection trip function. Two oversize drawings encl. Aperture cards will be in PDR.

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FLORIDA POWER & LIGHT COMPANY

June 11, 1981
L-81-245

Office of Nuclear Reactor Regulation
Attention: Mr. Robert A. Clark, Chief
Operating Reactors Branch #3
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Clark:

Re: St. Lucie Unit 1
Docket No. 50-335
Stretch Power Application

Enclosed is our response to the information request of your letter dated May 26, 1981, regarding the Asymmetric Steam Generator Transient Protection Trip Function.

Very truly yours,

Jack E. Uhrig for

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/DME/ah

Attachment

cc: Mr. J. P. O'Reilly, Director, Region II
Mr. Harold F. Reis, Esquire

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Question 1.

Provide TM/LP Trip Calculator electrical schematics showing the added ASGTPTF. (one channel).

Answer

The enclosed functional and wiring diagrams are extracted from the C-E Supplied RPS Technical manual and the RPS drawing package.

Fig 10., RPS interface logic diagram, illustrates how the SG pressure signals already available to the RPS (Low SG Pressure Trip Unit 5) are monitored in the Core Protection Calculator to force a Thermal margin/ Low Pressure trip when the difference in SG Pressures exceeds predetermined limits (Trip Unit 7). Figures 34 and 43 show the above function in block diagram form in more detail. E-19367-411-071 and E-19367-411-302 are the signal and CPC schematics.

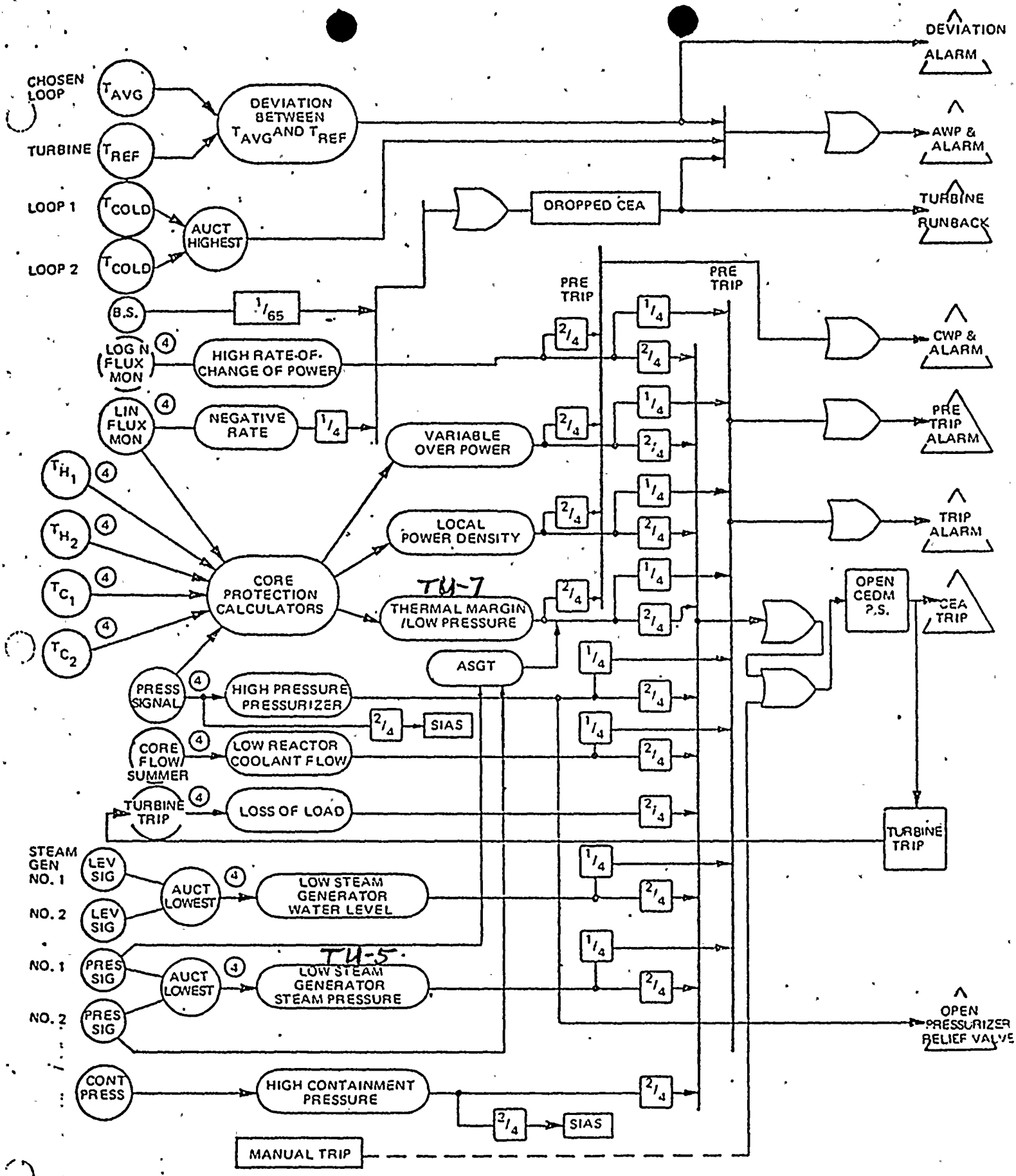

Figure 10

REACTOR PROTECTIVE SYSTEM INTERFACE LOGIC DIAGRAM

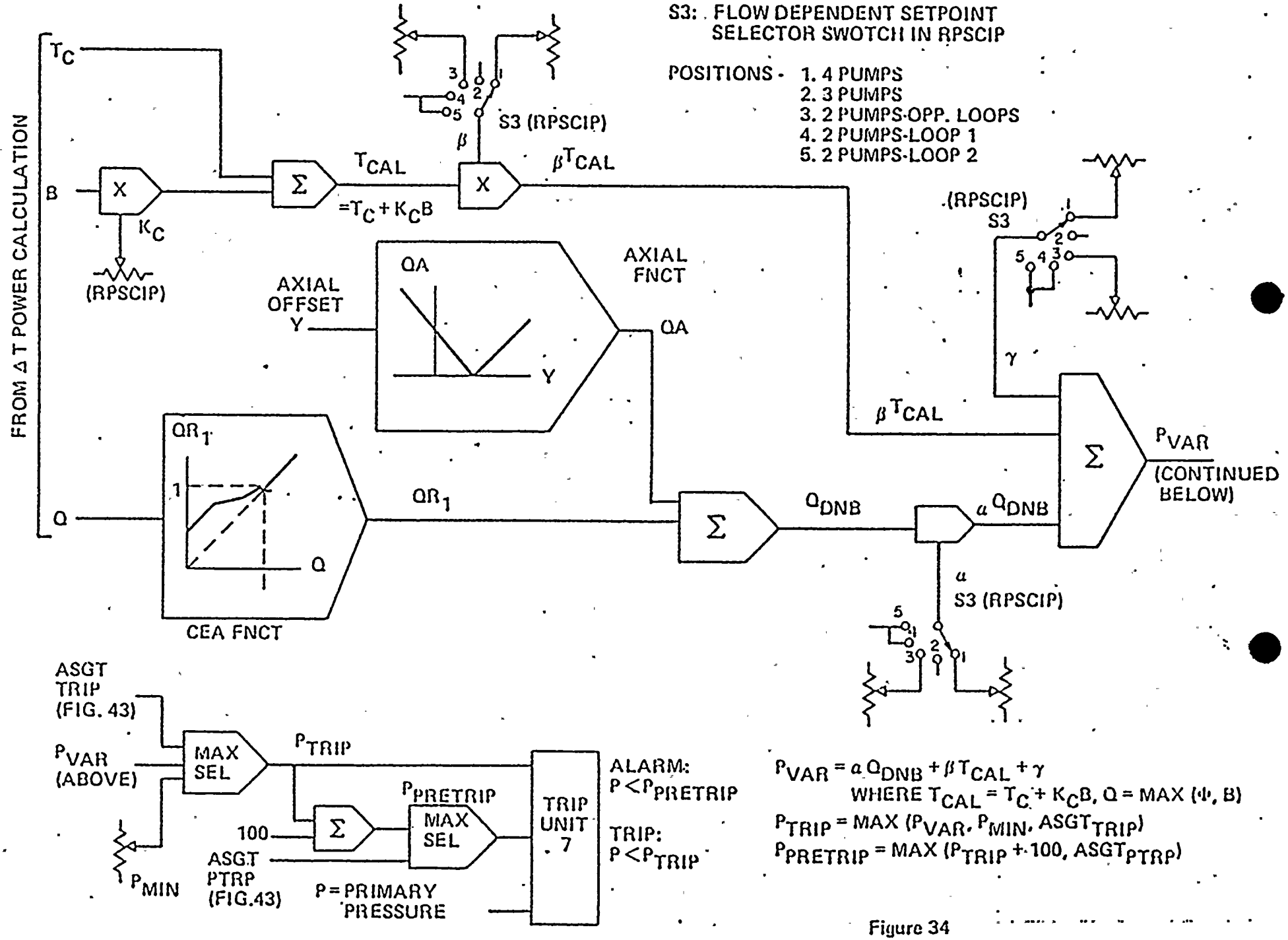

Figure 34
DNB TRIP

IF $|\Delta PSG| > ASGT_{TRIP}$ SET, $ASGT_{TRIP}$ = 2500 PSI. ELSE $ASGT_{TRIP}$ = 0 PSI

IF $|\Delta PSG| > ASGT_{PRETRIP}$, $ASGT_{PTRP}$ = 2500 PSI. ELSE $ASGT_{PRETRIP}$ = 0 PSI

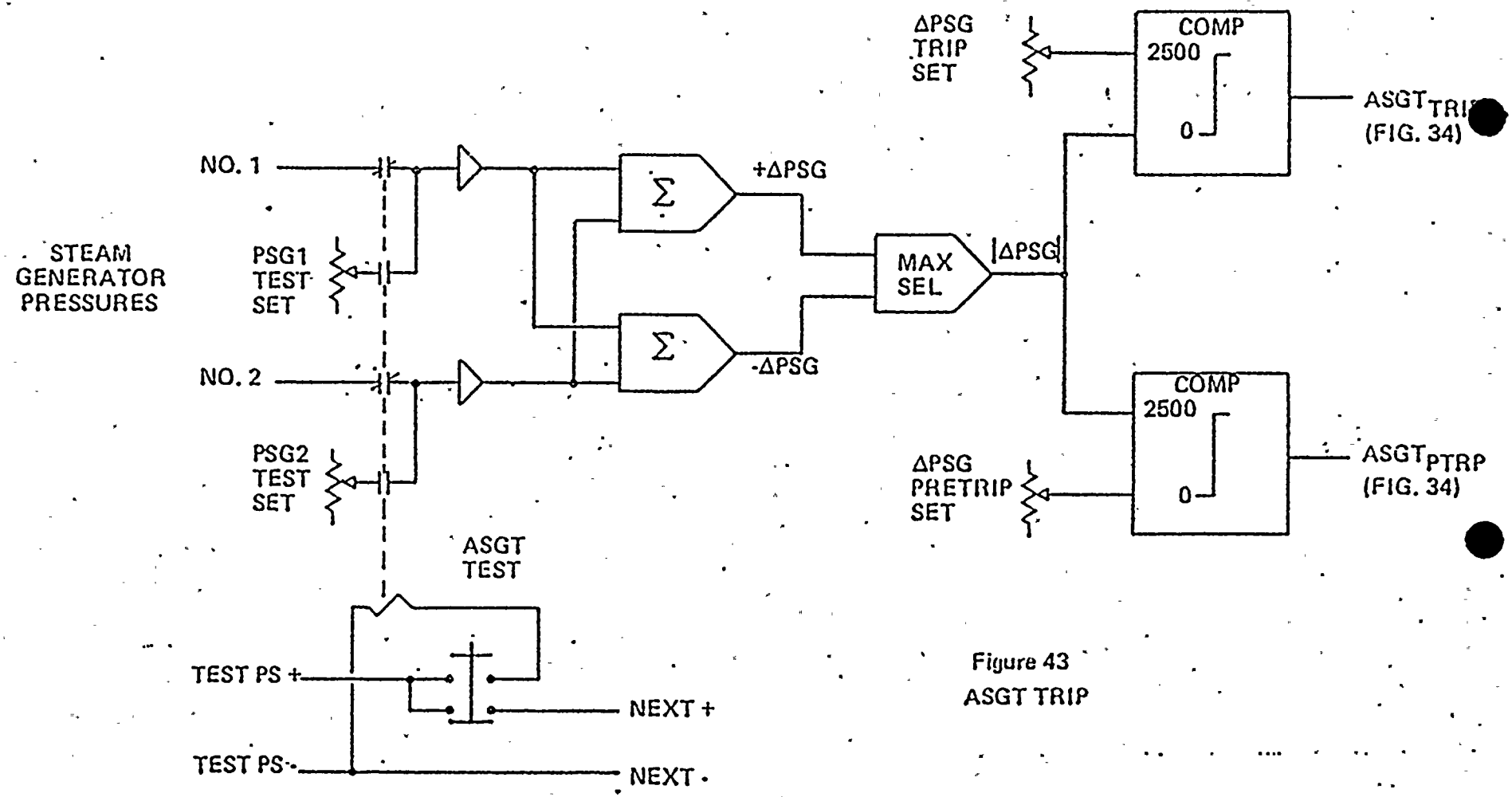

Figure 43
ASGT TRIP

Question 2.

Can failure of any portion of the ASGTPTF in anyway adversely effect the operation of the existing Reactor Protective System (RPS)?

Answer

No. The SG Pressure signals monitored by the Low SG Pressure bistable trip Unit 5 are buffered before being utilized by ASGTPTF and would not effect trip Unit 5 due to a failure of ASGTPTF. Also the ASGTPTF contribution to the TM/LP (#7) bistable trip unit setpoint calculation is an on/off (0/1) logic which will be zero during normal operation. An ASGTPTF failure in the zero state would not be seen by the TM/LP Calculator. An ASGTPTF failure in the "one" state would force a TM/LP trip in that channel and would be handled like any other single channel failure.

Question 3.

Are there any control or indication functions associated with the ASGTPTF? If so, describe the isolation provided between this circuitry and the RPS.

Answer

Since ASGTPTF is an additional function to the TM/LP trip, the only control or indication is that normally attributed to the TM/LP trip function.

Question 4.

Is ASGTPTF strictly an addition to the RPS? (i.e. is SG Low Level trip being altered in any way?)

Answer

Yes. The ASGTPTF is strictly an addition to the TM/LP trip function. The Low SG Pressure trip function is not affected in any way nor is the normal function of the TM/LP (DMB) trip being altered.

Question 5.

What indication is provided in the control room when an ASGTPTF channel is bypassed or inoperable?

Answer

The ASGTPTF is not a separate channel per se and therefore cannot be bypassed independent of the TM/LP trip. The ASGTPTF is an added function to the TM/LP trip and this function can be bypassed in one out of four channels in the standard RPS bypass system.

Control room indication of bypass is available since the RPS is located in the control room and is part of the operating control panels available to the operator. Any trip unit bypass is indicated by an indicator light directly above the key operated bypass switch on the front of the RPS. The trip units cannot be bypassed without the one key available per function (parameter).

Indication of ASGTPTF inoperability is as follows:

The ASGTPFT can only fail in one of two states (i.e. 1 or 0). A failure in the 1 state forces a TM/LP (#7) trip in one out of four channels. This trip would be annunciated on RPS (Visual indicator lights) and on the main control panel (Audio/Visual) and would be handled as any RPS single failure problem.

A failure in the 0 state would not be indicated in any way and would not effect other RPS functions. This failure mode would be immediately detected during any of three standard RPS surveillance tests, which are a) the monthly ASGTPTF operational test (question #6), b) the periodic SG pressure signal loop calibration and c) the RPS input signal integrity test used for all auctioneered input signals (SG 1 & 2 Pressures and levels).

Question 6.

Describe the tests(channel checks, functional test, etc.) planned to assure operability of the ASGTPTF channels.

Answer

The ASGTPTF test circuit, as shown on Figure 43, is contained in the Core Protection Calculator (CPC-2). This test circuit consists of a test switch, which connects locally generated test signals (in place of the actual pressure signals) to the ASGT differential comparator circuit, and potentiometers to vary those simulated signals and verify ASGT circuit operation. Setpoints and signals are monitored with the built-in digital voltmeter located in the RPS Calibration drawer.

The test consists of first bypassing the TM/LP Trip Unit 7 in the channel under test.

The second step is to verify that the trip and pretrip voltages are accurate with the DVM. Adjustments are made if the voltages are not as desired.

The third step is to fix the simulated signal for SG #1 Pressure at some nominal value.

The forth step is to press the test push button (located on the inner surface of the CPC-2 front door) and vary the simulated signal for SG #2 Pressure above and below that for SG #1 Pressure to verify that Trip Unit #7 trips at the required differential simulated pressure, and provides pretrip indication at the prescribed pressures.

The fifth step is to hold SG #2 Pressure signal at a fixed value and vary SG #1 signal above and below that for SG #2 as for step 4. This again verifies trip and pretrip of trip Unit 7 at the proper values.

Next, the Test Push Button is released to remove the test signal and restore the process loop trip inputs. Then the unit is removed from bypass. The above test is repeated for each of the four RPS channels.

Question 6. Answer(Continued)

The calibration of the normal current loop from each SG Pressure detector is usually accomplished during plant refueling outages. At this time, both Trip Unit 5 (Low SG Pressure) and Trip Unit 7 (TM/LP) would be bypassed in the channel under test.