SALEM GENERATING STATION

INSTRUCTOR LESSON PLAN

TITLE: ATWT

LESSON NO.: ___

DURATION: ___

REVISION NO.: 0 DATE: 3-08-83

SUBMITTED: Rick Sweeney DATE: 3-08-83

APPROVED: [signature] DATE: 3-8-83

INSTRUCTOR REFERENCES:

TRAINING MATERIAL REQUIRED:

STUDENT HANDOUTS:

CLASSROOM REQUIREMENTS:

NOTES

VIII. Solid State Protection System Review

A. Basic design function is to protect the core and ultimately to prevent fission product releases to the environment.

1. To ensure reliability in the design:

- o Redundancy
- o Independance
- o Diversity
- o Fail safe
- o Testability

B. Redundancy/Independance

Redundancy ensures that a single failure of an instrument channel will not prevent proper protective action when required. To enhance redundancy a coincidence circuitry is used.

Two independant and redundant protection trains (A and B) both receiving identical info and both being able to trip the reactor and actuate ESF. The instrument channels feeding the protection trains are both physically and electrically separated.

AC operated relays at the input of the trains provide electrical isolation between the inputs and the train logic. SSPS outputs are thru contacts which are operated by slave relays again providing electrical separation.

C. Multiplexing

The function of the multiplexing is to efficiently pass large amts. of info over the least number of conductors as possible. To do this a time-sharing technique is used. There are on the order of 200 lamps, 100 annunciators and 200 signals fed to the computer.

NOTES

TP-1

D. Protection Scheme/Signal Path

Example all 4 B/S supply both Trains. They operate their own Relays which operate contacts at the Input Bay. When the correct logic is made up the output relay operates which operates its contact to perform the safegaurd actuation/rx trip. The "OR" cable between the trains allows either train to operate the Rx Status or Computer demultiplexer.

For a Rx trip note that 'A' train deenergizes the 48V UV relay for the 'A' breaker and the 'B' bypass and the 'B' train gets the 'B' bkr and 'A' bypass.

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I. Specific Indications

A. Terminology

- Demand = > some SPECIFIC ACTUATION is being demanded to be performed
- Confirmation = > is confirming some given actuation has been performed

B. The yellow lites on the RP-4 status panel are energized via a 28V source via a contact.

This contact is operated by a relay located in the control board demultiplexer cabinet. The relay is being operated by the logic signal coming from the SSPS logic trains. Thus, these yellow lites would be classified as a demand signal.

C. The red reactor trip lite on RP-4 is a different story. The red lite is also powered from a 28V source when RTXB or RTXA contact 11/12 are closed. To actuate these relays Bkr 'B' and Bypass 'B' must be open or Bkr 'A' and Bypass 'A' must be open.

TP-1

TP-2

D. Overhead Annunciators

- F-46 Reactor trip Turbine Trip

  Confirmation alarm - actuated when the 'A' bkr & 'A' bypass are open or 'B' bkr & 'B' bypass are open. Note this is a confirmation alarm for the reactor and a demand for the turbine.

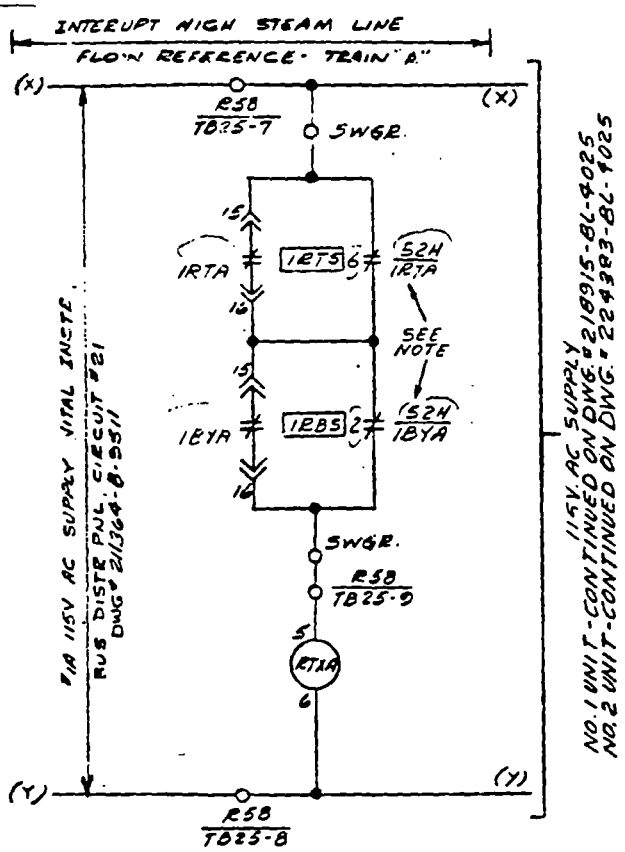
- F-30 Turbine Trip P7 Reactor Trip

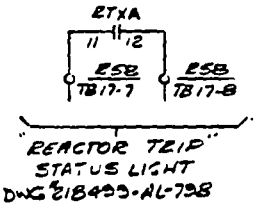
  Confirmation alarm for turbine as sensed by auto-stop oil presure and TV's and demand signal for reactor.

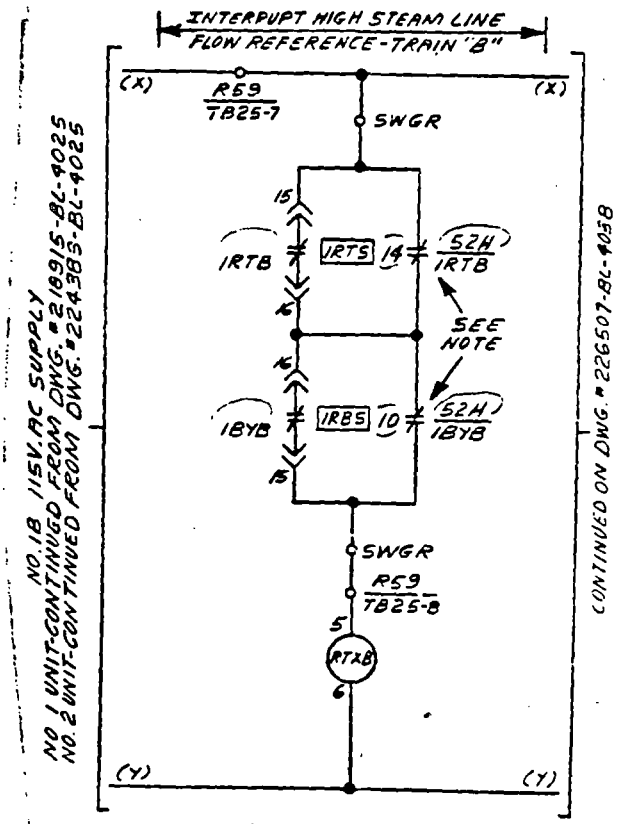
NOTES

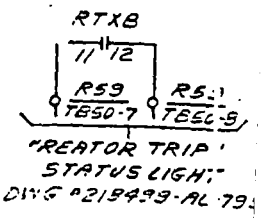
E. In accordance with the EI for reactor trip the operator is required to perform certain actions until a reactor trip is "CONFIRMED". Confirmed by:

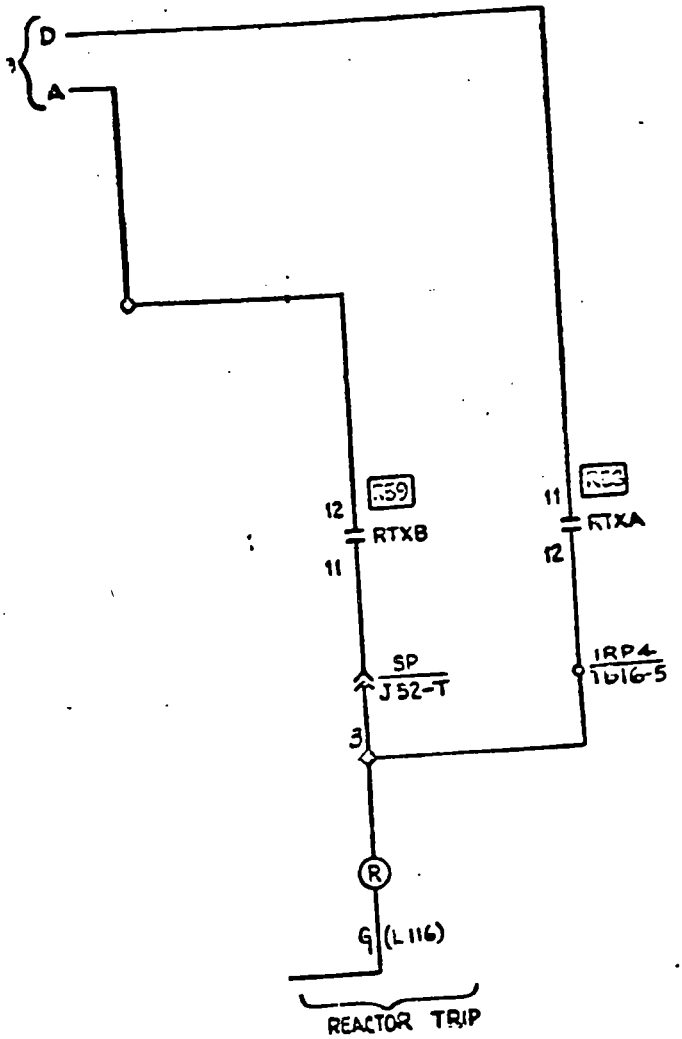
- RP-4 reactor trip lite
- F-46 Reac Trip Turbine Trip
- IRPI
- Rod bottom lites
- Green P.B. for rod drive bkrs.


INTERUPT HIGH STEAM LINE
FLOW REFERENCE - TRAIN "A"
(X)
(X)
R58
TB25-7
SWGR.
15
IRTA
1RTS
6
52H
IRTA
16
SEE
NOTE
15
1BYA
1RBS
2
52H
1BYA
16
SWGR.
R58
TB25-9
5
RTXA
6
(Y)
(Y)
R58
TB25-8
#1A 115V AC SUPPLY VITAL INSTR.
BUS DISTR PNL CIRCUIT #21
DWG # 21364-B-9511
115V. AC SUPPLY
NO. 1 UNIT-CONTINUED ON DWG. # 218915-BL-4025
NO. 2 UNIT-CONTINUED ON DWG. # 224383-BL-4025


RTXA
11
12
ES2
TB17-7
ES2
TB17-8
"REACTOR TRIP"
STATUS LIGHT
DWG # 218499-AL-79B


INTERRUPT HIGH STEAM LINE
FLOW REFERENCE - TRAIN "B"
(X)
(X)
R59
TB25-7
SWGR
15
IRTB
IRTS
14
52H
IRTB
16
SEE
NOTE
16
1BYB
IRBS
10
52H
1BYB
15
SWGR
R59
TB25-8
5
RTXB
6
(Y)
(Y)
NO. 1B 115V. AC SUPPLY
NO. 1 UNIT-CONTINUED FROM DWG. # 218915-BL-4025
NO. 2 UNIT-CONTINUED FROM DWG. # 224385-BL-4025
CONTINUED ON DWG. # 226507-BL-4058


RTXB
11
12
R59
TB50-7
R5-1
TB50-8
"REACTOR TRIP"
STATUS LIGHT
DWG # 218499-AL-79


D
A
12
K59
RTXB
11
11
K52
RTXA
12
SP
J52-T
IRP4
TB16-5
3
R
9
(L116)
REACTOR TRIP

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NOTES

AD-16 Post Reactor Trip/Safety Injection Review and Unit Start-Up Approval Requirements

I. Responsibilities

In event of SI/Rx trip the Senior Shift Supervisor:

- o Perform a Post trip review

  The review items are listed on Form AD-16-A

- o Evaluate the review to ensure all equipment and systems operated as designed

- o Form AD-16-A cover items such as

  conditions prior to event

  testing/maintenance/evolutions in progress

  any major equip/systems out of service

  description of event

  sequence of events agree w/first out

  any unexpected alarms

In event of SI/or Rx trip the Operations Manager:

- o Review Post Trip Review

- o Ensure cause of event has been identified

- o Equip operation as designed

- o Determine if corrective actions required prior to S/U

NOTES

II. Approval Requirements prior to S/U

- o After planned unit outages => Operations Manager
- o After Reactor Trips/SI

  Upon satisfactory completion of hte Post trip review the Operations Manager may authorize start-up.

  If cause of event not clear then the results shall be reviewed by SORC.

  Upon sat. completion of review then the General Manager may authorize S/U.

III Form AD-16-A

Used AD-16-A

- It should be brought out that has now been incorporated in IOP-2 ~~[illegible]~~ Cold S/D to Hot Standby ~~[illegible]~~

- In IOP-2 a note has been added [illegible] to the step referring to use of [illegible] that states if this recovery is [illegible] a reactor trip ensues AD-16-A has been completed, reviewed [illegible] approval has been granted

- Additionally in the [illegible] in IOP "Hot Standby to Minimum Load" a step has been added which states [illegible] has been granted in IAW AD-16 [illegible] 4.0 approval requirements [illegible]