

BABCOCK AND WILCOX TECHNOLOGY LESSON PLAN

Lesson No.306-13

Title:Essential Controls & Instrumentation

Written by: Larry Bell

Approved by: Larry Bell

Date: 5/5/92

3.0 Objectives

- 3.1 State the function of the Essential Controls and Instrumentation System.
- 3.2 Explain how wide range pressure signal is used in the decay heat removal system.
- 3.3 Explain how the once-through steam generator level is used in the auxiliary feedwater control circuitry.

4.0 Presentation

4.1 Introduction

4.1.1 ECI Purposes - The ECI system provides the operating staff with instrumentation required to place the plant in a safe shutdown condition.

4.1.1.1 Safe shutdown is defined as a 1% $\Delta K/K$ shutdown margin at either hot or cold plant conditions.

4.1.1.2 ECI provides instrumentation for the remote shutdown of the plant.

4.1.1.3 ECI provides post-LOCA qualified instrumentation.

4.1.2 ECI Features

4.1.2.1 Redundant Channels - ECI X&Y

4.1.2.2 Redundant inverter supplied power

4.1.2.3 Fiber optics are used to separate control and safety functions.

4.2 Instrumentation Systems

4.2.1 RCS Temperatures

4.2.1.1 Hot Leg Temperature

a. Narrow Range (530F-650F)

b. Maintain Hot Standby conditions

c. Analyze accidents

4.2.1.2 Cold Leg Temperature

a. Wide Range (50F - 650F)

b. Cool unit down to cold shutdown

c. Accident monitoring - Subcooling etc

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| | | <p>4.2.2 Pressurizer Level</p> <p>4.2.2.1 Also used by NNI</p> <p>4.2.2.2 Required for inventory control at hot standby and while cooling down.</p> <p>4.2.3 Wide Range Pressurizer Pressure</p> <p>4.2.3.1 Indication</p> <p>4.2.3.2 Also used by NNI</p> <p>4.2.3.3 Supplies interlock to DHR suction valves</p> <ol style="list-style-type: none"> a. Automatically closes suction valves to prevent overpressurization if RCS pressure exceeds 400 psig. b. Redundant signal to ESFAS signal-single failure protection. c. CFT Valve alarm - less than 650 psig and valve open. d. CFT Valve alarm ^{open signal} - greater than 750 psig and valve closed. <p>4.2.4 OTSG Pressure</p> <p>4.2.4.1 Indication</p> <p>4.2.4.2 MAD Valve Control</p> <p>4.2.5 OTSG Level</p> <p>4.2.5.1 Level Indication</p> <p>4.2.5.2 Level Control</p> <p>4.2.5.3 Two circuits per OTSG</p> <ol style="list-style-type: none"> a. ECI X receives an input from A OTSG and controls valve to A OTSG on motor-driven pump discharge. b. ECI X receives an input from B OTSG and controls valve to B OTSG on steam-driven pump discharge. c. ECI Y receives an input from B OTSG and controls valve to B OTSG on motor-driven pump discharge. c. ECI Y receives an input from A OTSG and controls valve to A OTSG on steam-driven pump discharge. |
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