R904B Instructor Outline

Day 1

Course Introduction .....

Objectives
Syllabus

Introduction to BWR's

Chapter 1.5, 1.7-1.11 .....
Review: Level/Power/Vacuum Set points include Level Ranges
(Table 5.1-1 in drawing Pkg)
Chapter 2, Figure1(overview of thermal limits)

Simulator Familiarization *(IC-20)* .....

Panel Overview
SPDS/Graphic Display

On panel 603 discuss:(IC-1) .....

Monitoring Systems used for reactor startup
Discuss the full core display lamps
Review all outstanding annunciators, clear and reset any that you can (Rod drift and RPS)

System Startups *(IC-1)*

Startup CRD (using Mini procedure) .....
Discuss system configuration and operation with a one line diagram then use mini-procedure to perform system startup.

Startup Reactor Recirculation (using Mini procedure) .....
Discuss system configuration and operation with a one line diagram then use mini-procedure to perform system startup.(Recirc and Recirc Flow Control)

Reactor Startup Preliminary (IC-1) .....

Discuss what is needed to withdraw control rods:
Need to remove all withdraw rod blocks (Mode switch to SU)
IRM range switches to range 1 (demo the block by selecting rg. 2)
IRM/SRM detector fully inserted (demo the block by withdrawing 1 det.)
SRM >3cps
RWM operable/operating
RSCS (some units)

A-1

Day 2

Reactor Startup *(IC-2,* Sequence "A" step 117) .....

Assign Positions
Do a panel check
Need to adjust CRD flow to ~48 gpm. Demonstrate how drive pressure effects rod speed.
(Double notching)
Check annunciators for panels A8, A9, & A10
Pull critical and establish a heatup
Discuss Heatup effect on Level control and NPSH for RR pumps

RCIC/HPCI/BPV Operations *(IC-3, Sequence "A" step 214)* .....

Perform Panel Walkdown
Discuss/Perform
Place RCIC/HPCI on Standby per Mini-procedure
Pull rods until BPV's open
Review Main Steam and EHC
Demonstrate feedwater flow effects on reactor power.

400# to 920# 8% Power *(IC-4, Sequence "A" Step 287)*

Review Condensate, Feedwater and FWCS with basic drawing .....
Place the first Feed Pump in service on SU valve per Mini-procedure
Continue to heatup to 920# and about 8% power on BPV's, discuss Shell warming on Turbine
Discuss going to Run
NMS >5% APRM not downscale
Reactor Pressure >825#, Mode switch effect on Group 1 closure, MSIV closure Scram
Feedwater Startup Valve limited to ~8% - 10% of rated FW flow
APRM Scram setpoint while in SU vs. Run mode
Feedwater flow effect on Reactor Power
Transfer Mode Switch to RUN
Align Feedwater/FWCS for Power operations (Xfer off the SU level controller) using mini-procedure.

Synchronize Turbine Generator *(IC-5, Sequence "A" Step 457)* Hot Turbine @ 1800 RPM .....

Synchronize and load per Mini-procedure

Day 3

Increase Power to 100 % from 100% Rod Line and 49% Core flow *(IC-6 Sequence"B" Step 927)* . . _____

Prior to increasing power determine the decrease in Recirculation suction temperature from the previous IC, to where it is presently. Should see the step change on the recorder. This is the direction and value change due to withdrawing control rods and combined effect from Feed water heating and core flow changes. This decrease in temperature increases sub cooling thus satisfying the interlocks on the RFC (30% Run back).

Point out as you withdraw control rods you are increasing sub cooling for NPSH as well as increasing Void fraction. Both void fraction and sub cooling increases are necessary before the Recirculation System can change power.

Increase Reactor power to 100% with Recirculation System.

Monitor effect on Reactor Power, Level, Pressure and recirculation suction temperature. Note suction temperatures should increase (decreasing sub cooling). Most efficient (least sub cooling) @ 100% Power /Core flow. Check sub cooling @ 100%. Sat temp vs Recirc suction temperature is a ball park figure in *F, the computer calculates the actual in units of BTU's.

Transients *(IC-20)*

Single Reactor Feed Pump Trip ..... _____

Handout the prediction sheet then trip a Feed Pump and observe actual plant response
Restore plant back to ~100% with mini-procedure

Single Reactor Recirculation Pump Trip ..... _____

Note: Verify reactor level at or below 36" or level will reach L8 on pump trip.
Handout the prediction sheet then trip 1 Recirculation Pump and observe actual plant response.
Restore plant back to ~100%. Discussion is to include Tech Spec section 3.4.1 on page 3.4-1.
Relate the level increase to the step in RC/Q prior to tripping recirc pumps.

One SRV Fails Open ..... _____

Handout prediction sheet then fail one SRV full open.
Discuss system overall effect (EHC, FWCS, Condensate makeup etc. etc)
Do a complete RHR review, and place RHR in SP cooling with mini procedure.
As the SP heats up to 110*F, refer to EOP entry and action.

FREEZE AND REVIEW ARI/RPS

Reactor Scram

Review the mini-scram procedure and handout the prediction sheet on scram then Scram the unit. Following the scram close the SRV. Discuss observed versus actual response. Discuss why/when will the reactor recirc system runback or does it ?

Complete the scram procedure, line up for Startup Level Controller operation

Establish plant cool down

Cool down to where feed water is on the Booster Pumps and then Freeze

Day 4

Shutdown Cooling Operations (IC-7) .....

Establish SD Cooling using the mini-procedure.

Shutdown Cooling Exercise .....

After shutdown cooling is established take a break and set up in IC-34 (R-624-B shutdown cooling examination). Walk down the panels and discuss any abnormalities.

Cover TI S/D plant problems, Hope Creek event.

100% Power Transients

Discus, predict, demonstrate;

Dual Reactor Feed Pump Trip w/o HPCI .....

TT with BPV

TT w/o BPV

MSIV closure .....

Dual Recirculation Pump Trip/Power operations

Discuss factors which contribute to instability and what plants have done to meet the GDC.

100% Power Accidents

ECCS Review .....

Demonstrate LOCAs, small and large .....

Day 5

Review the AMG/EPG handouts .....

Complete course evaluations, box books.