

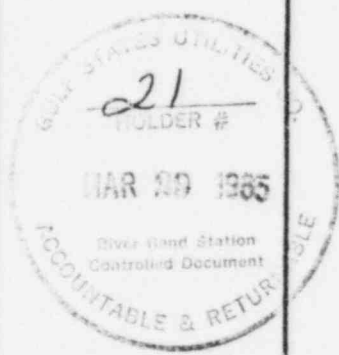
**RIVER BEND STATION  
APPROVAL SHEET  
STATION OPERATING PROCEDURES**

NO. AOP-0001

TITLE REACTOR SCRAM

SAFETY RELATED      YES ☒      NO ☐  
TECHNICAL REVIEW REQUIRED      YES ☒      NO ☐

REV. NO.	PAGES ISSUED	INDEP. REVIEW SIGNATURE/DATE	TECH. REVIEW SIGNATURE/DATE	APPROVED BY SIGNATURE/DATE	EFFECT DATE
0	1 THRU 5	<i>C. B. Hughes</i>	<i>RMM Rmby 10/18/84</i>	<i>PS F. B. Hughes 10/18/84</i>	10/18/84
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## REACTOR SCRAM

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## 1.0 PURPOSE/DISCUSSION

- 1.1 To provide instructions for the operator in the event of a reactor scram.
- 1.2 This procedure may interface with the Emergency Plan and Emergency Operating Procedures.
- 1.3 A reactor scram results in the rapid, simultaneous insertion of all withdrawn Control Rods. The Reactor Protection System automatically initiates a Reactor Scram if an unsafe plant condition exists.
- 1.4 The Operator "At-The-Controls" will manually initiate a reactor scram whenever:
  - 1.4.1 A scram setpoint is exceeded and an automatic scram did not occur or
  - 1.4.2 It is determined that the plant is in a Unsafe Condition not covered by Automatic Actions and a manual reactor scram will alleviate the consequences of this condition.

## 2.0 SYMPTOMS

- 2.1 Reactor scram trip annunciator.
- 2.2 Eight white scram solenoid valve lights are out.
- 2.3 Indication of rods inserted.
- 2.4 Reactor power rapidly decreasing.
- 2.5 One or more of the following scram setpoints are exceeded:
  - 2.5.1 CRD instrument volume high water level trip (equal to or less than 36% of full scale).
  - 2.5.2 Main Steam Line High-High Radiation (3 x normal).
  - 2.5.3 Main Steam Line Isolation Valves Closure (equal to or less than 8% closed).
  - 2.5.4 Reactor Vessel High Pressure (1065 Psig).
  - 2.5.5 Reactor Vessel Low Water Level (LEVEL 3).
  - 2.5.6 Reactor Vessel High Water Level (LEVEL 8).
  - 2.5.7 Turbine Stop Valve Closure Trip (equal to or less than 5% closed).
  - 2.5.8 Control Valve Fast Closure Trip (equal to or greater than 530 Psig).

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- 2.5.9 Non-Coincident; SRM's High-High (5 x 10E5) or INOP.
- 2.5.10 Intermediate Range Monitor Neutron Flux-High (120 divisions of full scale) or INOP.
- 2.5.11 Average Power Range Monitor Neutron Flux-High and not in Run mode (15% of Rated Thermal Power) or INOP.
- 2.5.12 Average Power Range Monitor Thermal Power Trip in Run mode (.66W + 48%) or (118%) or INOP.
- 2.5.13 Drywell High Pressure (1.68 Psig).
- 2.5.14 Manual Scram or Mode Switch in SHUTDOWN.

### 3.0 AUTOMATIC ACTIONS

- 3.1 All control rods insert to position 00, scram valves de-energize, backup scram valves energize and scram discharge volume vent and drain valves close.
- 3.2 If reactor water level decreases to Level 3 the Reactor Feedwater Level Controller will automatically increase its setpoint by 50% to approximately 54" for 10 seconds. The setpoint will then be automatically reduced to 50% of normal to approximately 18" and stay there until the SET POINT SETDOWN RESET pushbutton is pushed.
- 3.3 The Recirculation Pumps will shift to low speed and the loop flow controllers will shift to manual on any of the following signals:
  - 3.3.1 Less than 30% Feedwater flow (15 second time delay).
  - 3.3.2 Reactor water level below level 3.
  - 3.3.3 Main Steam Line to Recirc Pump Suction differential temperature less than 8°F (15 second time delay).
  - 3.3.4 Turbine trip.

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#### 4.0 IMMEDIATE OPERATOR ACTIONS

##### CAUTION

Steps 4.1 and 4.2 must be done sequentially per IEN 85-42.

- 4.1 ARM and DEPRESS all four manual scram pushbuttons, RPS Div 1, 2, 3, 4 on panel 1H13-P680.
- 4.2 Place the Mode Switch to SHUTDOWN.
- 4.3 Verify all control rods are fully inserted by depressing RAW DATA and ALL RODS pushbuttons. If all rods are inserted, the core display for all rods will be blank and a full-in green light will be displayed.
- 4.4 Verify power decreasing as indicated on the APRM's.
- 4.5 Verify the Feedwater System is operating to restore reactor water level.
- 4.6 Verify reactor pressure is being maintained by either the turbine bypass valves or safety relief valves.
- 4.7 Manually downshift the reactor recirc pumps by simultaneously depressing both "TRANSFER TO MG" pushbuttons.
- 4.8 Verify Turbine/Generator trips on reverse power or trip manually.
  - 4.8.1 Verify Generator Output Breakers open 1YWC-20635 and 1YWC-20640.
  - 4.8.2 Start Turning Gear Oil Pump and Motor Suction Pump.
  - 4.8.3 Verify Exciter Field Breaker open.

N/A

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## 5.0 SUSEQUENT OPERATOR ACTIONS

5.1 Select and drive in the SRM and IRM detectors. Switch IRM/APRM recorders to IRM's.

5.1.1 Downrange IRMS' as necessary to verify reactor power decreasing.

5.2 If any control rods have position indication greater than 04, enter AOP-0021 "Anticipated Transient Without Scram".

5.3 Verify reactor water level stabilizes at +18" or higher on narrow range level indication.

5.3.1 Switch to single element control and secure operating pumps and level control valves as necessary to maintain a stable water level. Leave at least one reactor feed pump running.

5.3.2 As Condensate/Feedwater flow is reduced secure the number of on-line Condensate Polishers per SOP-0093 to maintain flow rates through operating polishers between 1250 Gpm and 2350 Gpm. This should correspond to a differential pressure of between 20 Psid and 30 Psid as read on [1H13-P680].

### CAUTION

Do not attempt to reset the scram for at least 10 seconds after the scram to prevent CRD damage.

5.4 When the scram signal has cleared, reset the scram and return the CRD System to normal.

5.5 If any control rods have position indication between 00 and 04 individually select and drive these rods to position 00.

5.6 Restart the Reactor Water Cleanup System, if tripped, per SOP-0090.

5.6.1 Reject water as necessary to maintain level.

5.7 To reestablish normal water level perform the following:

5.7.1 Line-up Startup Level Control Valve by placing the controller in "MANUAL" and set at 0%. Open the LVL CONT BYP ISOL [1FWS-MOV105]. Slowly open the startup valve until the MASTER LEVEL CONTROLLER fully closes operating level control valves.

N/A

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- 5.7.2 When operating level control valves are full closed, place the Master Level Controller in "MANUAL" and decrease controller output to zero. Verify Startup Level Control Valve is maintaining reactor water level.
- 5.7.3 When operating level control valves are full closed and Startup Level Control Valve can safely handle feedwater demand, isolate these valves by closing [1FWS-MOV27A, 27B and 27C].
- 5.7.4 Depress the SETPOINT SETDOWN RESET pushbutton. Null out auto setpoint deviation meter on Startup Level Controller and place controller in "AUTO". Slowly increase RPV level to approximately 36" using auto/setpoint tape.
- 5.8 If reactor recirc pumps are operating in slow speed, place the flow control valves to the maximum open position.
- 5.9 Notify Radiation Protection of reactor scram for investigation of existing radiological conditions throughout the plant areas.
- 5.10 Perform Subsequent Actions of AOP-0002 "Main Turbine and Generator Trips".
- 5.11 Implement Emergency Operating Procedures and Emergency Implementing Procedures as directed by the Shift Supervisor.
- 5.12 When all parameters have stabilized enter GOP-0007 "Scram Recovery".

"END

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