

RO/SRO Admin Job Performance Measure "B"

Facility: **Vogtle**

Task No: V-LO-TA-27003

Task Title: K_{eff} Determination for Shutdown Banks withdrawn

JPM No: V-NRC-JP-14005-HL17

K/A Reference: G2.1.25 RO 3.9 SRO 4.2

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance _____ Actual Performance _____

Classroom _____ Simulator _____ Plant _____

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions: The crew is performing a reactor startup on Unit 1 following a trip from 100% power, steady state conditions.

Initiating Cue: Using the data below, the SS has directed you to "Determine K_{eff} for withdrawal of the Shutdown Banks". Perform calculation to three decimal places.

Reactor Trip occurred 35 hours ago:

Current Plant Conditions

Boron Concentration 1400 ppm
Tavg 557°F
All rods are inserted
ECC Boron Concentration 1400 ppm
ECP Control Rod Position 120 steps CBD

The following values are from Rx Engineering

Cycle Burnup 1250 MWD/MTU
Axial Offset Reactivity Correction 0 pcm
Boron-free Xenon plus Samarium Worth 2350 pcm

Task Standard: K_{EFF} calculated with the shutdown banks withdrawn.

- Required Materials:
1. 14005-1, "Shutdown Margin and K_{EFF} Calculations"
Ver 27.0
 2. PTDB Tab 1.0 for Cycle 17

General References: None

Time Critical Task: No

Validation Time: 20 minutes

Performance Information

Critical steps denoted with an asterisk

14005-1 Data Sheet 3 selected.

Standard: Candidate selects Data Sheet 3.

Comment:

Sheet 1 of Data Sheet 3 completed.

Standard: Candidate completes Sheet 1 as indicated on KEY from plant conditions given.

Comment:

Sheet 2 of Data Sheet 3 completed.

Standard: Candidate completes Sheet 2 using the PTDB as indicated on KEY.

Step J.1 obtained from Table 1.5.4-T1 BOL value.

Step J.2 obtained from Table 1.5.1-T2 at $CBD = 120$.

Step J.3 obtained from plant conditions.

Step J.4 completed from J.1, J.2, J.3 and math performed.

Step J.5 completed from J.4 and math performed.

Comment:

Terminating cue: Candidate returns cue sheet and completed Data sheet 3.

KEY
DATA SHEET 3

Sheet 1 of 2

KEFF WITH SHUTDOWN BANKS WITHDRAWN

G. CONDITIONS PRIOR TO ENTERING MODE 3 (SUBCRITICALITY)

G.1 Mode 3 declared Date Current date minus 35 hours Time current time minus 35 hours

G.2 Cycle Burnup 1250 MWD/MTU
(from Reactor Engineering)

G.3 Power Level 100 %

H. CURRENT/PROJECTED CONDITIONS (circle one)

H.1 Date N/A Time N/A
(If this Keff is being calculated for projected conditions, then enter the projected time.)

H.2 Core Average Temperature 557 ±1 °F

H.3 Length of Shutdown 35 hours

H.4 Estimated Critical Boron Concentration (ECC) at (H.3) hours after Mode 3 entry
1400 ppm

H.5 Estimated Critical Position (ECP) at (H.3) hours after Mode 3 entry
CBC 228 CBD 120

**KEY
DATA SHEET 3**

Sheet 2 of 2

J. KEFF CALCULATION

NOTE

For all calculations, record the ABSOLUTE VALUES of the reactivity values obtained from the PTDB.

- J.1 "Cumulative Control Rod Worth" for D+C+B+A Configuration at HZP and Burnup (G.2) (PTDB TAB 1.5.4-T1) + 3039 pcm
- J.2 Integral "Rod Worth" BOL, MOL or EOL at ECP (H.5) and Burnup (G.2) [If the Length of Shutdown (H.3) is less than 4 hours OR **greater than 12 hours, then USE HZP, HFP-Eq-Xe PTDB TAB 1.5.1-T2, T5, or T8.** If the Length of Shutdown (H.3) is between 4 and 12 hours, then USE HZP, HZP-Peak-Xe PTDB TAB 1.5.1-T3, T6, or T9.] + 366 pcm
- J.3 Axial Offset Reactivity Correction (From Reactor Engineering) + 0 pcm
- J.4 Shutdown Reactivity:
(J.1) - (J.2) - (J.3) =
3039 - 366 - 0 = (+) 2673 pcm
- J.5 Keff: $1.0000 / [1.0000 + ((J.4)/100,000)] =$
 $1.0000 / [1.0000 + (2673 / 100,000)] =$ + 0.974

ACCEPTANCE CRITERIA

Keff (J.5) shall be less than +0.99.

YES NO

Completed By:

SIGNATURE

CURRENT
DATE/TIME

Signature

Date/Time

Verified By:

Signature

Date/Time

Verification of Completion

Job Performance Measure No. V-NRC-JP-14005-HL17

Examinee's Name:

Examiner's Name:

Date Performed:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____

Response: _____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____

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Reactor Trip occurred 35 hours ago.

Current Plant conditions:

Boron Concentration	1400 ppm
T_{avg}	557°F
Current Rod Height	All rods are inserted
ECC Boron Concentration	1400 ppm
ECP Control Rod Position	120 steps CBD

The following values are from Rx Engineering:

Cycle Burnup	1250 MWD/MTU
Axial Offset Reactivity Correction	0 pcm
Boron-free Xenon plus Samarium Worth	2350 pcm