WOLF CREEK
NUCLEAR OPERATING CORPORATION

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Vice President
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February 26, 1992

ET 92-0050

U. S. Nuclear Regulatory Commission
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Washington, D. C. 20555

Reference: Letter ET 90-0132 dated August 21, 1990, from F. T. Rhodes, WCNOC, to the USNRC
Subject: Docket No. 50-482: Transmittal of Additonal Information on the Rod Exchange Methodology for Startup Physics Testing

Gentlemen:

The purpose of this letter is to submit Wolf Creek Nuclear Operating Corporation's (WCNOC) response to questions from the US Nuclear Regulatory Commission (USNRC) on WCNOC's Rod Exchange Methodology for Startup Physics Testing which was submitted in the Reference. The response to these questions is provided in the attachment.

If you have any questions concerning this matter, please contact me or Mr. S. G. Wideman of my staff.

Very truly yours,

Forrest T. Rhodes
Vice President
Engineering & Technical Services

FTR/aem

Attachment

cc: A. T. Howell (NRC), w/a
R. D. Martin (NRC), w/a
G. A. Pick (NRC), w/a
W. D. Reckley (NRC), w/a

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Wolf Creek Nuclear Operating Corporation (WCNOC) submitted Rod Exchange Methodology for Startup Physics Testing on August 21, 1990. During telephone conversations on August 8, 1991, and August 12, 1991, the US Nuclear Regulatory Commission (USNRC) provided a list of questions on the topical to WCNOC. In a meeting held on January 28, 1992, these questions were discussed between WCNOC and the USNRC, with WCNOC agreeing to submit answers in February, 1992. The questions are listed below with WCNOC's response immediately following each.

Question 1: Provide additional information regarding WCNOC's actions in the event that rod worth measurements fail to meet the Acceptance Criteria outlined in Section 4.2 of the topical report.

Response: Currently, paragraph #4 on page 14 of the WCNOC Rod Exchange topical addresses this situation. To further quantify the steps WCNOC will take in this event, paragraph #4 will be revised as follows:

"Failure of the Acceptance Criteria will result in additional evaluations. Further specific actions depend on evaluation results. These actions can include repeating the tests with more detailed attention to test prerequisites, added tests to search for anomalies, or design personnel performing detailed analyses of potential safety problems because of parameter deviation. If all subsequent actions and tests fail, the rod worths will be measured using the standard boration/dilution technique. Power is not escalated until evaluation shows that plant safety will not be compromised by such escalation."

Question 2: Provide additional benchmarks of rod worth predictions for measurements performed with the rod exchange technique as well as those performed with the boron dilution technique. Additionally provide, for comparison, any rod exchange predictions performed by outside contractors.

Response: The benchmark of the Wolf Creek models to rod worths obtained via the dilution technique is shown in the Wolf Creek topical report, "Qualification of Steady State Core Physics Methodology for Wolf Creek Design and Analysis."

Additionally, the recent Wolf Creek cycle 6 rod exchange results are reported in Table 1. These measurement results show excellent agreement with the Wolf Creek predictions. All are well within the requirements of both the review and acceptance criteria discussed in the topical.

An outside contractor was used to provide the rod exchange predictions for Wolf Creek cycles 5 and 6. These data are presented for comparison purposes in Tables 2 and 3.

Question 3: Several places in the topical text refer to the position of the Reference Bank being "at or nearly fully inserted" at the conclusion of the boron dilution measurement of the Reference Bank worth. Provide a more detailed discussion regarding the position of the reference bank being at or nearly fully inserted, including what administrative limits WCNOC will use for this position as well as an engineering basis for these limits.

Response: When performing the boron dilution measurement of the reference bank, it is necessary to secure the boron dilution process prior to the reference bank actually reaching the fully inserted position, to allow the coolant to complete mixing and reach an equilibrium boron concentration level. In the ideal case, the final mixing would result in the core being critical with the reference bank exactly at the fully inserted position. In practice, however, this is rarely the case, with the usual final position of the reference bank a few steps above the bottom of the core. In order to correct for this small amount of reactivity, the worth of the final few steps of the rod is typically determined using a standard endpoint technique by temporarily inserting the rod to the fully inserted position and measuring the resulting reactivity change with the reactivity computer. The reactor is then returned to criticality by withdrawing the rod back to its original position.

This correction shows up as the $(\Delta\rho)_{corr}$ term in Equation (7) of the topical. WCNOC uses guidelines promulgated by Westinghouse regarding the allowable magnitude of this correction, which is to maintain this correction lower than 50 pcm in magnitude. Historically, the average value of this correction from Wolf Creek Generating Station (WCGS) Cycles 3, 5, and 6 has been 13.6 pcm. The average of the correction from WCGS Cycle 1 was 34.2 pcm. Note that although the correction from Cycle 1 was larger, this is to be expected since Cycle 1 was a completely fresh core with associated higher differential rod worths near the ends of the core. The average rod position for these corrections from WCGS Cycles 1, 3, 5, and 6 was 25.8 steps withdrawn.

The effect of beginning with the reference bank slightly above the bottom of the core will be to cause the measured critical height of the reference bank to be higher. If the reference bank begins at a position 50 pcm from the bottom of the core, the new critical height will be at a position which corresponds to 50 pcm higher in the core.

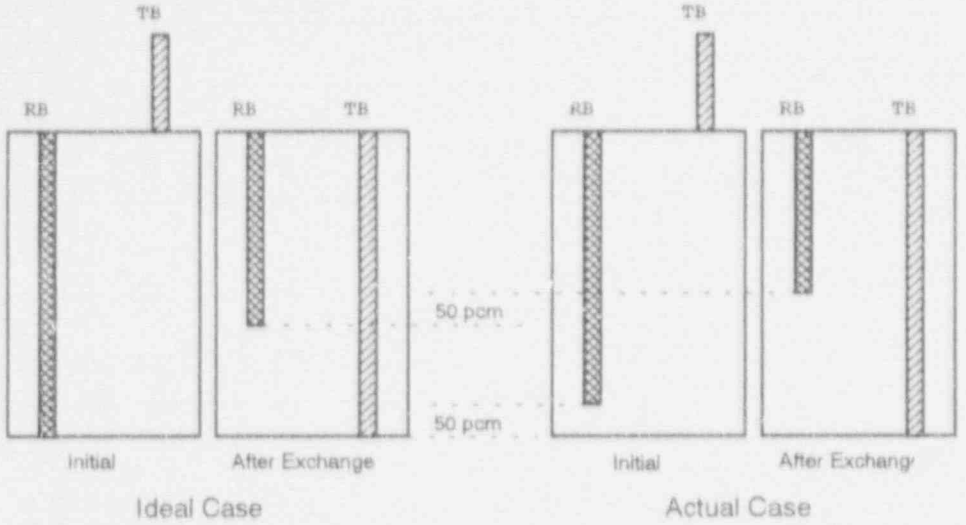

Figure 1: Ideal and Actual Rod Positions

In Figure 1, the new critical height is 50 pcm higher than the ideal case critical height. The actual step difference will be different for each rod bank, depending on the differential rod worth of the shadowed reference bank in the region near the critical height. For rod banks which have a critical height very near the top of the core, it is possible that this variation in critical height could be quite significant, since the differential rod worths can be low in this region. However, for all cases, the actual worth difference will still be 50 pcm, regardless of how different the new critical height may be.

In the ideal case, the inferred worth of the test bank is given by Equation (3) of the topical (repeated here):

$$W_{inf} = W_{ref} - (\alpha_x)(\Delta\rho)_{un}$$

where the value of α_x is calculated for the ideal case predicted critical height. For the actual case, a correction is made to the above equation to account for the initial position of the reference bank. This equation is given in the topical as Equation (7):

$$W_{inf} = W_{ref} - (\alpha_x)(\Delta\rho)_{un} - (\Delta\rho)_{corr}$$

There will be a small error introduced into the determination of W_{inf} with this equation, since the value of α_x is calculated assuming a given critical height, which has changed. However, since α_x is largely insensitive to critical height, the introduced error is small (see discussion on page 7 of topical).

To show that the introduced errors are small, and to conclusively demonstrate that small variations in critical height do not significantly affect the calculation results, the following steps can be taken:

1. Assume an initial position of the reference bank at some known worth above the bottom of the core. For the purposes of this discussion 50 pcm will be assumed.

2. Determine the new critical height:
   - o determine the differential rod worth of the reference bank, shadowed by the fully inserted test bank, in the area near the critical height
   - o adjust the reference bank critical height nearer the top of the core by 50 pcm

3. Using the new critical height, determine the new value of $(\Delta\rho)_{un}$. Recall that this term is defined as the worth of the unshadowed reference bank worth from the critical height position to fully withdrawn.

4. The α_x values are NOT adjusted for the new critical height. The values based on the ideal critical heights are used.

5. Use Equation (7) of the topical to determine the new W_{inf} test bank values.

6. Compare the new W_{inf} values with the ideal case W_{inf} values.

Note that this procedure exactly simulates the steps which would be taken during the measurement process, i.e. the initial position of the reference bank induces a small change to the critical height, but the ideal case values of α_x are used in the calculation. Note also that the assumption of a +50 pcm shift in the critical height can be further generalized into a +/- 50 pcm variation either up or down in the ideal critical height.

This calculation was performed on the WCGS data from Cycles 1, 3, 5, and 6. The results are shown in Tables 4 through 18. The results show that the introduction of a 50 pcm critical height variation results in almost negligible changes in the test bank W_{inf} values. The maximum error introduced on any bank was 3.1 pcm. The average error was 1.1 pcm. Based on these results, WCNOC will use 50 pcm as the limit for the magnitude of the rod endpoint correction, and will attempt to minimize this correction in any case.

Table 1: Cycle 6 Rod Exchange Final Results

Bank	MCP	$(\Delta\rho)_{un}$	α_x	$(\Delta\rho)_{corr}$	Meas W_{inf}	Pred W_{inf}	%Diff	PCM Diff
D	201	50	1.2163	10	637.2	615.4	3.5	21.8
C	193	76	0.9250	10	627.7	642.6	-2.3	-14.9
B	228*	6**	0.8442	12	702.0	679.5	2.4	16.5
A	113.5	402	1.0643	10	270.2	300.7	-10.3	-30.5
SE	120	371	0.8806	10	371.3	389.5	-4.7	-18.2
SD	149	241	1.0425	10	446.8	422.6	5.7	24.2
SC	147	249	1.0421	9	439.5	422.6	4.0	16.9
SA	110	419	1.0527	7	259.4	251.6	3.1	7.8
SB					708.0	711.7	-0.5	-3.7
Total					4462.1	4436.2	0.6	25.9

* Reference Bank SB fully withdrawn

** W_{final}

Table 2: Contractor Cycle 5 Rod Exchange Results

Bank	Meas W_{inf}	Pred W_{inf}	%Diff	PCM Diff
D	540.5	595	-9.2	-54.5
C	686.8	776	-11.5	-89.2
B	785.6	797	-1.4	-11.4
A	192.4	249	-22.7	-56.6
SE	330.7	374	-11.6	-43.3
SD	452.1	463	-2.4	-10.9
SC	448.6	465	-3.5	-16.4
SA	370.2	369	0.3	1.2
SB	781.6	838	-6.7	-56.4
Total	4588.5	4926	-6.9	-337.5

Table 3: Contractor Cycle 6 Rod Exchange Results

Bank	Meas W_{inf}	Pred W_{inf}	%Diff	PCM Diff
D	638	656	-2.7	-18
C	628	682	-7.9	-54
B	702	746	-5.9	-44
A	269	307	-12.4	-38
SE	365	399	-8.5	-34
SD	453	459	-1.3	-6
SC	446	454	-1.8	-8
SA	266	278	-4.3	-12
SB	708	756	-6.3	-48
Total	4475	4737	-5.5	-262

Table 4: Wolf Creek Cycle 1, Banks D and C

RESULTS, Cycle 1, Bank D
Stressed amount (pcm) : 50
Original critical height : 125.8
New critical height : 132.7
Original Test Bank worth (pcm): 637.9
New Test Bank worth (pcm) : 637.6
Worth Percent difference (%) : -0.04
Height Percent difference (%) : 5.51

RESULTS, Cycle 1, Bank D
Stressed amount (pcm) : -50
Original critical height : 125.8
New critical height : 118.9
Original Test Bank worth (pcm): 637.9
New Test Bank worth (pcm) : 638.6
Worth Percent difference (%) : 0.11
Height Percent difference (%) : -5.51

RESULTS, Cycle 1, Bank C
Stressed amount (pcm) : 50
Original critical height : 187.9
New critical height : 213.1
Original Test Bank worth (pcm): 942.5
New Test Bank worth (pcm) : 944.1
Worth Percent difference (%) : 0.17
Height Percent difference (%) : 13.40

RESULTS, Cycle 1, Bank C
Stressed amount (pcm) : -50
Original critical height : 187.9
New critical height : 162.7
Original Test Bank worth (pcm): 942.5
New Test Bank worth (pcm) : 941.0
Worth Percent difference (%) : -0.16
Height Percent difference (%) : -13.40

Table 5: Wolf Creek Cycle 1, Banks B and A

RESULTS, Cycle 1, Bank B

Stressed amount (pcm)	: 50
Original critical height	: 119.4
New critical height	: 130.1
Original Test Bank worth (pcm)	: 721.4
New Test Bank worth (pcm)	: 721.8
Worth Percent difference (%)	: 0.05
Height Percent difference (%)	: 8.97

RESULTS, Cycle 1, Bank B

Stressed amount (pcm)	: -50
Original critical height	: 119.4
New critical height	: 108.7
Original Test Bank worth (pcm)	: 721.4
New Test Bank worth (pcm)	: 720.6
Worth Percent difference (%)	: -0.11
Height Percent difference (%)	: -8.97

RESULTS, Cycle 1, Bank A

Stressed amount (pcm)	: 50
Original critical height	: 87.6
New critical height	: 92.7
Original Test Bank worth (pcm)	: 354.9
New Test Bank worth (pcm)	: 354.7
Worth Percent difference (%)	: -0.06
Height Percent difference (%)	: 5.85

RESULTS, Cycle 1, Bank A

Stressed amount (pcm)	: -50
Original critical height	: 87.6
New critical height	: 82.5
Original Test Bank worth (pcm)	: 354.9
New Test Bank worth (pcm)	: 354.4
Worth Percent difference (%)	: -0.15
Height Percent difference (%)	: -5.85

Table 6: Wolf Creek Cycle 1, Banks SE and SA

RESULTS, Cycle 1, Bank SE

Stressed amount (pcm)	: 50
Original critical height	: 94
New critical height	: 101.3
Original Test Bank worth (pcm)	: 552.7
New Test Bank worth (pcm)	: 554.5
Worth Percent difference (%)	: 0.32
Height Percent difference (%)	: 7.80

RESULTS, Cycle 1, Bank SE

Stressed amount (pcm)	: -50
Original critical height	: 94
New critical height	: 86.7
Original Test Bank worth (pcm)	: 552.7
New Test Bank worth (pcm)	: 550.7
Worth Percent difference (%)	: -0.36
Height Percent difference (%)	: -7.80

RESULTS, Cycle 1, Bank SA

Stressed amount (pcm)	: 50
Original critical height	: 91.6
New critical height	: 96.8
Original Test Bank worth (pcm)	: 392.4
New Test Bank worth (pcm)	: 392.0
Worth Percent difference (%)	: -0.11
Height Percent difference (%)	: 5.70

RESULTS, Cycle 1, Bank SA

Stressed amount (pcm)	: -50
Original critical height	: 91.6
New critical height	: 86.4
Original Test Bank worth (pcm)	: 392.4
New Test Bank worth (pcm)	: 393.9
Worth Percent difference (%)	: 0.37
Height Percent difference (%)	: -5.70

Table 7: Wolf Creek Cycle 1, Bank SD/SC

RESULTS, Cycle 1, Bank SD/SC

Stressed amount (pcm)	: 50
Original critical height	: 94.1
New critical height	: 99.8
Original Test Bank worth (pcm)	: 439.9
New Test Bank worth (pcm)	: 441.6
Worth Percent difference (%)	: 0.40
Height Percent difference (%)	: 6.07

RESULTS, Cycle 1, Bank SD/SC

Stressed amount (pcm)	: -50
Original critical height	: 94.1
New critical height	: 88.4
Original Test Bank worth (pcm)	: 439.9
New Test Bank worth (pcm)	: 438.9
Worth Percent difference (%)	: -0.22
Height Percent difference (%)	: -6.07

Table 8: Wolf Creek Cycle 3, Banks D and B

RESULTS, Cycle 3, Bank D

Stressed amount (pcm)	: 50
Original critical height	: 177.9
New critical height	: 187.4
Original Test Bank worth (pcm)	: 521.3
New Test Bank worth (pcm)	: 523.0
Worth Percent difference (%)	: 0.33
Height Percent difference (%)	: 5.35

RESULTS, Cycle 3, Bank D

Stressed amount (pcm)	: -50
Original critical height	: 177.9
New critical height	: 168.4
Original Test Bank worth (pcm)	: 521.3
New Test Bank worth (pcm)	: 519.9
Worth Percent difference (%)	: -0.28
Height Percent difference (%)	: -5.35

RESULTS, Cycle 3, Bank B

Stressed amount (pcm)	: 50
Original critical height	: 211.8
New critical height	: 223.1
Original Test Bank worth (pcm)	: 678.7
New Test Bank worth (pcm)	: 678.9
Worth Percent difference (%)	: 0.03
Height Percent difference (%)	: 5.31

RESULTS, Cycle 3, Bank B

Stressed amount (pcm)	: -50
Original critical height	: 211.8
New critical height	: 200.5
Original Test Bank worth (pcm)	: 678.7
New Test Bank worth (pcm)	: 678.2
Worth Percent difference (%)	: -0.07
Height Percent difference (%)	: -5.31

Table 9: Wolf Creek Cycle 3, Banks A and SE

RESULTS, Cycle 3, Bank A

Stressed amount (pcm)	: 50
Original critical height	: 102.2
New critical height	: 115.5
Original Test Bank worth (pcm)	: 268.8
New Test Bank worth (pcm)	: 268.0
Worth Percent difference (%)	: -0.29
Height Percent difference (%)	: 13.00

RESULTS, Cycle 3, Bank A

Stressed amount (pcm)	: -50
Original critical height	: 102.2
New critical height	: 88.9
Original Test Bank worth (pcm)	: 268.8
New Test Bank worth (pcm)	: 269.5
Worth Percent difference (%)	: 0.27
Height Percent difference (%)	: -13.00

RESULTS, Cycle 3, Bank SE

Stressed amount (pcm)	: 50
Original critical height	: 129.8
New critical height	: 142.3
Original Test Bank worth (pcm)	: 372.2
New Test Bank worth (pcm)	: 372.0
Worth Percent difference (%)	: -0.05
Height Percent difference (%)	: 9.60

RESULTS, Cycle 3, Bank SE

Stressed amount (pcm)	: -50
Original critical height	: 129.8
New critical height	: 117.3
Original Test Bank worth (pcm)	: 372.2
New Test Bank worth (pcm)	: 372.8
Worth Percent difference (%)	: 0.15
Height Percent difference (%)	: -9.60

Table 10: Wolf Creek Cycle 3, Banks SA and SD/SC

RESULTS, Cycle 3, Bank SA

Stressed amount (pcm)	: 50
Original critical height	: 181.9
New critical height	: 189.7
Original Test Bank worth (pcm)	: 497.5
New Test Bank worth (pcm)	: 500.6
Worth Percent difference (%)	: 0.63
Height Percent difference (%)	: 4.27

RESULTS, Cycle 3, Bank SA

Stressed amount (pcm)	: -50
Original critical height	: 181.9
New critical height	: 174.1
Original Test Bank worth (pcm)	: 497.5
New Test Bank worth (pcm)	: 495.1
Worth Percent difference (%)	: -0.49
Height Percent difference (%)	: -4.27

RESULTS, Cycle 3, Bank SD/SC

Stressed amount (pcm)	: 50
Original critical height	: 159.4
New critical height	: 168.7
Original Test Bank worth (pcm)	: 420.5
New Test Bank worth (pcm)	: 418.3
Worth Percent difference (%)	: -0.52
Height Percent difference (%)	: 5.80

RESULTS, Cycle 3, Bank SD/SC

Stressed amount (pcm)	: -50
Original critical height	: 159.4
New critical height	: 150.1
Original Test Bank worth (pcm)	: 420.5
New Test Bank worth (pcm)	: 422.8
Worth Percent difference (%)	: 0.55
Height Percent difference (%)	: -5.80

Table 11: Wolf Creek Cycle 5, Banks D and C

RESULTS, Cycle 5, Bank D

Stressed amount (pcm)	: 50
Original critical height	: 181.1
New critical height	: 191.0
Original Test Bank worth (pcm)	: 557.1
New Test Bank worth (pcm)	: 558.3
Worth Percent difference (%)	: 0.21
Height Percent difference (%)	: 5.49

RESULTS, Cycle 5, Bank D

Stressed amount (pcm)	: -50
Original critical height	: 181.1
New critical height	: 171.2
Original Test Bank worth (pcm)	: 557.1
New Test Bank worth (pcm)	: 555.9
Worth Percent difference (%)	: -0.22
Height Percent difference (%)	: -5.49

RESULTS, Cycle 5, Bank C

Stressed amount (pcm)	: 50
Original critical height	: 208.9
New critical height	: 229.1
Original Test Bank worth (pcm)	: 696.1
New Test Bank worth (pcm)	: 696.6
Worth Percent difference (%)	: 0.07
Height Percent difference (%)	: 9.66

RESULTS, Cycle 5, Bank C

Stressed amount (pcm)	: -50
Original critical height	: 208.9
New critical height	: 188.7
Original Test Bank worth (pcm)	: 696.1
New Test Bank worth (pcm)	: 695.4
Worth Percent difference (%)	: -0.10
Height Percent difference (%)	: -9.66

Table 12: Wolf Creek Cycle 5, Banks B and A

RESULTS, Cycle 5, Bank B

Stressed amount (pcm)	: 50
Original critical height	: 206.8
New critical height	: 227.2
Original Test Bank worth (pcm)	: 692.1
New Test Bank worth (pcm)	: 691.3
Worth Percent difference (%)	: -0.12
Height Percent difference (%)	: 9.87

RESULTS, Cycle 5, Bank B

Stressed amount (pcm)	: -50
Original critical height	: 206.8
New critical height	: 186.4
Original Test Bank worth (pcm)	: 692.1
New Test Bank worth (pcm)	: 693.1
Worth Percent difference (%)	: 0.14
Height Percent difference (%)	: -9.87

RESULTS, Cycle 5, Bank A

Stressed amount (pcm)	: 50
Original critical height	: 110.1
New critical height	: 119.4
Original Test Bank worth (pcm)	: 240.1
New Test Bank worth (pcm)	: 237.7
Worth Percent difference (%)	: -1.01
Height Percent difference (%)	: 8.42

RESULTS, Cycle 5, Bank A

Stressed amount (pcm)	: -50
Original critical height	: 110.1
New critical height	: 100.8
Original Test Bank worth (pcm)	: 240.1
New Test Bank worth (pcm)	: 242.1
Worth Percent difference (%)	: 0.84
Height Percent difference (%)	: -8.42

Table 13: Wolf Creek Cycle 5, Banks SE and SA

RESULTS, Cycle 5, Bank SE

Stressed amount (pcm)	: 50
Original critical height	: 113.1
New critical height	: 125.6
Original Test Bank worth (pcm)	: 340
New Test Bank worth (pcm)	: 340.8
Worth Percent difference (%)	: 0.24
Height Percent difference (%)	: 10.66

RESULTS, Cycle 5, Bank SE

Stressed amount (pcm)	: -50
Original critical height	: 113.1
New critical height	: 101.0
Original Test Bank worth (pcm)	: 340
New Test Bank worth (pcm)	: 338.8
Worth Percent difference (%)	: -0.35
Height Percent difference (%)	: -10.66

RESULTS, Cycle 5, Bank SA

Stressed amount (pcm)	: 50
Original critical height	: 133.6
New critical height	: 143.5
Original Test Bank worth (pcm)	: 342.9
New Test Bank worth (pcm)	: 343.8
Worth Percent difference (%)	: 0.25
Height Percent difference (%)	: 7.41

RESULTS, Cycle 5, Bank SA

Stressed amount (pcm)	: -50
Original critical height	: 133.6
New critical height	: 123.7
Original Test Bank worth (pcm)	: 342.9
New Test Bank worth (pcm)	: 341.9
Worth Percent difference (%)	: -0.30
Height Percent difference (%)	: -7.41

Table 14: Wolf Creek Cycle 5, Bank SD/SC

RESULTS, Cycle 5, Bank SD/SC

Stressed amount (pcm)	: 50
Original critical height	: 149
New critical height	: 158.8
Original Test Bank worth (pcm)	: 429.2
New Test Bank worth (pcm)	: 428.0
Worth Percent difference (%)	: -0.28
Height Percent difference (%)	: 7.28

RESULTS, Cycle 5, Bank SD/SC

Stressed amount (pcm)	: -50
Original critical height	: 148
New critical height	: 137.2
Original Test Bank worth (pcm)	: 429.2
New Test Bank worth (pcm)	: 430.4
Worth Percent difference (%)	: 0.29
Height Percent difference (%)	: -7.28

Table 15: Wolf Creek Cycle 6, Banks D and C

RESULTS, Cycle 6, Bank D

Stressed amount (pcm)	: 50
Original critical height	: 192.6
New critical height	: 205.8
Original Test Bank worth (pcm)	: 615.4
New Test Bank worth (pcm)	: 616.5
Worth Percent difference (%)	: 0.17
Height Percent difference (%)	: 6.86

RESULTS, Cycle 6, Bank D

Stressed amount (pcm)	: -50
Original critical height	: 192.6
New critical height	: 179.4
Original Test Bank worth (pcm)	: 615.4
New Test Bank worth (pcm)	: 614.3
Worth Percent difference (%)	: -0.18
Height Percent difference (%)	: -6.86

RESULTS, Cycle 6, Bank C

Stressed amount (pcm)	: 50
Original critical height	: 194.0
New critical height	: 210.9
Original Test Bank worth (pcm)	: 642.6
New Test Bank worth (pcm)	: 642.2
Worth Percent difference (%)	: -0.06
Height Percent difference (%)	: 8.70

RESULTS, Cycle 6, Bank C

Stressed amount (pcm)	: -50
Original critical height	: 194.0
New critical height	: 177.2
Original Test Bank worth (pcm)	: 642.6
New Test Bank worth (pcm)	: 643.1
Worth Percent difference (%)	: 0.06
Height Percent difference (%)	: -8.70

Table 16: Wolf Creek Cycle 6, Banks B and A

RESULTS, Cycle 6, Bank B

Stressed amount (pcm)	: 50
Original critical height	: 205.9
New critical height	: 229.6
Original Test Bank worth (pcm)	: 679.5
New Test Bank worth (pcm)	: 679.5
Worth Percent difference (%)	: -0.00
Height Percent difference (%)	: 11.47

RESULTS, Cycle 6, Bank B

Stressed amount (pcm)	: -50
Original critical height	: 205.9
New critical height	: 182.3
Original Test Bank worth (pcm)	: 679.5
New Test Bank worth (pcm)	: 679.5
Worth Percent difference (%)	: 0.00
Height Percent difference (%)	: -11.47

RESULTS, Cycle 6, Bank A

Stressed amount (pcm)	: 50
Original critical height	: 117.4
New critical height	: 127.5
Original Test Bank worth (pcm)	: 300.7
New Test Bank worth (pcm)	: 298.5
Worth Percent difference (%)	: -0.74
Height Percent difference (%)	: 8.61

RESULTS, Cycle 6, Bank A

Stressed amount (pcm)	: -50
Original critical height	: 117.4
New critical height	: 107.3
Original Test Bank worth (pcm)	: 300.7
New Test Bank worth (pcm)	: 302.9
Worth Percent difference (%)	: 0.74
Height Percent difference (%)	: -8.61

Table 17: Wolf Creek Cycle 6, Banks SA and SE

RESULTS, Cycle 6, Bank SA

Stressed amount (pcm)	: 50
Original critical heigh	: 106.9
New critical height	: 116.7
Original Test Bank worth (pcm)	: 251.6
New Test Bank worth (pcm)	: 251.6
Worth Percent difference (%)	: 0.02
Height Percent difference (%)	: 9.15

RESULTS, Cycle 6, Bank SA

Stressed amount (pcm)	: -50
Original critical height	: 106.9
New critical height	: 97.2
Original Test Bank worth (pcm)	: 251.6
New Test Bank worth (pcm)	: 250.4
Worth Percent difference (%)	: -0.47
Height Percent difference (%)	: -9.15

RESULTS, Cycle 6, Bank SE

Stressed amount (pcm)	: 50
Original critical height	: 121.9
New critical height	: 134.7
Original Test Bank worth (pcm)	: 389.5
New Test Bank worth (pcm)	: 389.2
Worth Percent difference (%)	: -0.09
Height Percent difference (%)	: 10.42

RESULTS, Cycle 6, Bank SE

Stressed amount (pcm)	: -50
Original critical height	: 121.9
New critical height	: 109.2
Original Test Bank worth (pcm)	: 389.5
New Test Bank worth (pcm)	: 389.9
Worth Percent difference (%)	: 0.09
Height Percent difference (%)	: -10.42

Table 18: Wolf Creek Cycle 6, Bank SD/SC

RESULTS, Cycle 6, Bank SD/SC	
Stressed amount (pcm)	: 50
Original critical height	: 141.7
New critical height	: 153.4
Original Test Bank worth (pcm)	: 422.6
New Test Bank worth (pcm)	: 426.6
Worth Percent difference (%)	: 0.94
Height Percent difference (%)	: 8.21

RESULTS, Cycle 6, Bank SD/SC	
Stressed amount (pcm)	: -50
Original critical height	: 141.7
New critical height	: 130.1
Original Test Bank worth (pcm)	: 422.6
New Test Bank worth (pcm)	: 418.1
Worth Percent difference (%)	: -1.06
Height Percent difference (%)	: -8.21