Central file

# Iowa Electric Light and Power Company

January 3, 1980 LDR-80-9

LARRY D. ROOT ASSISTANT VICE PRESIDENT NUCLEAR GENERATION

> Mr. James G. Keppler, Director Office of Inspection and Enforcement U.S. Nuclear Regulatory Commission Region III 799 Roosevelt Road Glen Ellyn, IL 60137

50-331

Subject: Boron Loss From BWR Control Blades Reference: IE Bulletin No. 79-26 File: A-101a

Dear Mr. Keppler:

Please find attached our responses to Items 1 and 2 of IE Bulletin 79-26. Responses to Items 3 and 4 will be submitted within the intervals listed in Item 5 of the bulletin.

Very truly yours,

Nuclear Generation

Larry D. Root Assistant Vice President

LDR/JVS/n Attachment

cc: U.S. Nuclear Regulatory Commission Office of Inspection and Enforcement Division of Reactor Operations Inspection Washington, D.C. 20555

- D. Arnold
- S. Tuthill
- L. Liu
- D. Mineck
- K. Meyer
- D. Wilson
- B. York

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## DUANE ARNOLD ENERGY CENTER Response to NRC IE Bulletin No. 79-26

#### Item No. 1

The operating history of the reactor is to be reviewed to establish a record of the current  $B^{10}$  depletion averaged over the upper one-fourth of the blade for every control blade; the record is to be maintained on a continuing basis. This action is required on all reactors whether shutdown for refueling or operating.

#### Response

1. The operating history of the DAEC reactor has been reviewed and a record of the current  $B^{10}$  depletion averaged over the upper one-fourth of each control blade has been made. The method for calculating the maximum number of SNVTs (NVT x 10E21) is as follows:

$$K_{B-10} = \frac{5.9223 \times 10^{-4}}{(C2) \text{ (NBUN)}} \qquad C2 = .97 \times 10^{-7} \qquad \text{NBUN} = 368$$
$$K_{B-10} = \frac{5.9223 \times 10^{-4}}{(.97 \times 10^{-7}) (368)} = 16.591$$

Maximum SNVTs =  $\frac{\$B^{10}}{K_{B-10}}$  =  $\frac{34}{16.591}$  = 2.048 SNVTs  $\$B^{10}$  = 34

C2 is a plant dependent constant furnished by GE. NBUN is the number of fuel bundles. %B<sup>10</sup> is the percent of allowable Boron depletion

The records on control blade exposures are being maintained on a continuous basis.

Following is a list of the upper one-fourth control blade exposures as of November 30, 1979. These exposures remain essentially unchanged due to the present control rod configuration.

1 $0.07577$ 46 $1.05403$ 2 $0.13292$ 47 $0.96892$ 3 $0.07575$ 48 $1.35679$ 4 $0.06612$ 49 $0.66616$ 5 $0.21654$ 50 $0.08998$ 6 $0.12314$ 51 $0.07021$ 7 $0.60654$ 52 $0.35794$ 8 $0.12318$ 53 $0.45619$ 9 $0.21683$ 54 $1.09636$ 10 $0.06629$ 55 $0.93590$ 11 $0.07754$ 56 $1.25799$ 12 $0.21896$ 57 $0.93923$ 13 $0.52774$ 58 $1.09362$ 14 $1.19210$ 59 $1.31322$ 15 $1.11327$ 60 $0.35798$ 16 $1.19415$ 61 $0.07207$ 17 $0.52795$ 62 $0.23178$ 18 $0.21884$ 63 $1.00018$ 20 $0.23207$ 65 $1.33851$ 21 $0.99931$ 66 $1.08309$ 22 $1.02710$ 67 $1.33730$ 23 $1.33515$ 68 $1.02741$ 24 $1.08302$ 69 $0.99963$ 25 $1.33910$ 70 $0.23207$ 26 $1.02626$ 77 $0.52795$ 29 $0.07207$ 74 $1.9392$ 31 $1.3143$ 76 $1.9290$ 32 $1.09626$ 77 $0.27869$ 34 $1.26354$ 79 $0.07754$ 35 $0.93666$ 80 $0.06629$ 36 $1.09766$ 81	Control Rod No.	SNVTs	Control Rod No.	SNVTS
30.07575481.3567940.06612490.6661650.21654500.0899860.12314510.0702170.60654520.3579490.21683541.09636100.06629550.93590110.07754561.25799120.21896570.93923130.52774581.09362141.19210591.31322151.11327600.35798161.19415610.07207170.52795620.23178180.21884631.00018190.07752641.02800200.23207651.33851210.99931661.08309221.02710671.33730231.33515681.02741241.08302690.99963251.33910700.23207261.02682710.07752270.99963720.21884280.23178730.52795300.35792751.11112311.31343761.19290321.09626770.22807330.93675780.21863340.93666800.06629350.93666800.07575330.93794830.60656390.070719	1	0.07577	46	1.05403
4 $0.06612$ $49$ $0.66616$ 5 $0.21654$ $50$ $0.08998$ 6 $0.12314$ $51$ $0.07021$ 7 $0.60654$ $52$ $0.35794$ 8 $0.12318$ $53$ $0.45619$ 9 $0.21683$ $54$ $1.09636$ 10 $0.06629$ $55$ $0.93590$ 11 $0.07754$ $56$ $1.25799$ 12 $0.21896$ $57$ $0.93923$ 13 $0.52774$ $58$ $1.09362$ 14 $1.19210$ $59$ $1.31322$ 15 $1.11327$ $60$ $0.35798$ 16 $1.9415$ $61$ $0.07207$ 17 $0.52795$ $62$ $0.23178$ 18 $0.21884$ $63$ $1.00018$ 19 $0.07752$ $64$ $1.02800$ 22 $1.02710$ $67$ $1.33851$ 21 $0.99931$ $66$ $1.08309$ 22 $1.02710$ $67$ $1.33730$ 23 $1.33515$ $68$ $1.02741$ 24 $1.08302$ $69$ $0.99963$ 25 $1.33910$ $70$ $0.23207$ 26 $1.02682$ $71$ $0.7752$ 27 $0.99963$ $72$ $0.21884$ 28 $0.23178$ $73$ $0.52785$ 33 $0.93875$ $78$ $0.21893$ 34 $1.26354$ $79$ $0.07752$ 35 $0.93666$ $80$ $0.06629$ 36 $1.09776$ $81$ $0.21633$ 37 $0.45568$ $82$ <td>3</td> <td>0.07575</td> <td>48</td> <td>1 35679</td>	3	0.07575	48	1 35679
5 $0.21654$ $50$ $0.08998$ 6 $0.12314$ $51$ $0.07021$ 7 $0.60654$ $52$ $0.35794$ 8 $0.12318$ $53$ $0.45619$ 9 $0.21683$ $54$ $1.09636$ 10 $0.06629$ $55$ $0.93590$ 11 $0.07754$ $56$ $1.25799$ 12 $0.21896$ $57$ $0.93923$ 13 $0.52774$ $58$ $1.09362$ 14 $1.19210$ $59$ $1.31322$ 15 $1.11327$ $60$ $0.35798$ 16 $1.19415$ $61$ $0.07207$ 17 $0.52795$ $62$ $0.23178$ 18 $0.21884$ $63$ $1.00018$ 19 $0.07752$ $64$ $1.02800$ 20 $0.23207$ $65$ $1.33851$ 21 $0.99931$ $66$ $1.08309$ 22 $1.02710$ $67$ $1.33730$ 23 $1.33515$ $68$ $1.02741$ 24 $1.08302$ $69$ $0.99963$ 25 $1.33910$ $70$ $0.23207$ 26 $1.02682$ $71$ $0.07752$ 27 $0.99963$ $72$ $0.21884$ 28 $0.23178$ $73$ $0.52795$ 29 $0.07207$ $74$ $1.19392$ 30 $0.35792$ $75$ $1.1112$ 31 $1.31343$ $76$ $1.19290$ 32 $1.09626$ $77$ $0.52769$ 33 $0.9375$ $78$ $0.21886$ 34 $1.26354$ $79$ </td <td>4</td> <td>0.06612</td> <td>49</td> <td>0.66616</td>	4	0.06612	49	0.66616
6 $0.12314$ $51$ $0.07021$ 7 $0.60654$ $52$ $0.35794$ 8 $0.12318$ $53$ $0.45619$ 9 $0.21683$ $54$ $1.09636$ 10 $0.06629$ $55$ $0.93590$ 11 $0.07754$ $56$ $1.25799$ 12 $0.21896$ $57$ $0.93923$ 13 $0.52774$ $58$ $1.09362$ 14 $1.19210$ $59$ $1.31322$ 15 $1.11327$ $60$ $0.35798$ 16 $1.19415$ $61$ $0.07207$ 17 $0.52795$ $62$ $0.23178$ 18 $0.21884$ $63$ $1.00018$ 19 $0.7752$ $64$ $1.02800$ 20 $0.23207$ $65$ $1.33851$ 21 $0.99931$ $66$ $1.02741$ 24 $1.08302$ $69$ $0.99963$ 25 $1.33910$ $70$ $0.23207$ 26 $1.02682$ $71$ $0.07752$ 27 $0.99963$ $72$ $0.21884$ 28 $0.23178$ $73$ $0.52795$ 30 $0.35792$ $75$ $1.11122$ 31 $1.31343$ $76$ $1.19290$ 32 $1.09626$ $77$ $0.52769$ 33 $0.93875$ $78$ $0.21884$ 34 $1.26354$ $79$ $0.7754$ 35 $0.93666$ $80$ $0.06629$ 36 $1.09776$ $81$ $0.21633$ 38 $0.35794$ $83$ $0.60656$ 39 $0.07019$ $84$ <	5	0.21654	50	0.08998
7 $0.60654$ $52$ $0.35794$ 8 $0.12318$ $53$ $0.45619$ 9 $0.21683$ $54$ $1.09636$ 10 $0.06629$ $55$ $0.93590$ 11 $0.07754$ $56$ $1.25799$ 12 $0.21896$ $57$ $0.93923$ 13 $0.52774$ $58$ $1.09362$ 14 $1.19210$ $59$ $1.31322$ 15 $1.11327$ $60$ $0.35798$ 16 $1.19415$ $61$ $0.07207$ 17 $0.52795$ $62$ $0.23178$ 18 $0.21884$ $63$ $1.00018$ 19 $0.07752$ $64$ $1.02800$ 20 $0.23207$ $65$ $1.33851$ 21 $0.99931$ $66$ $1.08309$ 22 $1.02710$ $67$ $1.33730$ 23 $1.33515$ $68$ $1.02741$ 24 $1.02682$ $71$ $0.7752$ 25 $1.33910$ $70$ $0.23207$ 26 $1.02682$ $71$ $0.07752$ 27 $0.9963$ $72$ $0.21884$ 28 $0.23178$ $73$ $0.52795$ 29 $0.07207$ $74$ $1.19392$ 30 $0.35792$ $75$ $1.1112$ 31 $1.31343$ $76$ $1.9290$ 32 $1.99626$ $77$ $0.52769$ 33 $0.93675$ $78$ $0.21896$ 34 $1.26354$ $79$ $0.7754$ 35 $0.93666$ $80$ $0.21683$ 37 $0.45568$ $82$ <td>6</td> <td>0.12314</td> <td>51</td> <td>0.07021</td>	6	0.12314	51	0.07021
8 $0.12318$ $53$ $0.45619$ 9 $0.21683$ $54$ $1.09636$ 10 $0.06629$ $55$ $0.93590$ 11 $0.07754$ $56$ $1.25799$ 12 $0.21896$ $57$ $0.93923$ 13 $0.52774$ $58$ $1.09362$ 14 $1.19210$ $59$ $1.31322$ 15 $1.11327$ $60$ $0.35798$ 16 $1.19415$ $61$ $0.07207$ 17 $0.52795$ $62$ $0.23178$ 18 $0.21884$ $63$ $1.00018$ 19 $0.07752$ $64$ $1.02800$ 20 $0.23207$ $65$ $1.33851$ 21 $0.99931$ $66$ $1.08309$ 22 $1.02710$ $67$ $1.33730$ 23 $1.33515$ $68$ $1.02741$ 24 $1.08302$ $69$ $0.99963$ 25 $1.33910$ $70$ $0.23207$ 26 $1.02682$ $71$ $0.07752$ 27 $0.99963$ $72$ $0.21884$ 28 $0.23178$ $73$ $0.52795$ 29 $0.07207$ $74$ $1.19392$ 30 $0.35792$ $75$ $1.1112$ 31 $1.31343$ $76$ $1.19290$ 32 $1.09626$ $77$ $0.52769$ 33 $0.93875$ $78$ $0.21884$ 34 $1.26354$ $79$ $0.07754$ 35 $0.93666$ $80$ $0.21639$ 34 $1.26354$ $79$ $0.07754$ 35 $0.93666$ $8$	7	0.60654	52	0.35794
9 $0.21683$ $54$ $1.09636$ 10 $0.06629$ $55$ $0.93590$ 11 $0.07754$ $56$ $1.25799$ 12 $0.21896$ $57$ $0.93923$ 13 $0.52774$ $58$ $1.09362$ 14 $1.19210$ $59$ $1.31322$ 15 $1.11327$ $60$ $0.35798$ 16 $1.19415$ $61$ $0.07207$ 17 $0.52795$ $62$ $0.23178$ 18 $0.21884$ $63$ $1.00018$ 19 $0.07752$ $64$ $1.02800$ 20 $0.23207$ $65$ $1.33851$ 21 $0.99931$ $66$ $1.008309$ 22 $1.02710$ $67$ $1.33730$ 23 $1.33515$ $68$ $1.02741$ 24 $1.08302$ $69$ $0.99963$ 25 $1.33910$ $70$ $0.23207$ 26 $1.02682$ $71$ $0.07552$ 29 $0.07207$ $74$ $1.19392$ 30 $0.35792$ $75$ $1.1112$ 31 $1.31343$ $76$ $1.19290$ 32 $1.09626$ $77$ $0.52769$ 34 $1.26354$ $79$ $0.07754$ 35 $0.93666$ $80$ $0.06629$ 36 $1.09776$ $81$ $0.21683$ 37 $0.45568$ $82$ $0.02318$ 38 $0.35794$ $83$ $0.60656$ 39 $0.07019$ $84$ $0.12314$ 40 $0.08998$ $85$ $0.21639$ 41 $0.66168$	8	0.12318	53	0.45619
10 $0.06629$ $55$ $0.93890$ $11$ $0.07754$ $56$ $1.25799$ $12$ $0.21896$ $57$ $0.93923$ $13$ $0.52774$ $58$ $1.09362$ $14$ $1.19210$ $59$ $1.31322$ $15$ $1.11327$ $60$ $0.35798$ $16$ $1.19415$ $61$ $0.07207$ $17$ $0.52795$ $62$ $0.23178$ $18$ $0.21884$ $63$ $1.00018$ $19$ $0.07752$ $64$ $1.02800$ $20$ $0.23207$ $65$ $1.33851$ $21$ $0.99931$ $66$ $1.08309$ $22$ $1.02710$ $67$ $1.33730$ $23$ $1.33515$ $68$ $1.02741$ $24$ $1.08302$ $69$ $0.99963$ $25$ $1.33910$ $70$ $0.23207$ $26$ $1.02682$ $71$ $0.07752$ $27$ $0.99963$ $72$ $0.21884$ $28$ $0.23178$ $73$ $0.52795$ $29$ $0.07207$ $74$ $1.19290$ $30$ $0.35792$ $75$ $1.1112$ $31$ $1.31343$ $76$ $1.9290$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.06629$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.06656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.8998$ $85$ $0.21639$ $34$ $1.05213$ $89$	9	0.21683	54	1.09636
11 $0.07/34$ $36$ $1.25/99$ 12 $0.21896$ $57$ $0.93923$ 13 $0.52774$ $58$ $1.09362$ 14 $1.19210$ $59$ $1.31322$ 15 $1.11327$ $60$ $0.35798$ 16 $1.9415$ $61$ $0.7207$ 17 $0.52795$ $62$ $0.23178$ 18 $0.21884$ $63$ $1.00018$ 19 $0.07752$ $64$ $1.02800$ 20 $0.23207$ $65$ $1.33730$ 21 $0.99931$ $66$ $1.08309$ 22 $1.02710$ $67$ $1.33730$ 23 $1.33515$ $68$ $1.02741$ 24 $1.02802$ $69$ $0.99963$ 25 $1.33910$ $70$ $0.23207$ 26 $1.02682$ $71$ $0.07752$ 27 $0.99963$ $72$ $0.21884$ 28 $0.23178$ $73$ $0.52795$ 29 $0.07207$ $74$ $1.19392$ 30 $0.35792$ $75$ $1.11112$ 31 $1.31343$ $76$ $1.19290$ 32 $1.09626$ $77$ $0.52769$ 33 $0.93875$ $78$ $0.21896$ 34 $1.26354$ $79$ $0.07754$ 35 $0.93666$ $80$ $0.021633$ 36 $1.09776$ $81$ $0.21633$ 37 $0.45568$ $82$ $0.22184$ 40 $0.08998$ $85$ $0.21639$ 41 $0.66168$ $86$ $0.06614$ 42 $1.35649$	10	0.05629	55	0.93590
12 $0.21890$ $37$ $0.93923$ $13$ $0.52774$ $58$ $1.09362$ $14$ $1.19210$ $59$ $1.31322$ $15$ $1.11327$ $60$ $0.35798$ $16$ $1.19415$ $61$ $0.07207$ $17$ $0.52795$ $62$ $0.23178$ $18$ $0.21884$ $63$ $1.00018$ $19$ $0.07752$ $64$ $1.02800$ $20$ $0.23207$ $65$ $1.33851$ $21$ $0.99931$ $66$ $1.08309$ $22$ $1.02710$ $67$ $1.33730$ $23$ $1.33515$ $68$ $1.02741$ $24$ $1.08302$ $69$ $0.99963$ $25$ $1.33910$ $70$ $0.23207$ $26$ $1.02682$ $71$ $0.07752$ $27$ $0.99963$ $72$ $0.21884$ $28$ $0.23178$ $73$ $0.52795$ $29$ $0.07207$ $74$ $1.19392$ $30$ $0.35792$ $75$ $1.1112$ $31$ $1.31343$ $76$ $1.19290$ $32$ $1.09626$ $77$ $0.52769$ $33$ $0.93875$ $78$ $0.21896$ $34$ $1.26354$ $79$ $0.07575$ $35$ $0.93666$ $80$ $0.66629$ $36$ $1.09776$ $81$ $0.21683$ $37$ $0.45568$ $82$ $0.02318$ $38$ $0.35794$ $83$ $0.60656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.08998$ $87$ <t< td=""><td>1.2</td><td>0.07/54</td><td>50 57</td><td>1.25799</td></t<>	1.2	0.07/54	50 57	1.25799
15 $0.3279$ $36$ $1.09362$ 14 $1.19210$ $59$ $1.31322$ 15 $1.11327$ $60$ $0.35798$ 16 $1.19415$ $61$ $0.07207$ 17 $0.52795$ $62$ $0.23178$ 18 $0.21884$ $63$ $1.00018$ 19 $0.07752$ $64$ $1.02800$ 20 $0.23207$ $65$ $1.33851$ 21 $0.99931$ $66$ $1.08309$ 22 $1.02710$ $67$ $1.33730$ 23 $1.33515$ $68$ $1.02741$ 24 $1.08302$ $69$ $0.99963$ 25 $1.33910$ $70$ $0.23207$ 26 $1.02682$ $71$ $0.07752$ 27 $0.99963$ $72$ $0.21884$ 28 $0.23178$ $73$ $0.52795$ 29 $0.07207$ $74$ $1.19392$ 30 $0.35792$ $75$ $1.1112$ 31 $1.31343$ $76$ $1.19290$ 32 $1.09626$ $77$ $0.52769$ 33 $0.93875$ $78$ $0.21896$ 34 $1.26354$ $79$ $0.07754$ 35 $0.93666$ $80$ $0.06629$ 36 $1.09776$ $81$ $0.21633$ 37 $0.45568$ $82$ $0.22184$ 40 $0.08998$ $85$ $0.21639$ 41 $0.66168$ $86$ $0.06614$ 42 $1.35649$ $87$ $0.07575$ 43 $0.97086$ $88$ $0.13291$ 44 $1.05213$	13	0.21090	50	0.93923
151.1132760 $0.35798$ 161.1941561 $0.07207$ 17 $0.52795$ 62 $0.23178$ 18 $0.21884$ 63 $1.00018$ 19 $0.07752$ 64 $1.02800$ 20 $0.23207$ 65 $1.33851$ 21 $0.99931$ 66 $1.08309$ 22 $1.02710$ 67 $1.33730$ 23 $1.33515$ 68 $1.02741$ 24 $1.08302$ 69 $0.99963$ 25 $1.33910$ 70 $0.23207$ 26 $1.02682$ 71 $0.07752$ 27 $0.99963$ 72 $0.21884$ 28 $0.23178$ 73 $0.52795$ 29 $0.07207$ 74 $1.19392$ 30 $0.35792$ 75 $1.1112$ 31 $1.31343$ 76 $1.19290$ 32 $1.09626$ 77 $0.52769$ 33 $0.93875$ 78 $0.21896$ 34 $1.26354$ 79 $0.0754$ 35 $0.93666$ 80 $0.06629$ 36 $1.09776$ 81 $0.21683$ 37 $0.45568$ 82 $0.21314$ 40 $0.08998$ 85 $0.21639$ 41 $0.66168$ 86 $0.06614$ 42 $1.35649$ 87 $0.07575$ 43 $0.97086$ 88 $0.13291$ 44 $1.05213$ 89 $0.07577$	14	1,19210	59	1 21222
16 $1.19415$ $61$ $0.07207$ $17$ $0.52795$ $62$ $0.23178$ $18$ $0.21884$ $63$ $1.00018$ $19$ $0.07752$ $64$ $1.02800$ $20$ $0.23207$ $65$ $1.33851$ $21$ $0.99931$ $66$ $1.08309$ $22$ $1.02710$ $67$ $1.33730$ $23$ $1.33515$ $68$ $1.02741$ $24$ $1.08302$ $69$ $0.99963$ $25$ $1.33910$ $70$ $0.23207$ $26$ $1.02682$ $71$ $0.07752$ $27$ $0.99963$ $72$ $0.21884$ $28$ $0.23178$ $73$ $0.52795$ $29$ $0.07207$ $74$ $1.19392$ $30$ $0.35792$ $75$ $1.11112$ $31$ $1.31343$ $76$ $1.19290$ $32$ $1.09626$ $77$ $0.52769$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.06629$ $36$ $1.09776$ $81$ $0.21683$ $37$ $0.45568$ $82$ $0.02318$ $38$ $0.35794$ $83$ $0.60656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.08988$ $85$ $0.21639$ $41$ $0.66168$ $86$ $0.06614$ $42$ $1.35649$ $87$ $0.07575$ $43$ $0.97086$ $88$ $0.13291$ $44$ $1.05213$ $89$ $0.07577$	15	1,11327	60	0 35798
17 $0.52795$ $62$ $0.23178$ $18$ $0.21884$ $63$ $1.00018$ $19$ $0.07752$ $64$ $1.02800$ $20$ $0.23207$ $65$ $1.33851$ $21$ $0.99931$ $66$ $1.08309$ $22$ $1.02710$ $67$ $1.33730$ $23$ $1.33515$ $68$ $1.02741$ $24$ $1.08302$ $69$ $0.99963$ $25$ $1.33910$ $70$ $0.23207$ $26$ $1.02682$ $71$ $0.07752$ $27$ $0.99963$ $72$ $0.21884$ $28$ $0.23178$ $73$ $0.52795$ $29$ $0.07207$ $74$ $1.19392$ $30$ $0.35792$ $75$ $1.11112$ $31$ $1.3143$ $76$ $1.19290$ $32$ $1.09626$ $77$ $0.52769$ $33$ $0.93875$ $78$ $0.21896$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.21683$ $37$ $0.45568$ $82$ $0.02318$ $38$ $0.35794$ $83$ $0.60656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.08998$ $85$ $0.21639$ $41$ $0.66168$ $86$ $0.06614$ $42$ $1.35649$ $87$ $0.07575$ $43$ $0.97086$ $88$ $0.13291$ $44$ $1.05213$ $89$ $0.07577$	16	1.19415	61	0.07207
18 $0.21884$ $63$ $1.00018$ $19$ $0.07752$ $64$ $1.02800$ $20$ $0.23207$ $65$ $1.33851$ $21$ $0.99931$ $66$ $1.08309$ $22$ $1.02710$ $67$ $1.33730$ $23$ $1.33515$ $68$ $1.02741$ $24$ $1.08302$ $69$ $0.99963$ $25$ $1.33910$ $70$ $0.23207$ $26$ $1.02682$ $71$ $0.07752$ $27$ $0.99963$ $72$ $0.21884$ $28$ $0.23178$ $73$ $0.52795$ $29$ $0.07207$ $74$ $1.19392$ $30$ $0.35792$ $75$ $1.11112$ $31$ $1.31343$ $76$ $1.19290$ $32$ $1.09626$ $77$ $0.52769$ $33$ $0.93875$ $78$ $0.21896$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.06629$ $36$ $1.09776$ $81$ $0.21683$ $37$ $0.45568$ $82$ $0.02318$ $38$ $0.35794$ $83$ $0.60656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.08998$ $85$ $0.21639$ $41$ $0.66168$ $86$ $0.06614$ $42$ $1.35649$ $87$ $0.07575$ $43$ $0.97086$ $88$ $0.13291$ $44$ $1.05213$ $89$ $0.07577$	17	0.52795	62	0.23178
19 $0.07752$ $64$ $1.02800$ 20 $0.23207$ $65$ $1.33851$ 21 $0.99931$ $66$ $1.08309$ 22 $1.02710$ $67$ $1.33730$ 23 $1.33515$ $68$ $1.02741$ 24 $1.08302$ $69$ $0.99963$ 25 $1.33910$ $70$ $0.23207$ 26 $1.02682$ $71$ $0.07752$ 27 $0.99963$ $72$ $0.21884$ 28 $0.23178$ $73$ $0.52795$ 29 $0.07207$ $74$ $1.19392$ 30 $0.35792$ $75$ $1.11112$ 31 $1.31343$ $76$ $1.19290$ 32 $1.09626$ $77$ $0.52769$ 33 $0.93875$ $78$ $0.21886$ 34 $1.26354$ $79$ $0.07754$ 35 $0.93666$ $80$ $0.06629$ 36 $1.09776$ $81$ $0.21683$ 37 $0.45568$ $82$ $0.02318$ 38 $0.35794$ $83$ $0.60656$ 39 $0.07019$ $84$ $0.12314$ 40 $0.8998$ $85$ $0.21639$ 41 $0.66168$ $86$ $0.06614$ 42 $1.35649$ $87$ $0.07575$ $43$ $0.97086$ $88$ $0.13291$ $44$ $1.05213$ $89$ $0.07577$	18	0.21884	63	1.00018
20 $0.23207$ $65$ $1.33851$ $21$ $0.99931$ $66$ $1.08309$ $22$ $1.02710$ $67$ $1.33730$ $23$ $1.33515$ $68$ $1.02741$ $24$ $1.08302$ $69$ $0.99963$ $25$ $1.33910$ $70$ $0.23207$ $26$ $1.02682$ $71$ $0.07752$ $27$ $0.99963$ $72$ $0.21884$ $28$ $0.23178$ $73$ $0.52795$ $29$ $0.7207$ $74$ $1.19392$ $30$ $0.35792$ $75$ $1.11112$ $31$ $1.31343$ $76$ $1.19290$ $32$ $1.09626$ $77$ $0.52769$ $33$ $0.93875$ $78$ $0.21896$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.06629$ $36$ $1.09776$ $81$ $0.21683$ $37$ $0.45568$ $82$ $0.02318$ $38$ $0.35794$ $83$ $0.60656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.8998$ $85$ $0.21639$ $41$ $0.66168$ $86$ $0.06614$ $42$ $1.35649$ $87$ $0.07575$ $43$ $0.97086$ $88$ $0.13291$ $44$ $1.05213$ $89$ $0.07577$	19	0.07752	64	1.02800
21 $0.99931$ $66$ $1.08309$ $22$ $1.02710$ $67$ $1.33730$ $23$ $1.33515$ $68$ $1.02741$ $24$ $1.08302$ $69$ $0.99963$ $25$ $1.33910$ $70$ $0.23207$ $26$ $1.02682$ $71$ $0.07752$ $27$ $0.99963$ $72$ $0.21884$ $28$ $0.23178$ $73$ $0.52795$ $29$ $0.07207$ $74$ $1.19392$ $30$ $0.35792$ $75$ $1.11112$ $31$ $1.31343$ $76$ $1.19290$ $32$ $1.09626$ $77$ $0.52769$ $33$ $0.93875$ $78$ $0.21896$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.06629$ $36$ $1.09776$ $81$ $0.21683$ $37$ $0.45568$ $82$ $0.02318$ $38$ $0.35794$ $83$ $0.60656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.8998$ $85$ $0.21639$ $41$ $0.66168$ $86$ $0.06614$ $42$ $1.35649$ $87$ $0.07575$ $43$ $0.97086$ $88$ $0.13291$ $44$ $1.05213$ $89$ $0.07577$	20	0.23207	65	1.33851
221.02710 $67$ 1.33730 $23$ 1.33515 $68$ 1.02741 $24$ 1.08302 $69$ 0.99963 $25$ 1.33910 $70$ 0.23207 $26$ 1.02682 $71$ 0.07752 $27$ 0.99963 $72$ 0.21884 $28$ 0.23178 $73$ 0.52795 $29$ 0.07207 $74$ 1.19392 $30$ 0.35792 $75$ 1.11112 $31$ 1.31343 $76$ 1.19290 $32$ 1.09626 $77$ 0.52769 $33$ 0.93875 $78$ 0.21886 $34$ 1.26354 $79$ 0.07754 $35$ 0.93666 $80$ 0.06629 $36$ 1.09776 $81$ 0.21683 $37$ 0.45568 $82$ 0.02318 $38$ 0.35794 $83$ 0.60656 $39$ 0.07019 $84$ 0.12314 $40$ 0.08998 $85$ 0.21639 $41$ 0.66168 $86$ 0.06614 $42$ 1.35649 $87$ 0.07575 $43$ 0.97086 $88$ 0.13291 $44$ 1.05213 $89$ 0.07577	21	0.99931	66	1.08309
23 $1.33515$ $68$ $1.02741$ $24$ $1.08302$ $69$ $0.99963$ $25$ $1.33910$ $70$ $0.23207$ $26$ $1.02682$ $71$ $0.07752$ $27$ $0.99963$ $72$ $0.21884$ $28$ $0.23178$ $73$ $0.52795$ $29$ $0.07207$ $74$ $1.19392$ $30$ $0.35792$ $75$ $1.11112$ $31$ $1.31343$ $76$ $1.19290$ $32$ $1.09626$ $77$ $0.52769$ $33$ $0.93875$ $78$ $0.21896$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.06629$ $36$ $1.09776$ $81$ $0.21683$ $37$ $0.45568$ $82$ $0.02318$ $38$ $0.35794$ $83$ $0.60656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.8998$ $85$ $0.21639$ $41$ $0.66168$ $86$ $0.06614$ $42$ $1.35649$ $87$ $0.07575$ $43$ $0.97086$ $88$ $0.13291$ $44$ $1.05213$ $89$ $0.07577$	22	1.02710	67	1.33730
241.08302690.99963251.33910700.23207261.02682710.07752270.99963720.21884280.23178730.52795290.07207741.19392300.35792751.11112311.31343761.19290321.09626770.52769330.93875780.21896341.26354790.07754350.93666800.06629361.09776810.21683370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	23	1.33515	68	1.02741
251.33910700.23207 $26$ 1.02682710.07752 $27$ 0.99963720.21884 $28$ 0.23178730.52795 $29$ 0.07207741.19392 $30$ 0.35792751.11112 $31$ 1.31343761.19290 $32$ 1.09626770.52769 $33$ 0.93875780.21896 $34$ 1.26354790.07754 $35$ 0.93666800.06629 $36$ 1.09776810.21683 $37$ 0.45568820.02318 $38$ 0.35794830.60656 $39$ 0.07019840.12314 $40$ 0.08998850.21639 $41$ 0.66168860.06614 $42$ 1.35649870.07575 $43$ 0.97086880.13291 $44$ 1.05213890.07577	24	1.08302	69	0.99963
261.02682710.07752270.99963720.21884280.23178730.52795290.07207741.19392300.35792751.11112311.31343761.19290321.09626770.52769330.93875780.21896341.26354790.07754350.93666800.06629361.09776810.21683370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	25	1.33910	70	0.23207
27 $0.99963$ $72$ $0.21884$ $28$ $0.23178$ $73$ $0.52795$ $29$ $0.07207$ $74$ $1.19392$ $30$ $0.35792$ $75$ $1.11112$ $31$ $1.31343$ $76$ $1.19290$ $32$ $1.09626$ $77$ $0.52769$ $33$ $0.93875$ $78$ $0.21896$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.06629$ $36$ $1.09776$ $81$ $0.21683$ $37$ $0.45568$ $82$ $0.02318$ $38$ $0.35794$ $83$ $0.60656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.8998$ $85$ $0.21639$ $41$ $0.66168$ $86$ $0.06614$ $42$ $1.35649$ $87$ $0.07575$ $43$ $0.97086$ $88$ $0.13291$ $44$ $1.05213$ $89$ $0.07577$	26	1.02682	71	0.07752
28 $0.23178$ $73$ $0.52795$ $29$ $0.07207$ $74$ $1.19392$ $30$ $0.35792$ $75$ $1.11112$ $31$ $1.31343$ $76$ $1.19290$ $32$ $1.09626$ $77$ $0.52769$ $33$ $0.93875$ $78$ $0.21896$ $34$ $1.26354$ $79$ $0.07754$ $35$ $0.93666$ $80$ $0.06629$ $36$ $1.09776$ $81$ $0.21683$ $37$ $0.45568$ $82$ $0.02318$ $38$ $0.35794$ $83$ $0.60656$ $39$ $0.07019$ $84$ $0.12314$ $40$ $0.08998$ $85$ $0.21639$ $41$ $0.66168$ $86$ $0.06614$ $42$ $1.35649$ $87$ $0.07575$ $43$ $0.97086$ $88$ $0.13291$ $44$ $1.05213$ $89$ $0.07577$	27	0.99963	72	0.21884
290.07207741.19392300.35792751.11112311.31343761.19290321.09626770.52769330.93875780.21896341.26354790.07754350.93666800.06629361.09776810.21683370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	20	0.231/8	73	0.52795
300.33792731.11112311.31343761.19290321.09626770.52769330.93875780.21896341.26354790.07754350.93666800.06629361.09776810.21683370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	29	0.07207	74	1.19392
311.31343761.19290321.09626770.52769330.93875780.21896341.26354790.07754350.93666800.06629361.09776810.21683370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	30	1 31343	75	1.11112
330.93875780.21896341.26354790.07754350.93666800.06629361.09776810.21683370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	32	1.09626	70	1.19290
341.26354790.07754350.93666800.06629361.09776810.21683370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	33	0.93875	78	0.21896
350.93666800.06629361.09776810.21683370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	34	1.26354	79	0.07754
361.09776810.21683370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	35	0.93666	80	0.06629
370.45568820.02318380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	36	1.09776	. 81	0.21683
380.35794830.60656390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	37	0.45568	82	0.02318
390.07019840.12314400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	38	0.35794	83	0.60656
400.08998850.21639410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	39	0.07019	84	0.12314
410.66168860.06614421.35649870.07575430.97086880.13291441.05213890.07577	40	0.08998	85	0.21639
42   1.35649   87   0.07575     43   0.97086   88   0.13291     44   1.05213   89   0.07577     45   1.04100   1.04100   1.04100	41	0.66168	86	0.06614
43 0.97086 88 0.13291   44 1.05213 89 0.07577   45 1.04100	42	1,35649	87	0.07575
44 I.USZIS 89 0.07577	43	0.97086	88	0.13291
	44 45	1 04100 1.02213	۲ø	0.07577

### Item No. 2

Identify any control blades predicted to have greater than 34 percent B<sup>10</sup> depletion averaged over the upper one-fourth of the blade by the next refueling outage.

- a. Describe your plans for replacement of identified control blades.
- b. Describe measure which you plan to take justifying continued operations until the next refueling specifically addressing (1) any blade with greater than 42 percent depletion averaged over the upper one-fourth of the blade; and (2) the condition where you find greater than 26 percent of the control blades calculated to have greater than 34 percent depletion averaged over the upper one-fourth of the blade.

#### Response

DAEC will not have any control blades with greater than 34 percent  $B^{10}$  depletion averaged over the upper one-fourth of the blade by the next refueling outage. (End of cycle 4B) It is predicted that the following control blades will reach 34 percent  $B^{10}$  depletion during cycle 6; 18-15; 26-15; 10-23; 34-23; 18-31; 26-31. We plan to replace these blades at the end-of-the-cycle 5.