

LICENSEE EVENT REPORT

CONTROL BLOCK: _____ (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 | V | A | S | P | S | 1 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 4 | 1 | 1 | 1 | 1 | 1 | 4 | 5
8 9 14 15 25 26 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

02 | L | 6 | 0 | 5 | 0 | 0 | 0 | 2 | 8 | 0 | 7 | 0 | 4 | 1 | 5 | 8 | 2 | 8 | 0 | 5 | 1 | 4 | 8 | 2 | 9
51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

03 | 2 | Following a reactor trip from 25% power, the reactor coolant system was diluted
04 | 5 | to a Boron Concentration wherein the critical rod position achieved, if the
05 | 4 | control rod assemblies were withdrawn in normal sequence, would have been lower
06 | 5 | than the insertion limit for zero power. Since the reactor remained subcritical
07 | 6 | and more than adequate shutdown margin remained available for a postulated steam
08 | 7 | line break, the health and safety of the public were not affected. This is
09 | 8 | contrary to T.S. 3.12.A.4 and reportable per T.S. 6.6.2.b.(3).
10 | 9 |

09 | R | B | 11 | A | 12 | A | 13 | Z | Z | Z | Z | Z | Z | 14 | Z | 15 | Z | 16
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
17 | 8 | 2 | 0 | 4 | 8 | 0 | 3 | L | 0
21 22 23 24 25 26 27 28 29 30 31 32
18 | X | 18 | H | 19 | C | 20 | Z | 21 | 0 | 0 | 0 | 0 | Y | 23 | N | 24 | Z | 25 | Z | 9 | 9 | 9 | 26
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

10 | 0 | Failure to maintain makeup boron concentration equal to RCS concentration resulted
11 | 1 | in an overdilution. Because of errors in the ECP calculations, the dilution
12 | 2 | was not detected until the subsequent approach to criticality. The controlling
13 | 3 | bank was inserted and the RCS borated to the required concentration.
14 | 4 |

15 | C | 28 | 0 | 0 | 0 | 29 | N/A | 30 | A | 31 | Operator's Observation | 32
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

16 | Z | 33 | Z | 34 | N/A | 35 | N/A | 36
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

17 | 0 | 0 | 0 | 37 | Z | 38 | N/A | 39
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

18 | 0 | 0 | 0 | 40 | N/A | 41
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

19 | Z | 42 | N/A | 43
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

20 | S | 8205210102 820514 | PDR ADOCK 05000280 | PDR | N/A | NRC USE ONLY
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

ATTACHMENT 1

SURRY POWER STATION, UNIT NO. 1

DOCKET NO: 50-280

REPORT NO: 82-048/03L-0

EVENT DATE: 4/15/82

TITLE OF THE EVENT: Predicted Criticality Below Insertion Limit

1. DESCRIPTION OF EVENT:

On April 15, 1982, while conducting a reactor start up, the reactor operator observed nuclear instrument responses that indicated that a potential existed for the reactor to achieve criticality below the minimum control rod insertion limits. The initial review of the estimated Critical Rod Position (ECP) calculations revealed a mathematical error. An adjustment to the boron concentration (boration) was made and the reactor start up was recommenced. The reactor achieved criticality above the minimum insertion limits. A detailed evaluation of the complicated Xenon power history was initiated. This time consuming evaluation verified that the critical rod height would have been approximately 9% (37 steps) below the minimum insertion limits. This is contrary to Technical Specification 6.6.2.b(3).

2. PROBABLE CONSEQUENCES:

Insertion limits are developed to satisfy safety requirements for shutdown margin, power distribution limits, and maximum worth for an ejected control rod. A violation of the insertion limits does not necessarily result in a violation of the above mentioned safety requirements because of conservatism used in developing these limits. Since the reactor remained subcritical throughout this event and more than adequate shutdown margin (4%) was available to combat a postulated steam line break, the health and safety of the general public were not affected.

3. CAUSE OF THE EVENT:

Due to increased primary system makeup demands as a result of a cooldown following a previous reactor trip, the primary grade water flow to the blender was increased without a corresponding increase in boric acid flow. This resulted in diluting the reactor coolant system below the minimum rod insertion limit boron concentration.

Because of a mathematical error and the use of inaccurate Xenon worth in the ECP calculation, the dilution was not detected until the subsequent approach to criticality.

4. IMMEDIATE CORRECTIVE ACTION:

The controlling bank was immediately inserted.

5. SUBSEQUENT CORRECTIVE ACTION:

The Shift Supervisor and the reactor engineer reviewing ECP identified an error which indicated low RCS boron concentration for the attempted start-up. The RCS was borated as per the corrected ECP and the start-up continued.

6. ACTION TAKEN TO PREVENT RECURRENCE:

Personnel involved have been reinstructed in the necessity of maintaining the blended flow concentration the same as the existing RCS boron concentration. The ECP has been modified to clarify requirements for Boron adjustment. In addition, all licensed operators will be given retraining on ECP calculations.

7. GENERIC IMPLICATIONS:

None.