

NATIONAL BUREAU OF STANDARDS REACTOR

Docket #50-184

Facility License No. TR-5

Operations Report

--- #38 ---

January 1, 1985 - December 31, 1985

This report contains a summary of activities connected with the operations of the NBSR. It is submitted in fulfillment of section 7.8(3) of the NBSR Technical Specifications and covers the period from January 1, 1985 to December 31, 1985.

Section numbers in the report (such as 7.8(3)(a)) correspond to those used in the Technical Specifications.

March 20, 1986

*Robert S. Carter*

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Chief, Reactor Radiation Division

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### 7.8(3)(a) Summary of Plant Operations

During the calendar year 1985, the reactor was critical for 5246 hours and the energy generated was 101,979 MWH.

On April 3, 1985 the reactor achieved its new power level of 20 MW. This followed programmed step increases in reactor power. A baseline was established at the old power of 10 MW, followed, over a period of time, by increases to 12.5 MW, 15 MW, 17.5 MW and finally to 20 MW. The approach to 20 MW was uneventful. All parameters, nuclear, process and radiation were as predicted and essentially double the baseline data obtained at 10 MW.

Only 3 primary main pumps were needed to produce the desired flow of about 8900 gpm, leaving the fourth pump as a spare. The flow is about 50% more than that at 10 MW. A 4<sup>o</sup>F increase in primary delta T brought it to about 14<sup>o</sup>F. Since April 1985, the reactor was operated routinely at 20 MW in the same manner as in previous years at 10 MW.

### 7.8(3)(b) Unscheduled Shutdowns

There were five (5) Scrams due to commercial power dips during storms on 5-21-85, 5-28-85, 6-5-85, 7-12-85, and 7-26-85. In four of the five cases the reactor was returned to power at once. In the fifth case it happened at the end of a cycle and the reactor stayed down for refueling.

On 6-17-85 the reactor Scrammed on low flow while the operator was shifting No. 4 main cooling pump from Hand to Auto. The reactor was returned to power at once.

### 7.8(3)(c) Tabulation of Major Items of Plant Maintenance

1. Repaired leak on 150# air receiver.
2. Cleaned air operator on DWV-6.

3. Cleaned air regulator on SCV-1, 2, and 3.
4. Repaired backup door seal regulator.
5. Cleaned out channels and repaired facings at elevator door seals.
6. Installed upper and lower strong-backs for elevator sliding door.
7. Repaired building ceiling leaks.
8. Repaired locks on B-2 door to confinement building.
9. Installed safety rails above stairwells.
10. Installed grating above HE-1A & B.
11. Repaired demineralized water piping leak in room B-153 and on B-2.
12. Changed demineralized water filters.
13. Plugged 4 leaking tubes in HE-4.
14. Replaced time delay relays TD-1, 2, & 3 in the Inverter/Diverter.
15. Cleaned breaker on Diesel B.
16. Replaced 2 cells in station battery.
17. Changed overload relays in DP-1,2,3,&4 and replaced time delay relay in #3 controller.
18. Replaced time delay relay in DP-5.
19. Replaced breakers in Aux. pumps 1 & 2.
20. Replaced control relays and undervoltage relays in A-5/B-6 Breakers 1,2,3, & 4.
21. Cleaned contacts on DP-1.
22. Replaced boron plates on lower shutter of BT-9.
23. Replaced 2 strip heaters on helium sweep system.
24. Replaced diaphragms on HEV-40, 41, 30, 31, & 32.
25. Replaced diaphragm on IRV-5.
26. Replace pump B and repaired suction line on pump A of sump #3 in pump house. Also repaired level sensor.

27. Cleaned drive on Shim Arm #4.
28. Installed return pump on sampling system.
29. Installed flow switch on tritium monitor.
30. Changed D<sub>2</sub>O in G-2 experimental tube.
31. Installed leak detection system on Shim Arm #2.
32. Cleaned Shim Arm #1 clutch.
33. Replaced pedestal bearing in DP-2.
34. Replaced LIA-40.
35. Replaced impeller gaskets on DP-1 & 3.
36. Changed pre & after filters on primary IX columns.
37. Replaced "O"rings in RT-3, 4, & 1.
38. Replaced IN light on RT-4.
39. Inspected and cleaned RW-13.
40. Replaced bearing on G-6 transfer arm.
41. Installed new lower section on dropout tool.
42. Replaced SCV-5.
43. Replaced Cooling Tower makeup valves.
44. Installed auxiliary makeup line to Cooling Tower.
45. Replaced coupling on Secondary Pump #4.
46. Installed a priming system on storage pool pumps.
47. Installed new hoses and piping on pool vacuum.
48. Changed pool system pre and after filters twice.
49. Installed pressure indicators on the upper ring header of the thermal shield cooling system.
50. Replaced bonnet on TSV-1.
51. Repaired air solenoid on TSV-2.
52. Replaced seal on T.S. pump #2.

53. Repaired TSV-586.
54. Replaced T.S. IX conductivity cells.
55. Repaired leak in T.S. heat exchanger end bell with a different gasket.
56. Replaced washers on all upper ring header valves.
57. Replaced digital indicator on Shim Arm #2.
58. Cleared water out of Fission Products detector housing.
59. Replaced gain potentiometer in the Reg Rod DIAT Controller.
60. Replaced GM tube in RM3-2 Fission Products Monitor. Corrected tube failures by placing dropping resistor nearer detector.
61. Partial test and operational test of RM4-1 Stack Monitor.
62. Replaced GM tube in RM3-1 N-16 Monitor.
63. Replaced PSX relay in the emergency fan controller SPC-150.
64. Replaced amplifier in FR-1 Reactor Outlet Flow channel, performed calibration check.
65. Cleaned NC-6 test switch and verified NC-6 trip points.
66. Installed 2 (1/2 ampere) fuses in Reg Rod motor control circuit.
67. Replaced amplifier and calibrated FR-3 Outer Plenum Flow.
68. Replaced amplifiers on FR-3 and FR-4, Outer and Inner Plenum Flow channels. Performed calibration and scram response tests.
69. Technical Specificatio Test
  - RM-3-5 Normal Air Monitor
  - TIA-40A Reactor Delta Temperature Indicator
  - PC-3 Normal Exhaust Monitor
  - PC-27 Process Room Fan Controller
  - SPC-150 Emergency Fan Controller
  - SPS-151 Vacuum Breaker Controller

SPS-150	Emergency Standby Controller
RM-3-5	Normal Air Monitor
RM-3-4	Irradiated Air Monitor
RM-3-1	N-16 Monitor
NC-1	Nuclear Source Range Channel
NC-2	Nuclear Source Range Channel
NC-4	Nuclear Intermediate Range Channel
NC-6	Nuclear Power Range Channel
NC-8	Nuclear Power Range Channel
BTUR-1	Reactor Thermal Power
FR-3	Reactor Outlet Plenum Flow
LIA-40	Reactor Level Indicator
FR-4	Reactor Inner Plenum Flow
RM-4-1	Stack Air Monitor
NC-7	Nuclear Power Range Channel
RM-1-1-10	Area Radiation Monitors
NC-3	Nuclear Intermediate Range Channel
LRC-1	Reactor Level Recorder
NC-6	Nuclear Power Range Channel
NC-9	Nuclear Interlock Trip Test
FRC-3	Reactor Outlet Flow
TRA-2	Reactor Outlet Temperature Recorder
TIA-40B	Reactor Delta Temperature Indicator
RM-3-2	Fission Products Monitor
LIA-40	Reactor Level Indicator
FIA-40	Reactor Outlet Flow Indicator
RM-3-1	N-16 Monitor

7.8(3)(d) Tabulation of Major Changes in the Facility and Procedures, and the Test and Experiments, Carried Out Without Prior Approval by the NRC pursuant to 10 CFR 50.59

Relevant Engineering Changes are summarized below.

ECN-288 RFI protection for temperature transmitters.

This involved the fabrication of a metal cabinet to contain the plant temperature transmitters in order for them to be protected from RF when 2-way radios might be used in their vicinity.

ECN-305 Removal of unnecessary and unused valves in primary system.

This involved the removal of such valves as the Storage tank drain, strainer vent valve and helium to IX column valve. These valves are not involved in reactor operation and therefore pose no unreviewed safety question their removal.

ECN-310 Installation of a flow switch in the tritium monitor system.

The purpose of this installation is to alert the Control Room operator of any condition that results in a low flow of sample air to the tritium detector. It has no effect on the operation of the reactor and therefore it's failure would not involve an unreviewed safety question.

ECN-311 Install additional ball plungers in the fuel element head mounting block.

The purpose of this installation is to install two additional ball plungers, to the two already in the design, in the fuel

element mounting head in such a way as to engage a groove in the shaft of the fuel element lifting head so that it can not easily rotate once the latching bar has engaged beneath upper grid. This is a minor change for improvement and will not change the function of the fuel element head. All other functions and operations of the head remain the same.

Changes to procedures:

Comprehensive Emergency Procedures were prepared and instituted to implement the new NRC approved Emergency Plan.

7.8(3)(e) Summary of Radioactive Material Released and Results of Environmental Surveys Performed.

The gaseous waste released was 234 curies of tritium and 852 curies of Argon-41, while 14.38 curies of tritium and 0.002 curies of other beta-gamma emitters were released into the sanitary sewer.

Environmental samples of the streams, wells, vegetation, and/or soil, and air showed no significant changes.

7.8(3)(f) Summary of Significant Exposures Received by Facility Personnel and Visitors

1. None to visitors.
2. Dosimetry results for this reporting period indicated that 6 operators received from 1.367 to 2.236 Rem.



UNITED STATES DEPARTMENT OF COMMERCE  
National Bureau of Standards  
Gaithersburg, Maryland 20899

March 20, 1986

U. S. Nuclear Regulatory Commission  
Regional Administrator, Region 1  
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Subject: Docket #50-184

Gentlemen:

Transmitted herewith is Operations Report No. 38 for the National Bureau of Standards Reactor. The report covers the period January 1, 1985 to December 31, 1985.

Very truly yours,

Robert S. Carter  
Chief, Reactor Radiation Division

Attachment

cc: Director, Division of Reactor Licensing  
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