J. Collins (NRC)
Trailer "T"

GPU Service Corporation Interoffice Memorandum

File

GPU Service

Press/Volume

Control Systems

Date August 6, 1979
TSG-333

Subject Control of Natural Circulation Using the Turbine Bypass Valves

To R. C. Arnold Location TMI

Reference: (1) Natural Circulation Stability, 6/29/79, by S. H. Esleeck and J. E. Lemon of B&W.

Precision control of secondary heat load utilizing turbine bypass valves MS-V25A and MS-V26A is impaired in the current operating mode. Three problems have been identified that are causing this degradation:

1. The bypass steam flow controller demand is operating at less than 15% of full range, resulting in a more significant valve position demand error.

2. Both turbine bypass valves are approaching operation in a region where the flow coefficient, Cv, is poorly defined.

3. The curve presently being used to set valve position is an extrapolation from the previously used curve.

Rectification of these problems should proceed in a timely fashion. The Technical Support Group's recommendations are discussed below.

In order to position the control room indicator to approximately one-third scale and to move the valve coefficient into a less sensitive region, one of the turbine bypass valves should be isolated. Calculations performed to determine steam flow indicate that one valve is capable of providing the steam flow necessary to maintain the present primary temperature conditions ($T_h \geq 160^{\circ}F$).

Figure 1 shows projected flow demand on the control room indicator versus time in days. This curve was generated assuming one bypass valve was isolated. The decay heat values were obtained from Figure 7 of Reference 1.

The actual flow demand used to maintain the present primary conditions may vary from these predictions. These variations can be attributed to: 1) errors associated with the valve position indicators, 2) errors in the decay heat and Cv curves, 3) inaccurate determination of the ambient heat losses, and 4) perturbations in primary and secondary operating conditions.

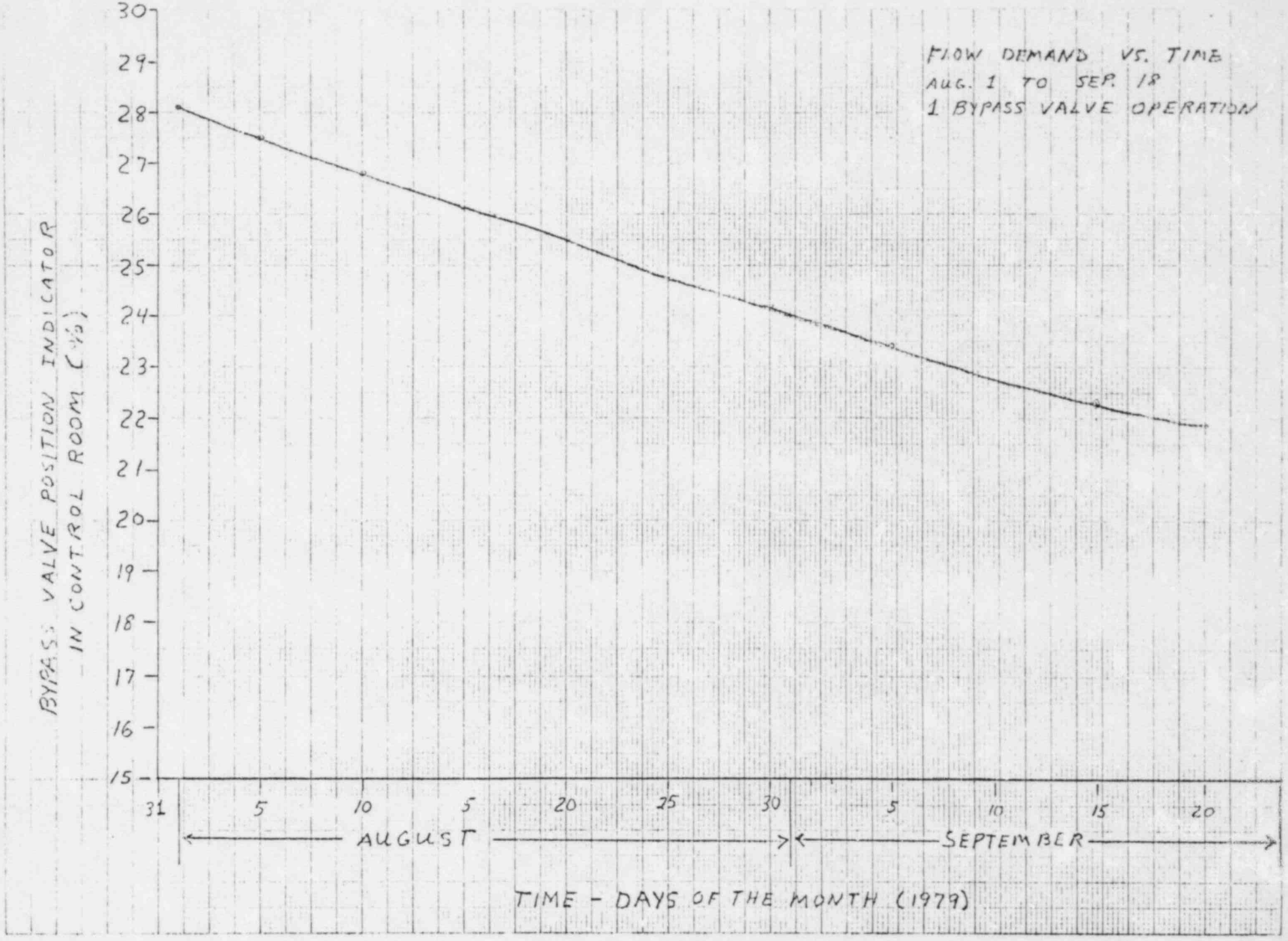
It is recommended that the transition be made from two turbine bypass valve operation to single bypass valve operation. This can be accomplished by either closing isolation valve MS-V23A or MS-V24A and increasing bypass flow through the unisolated valve to the value indicated on Figure 1. A procedure for accomplishing the transition to single valve operation is being prepared.

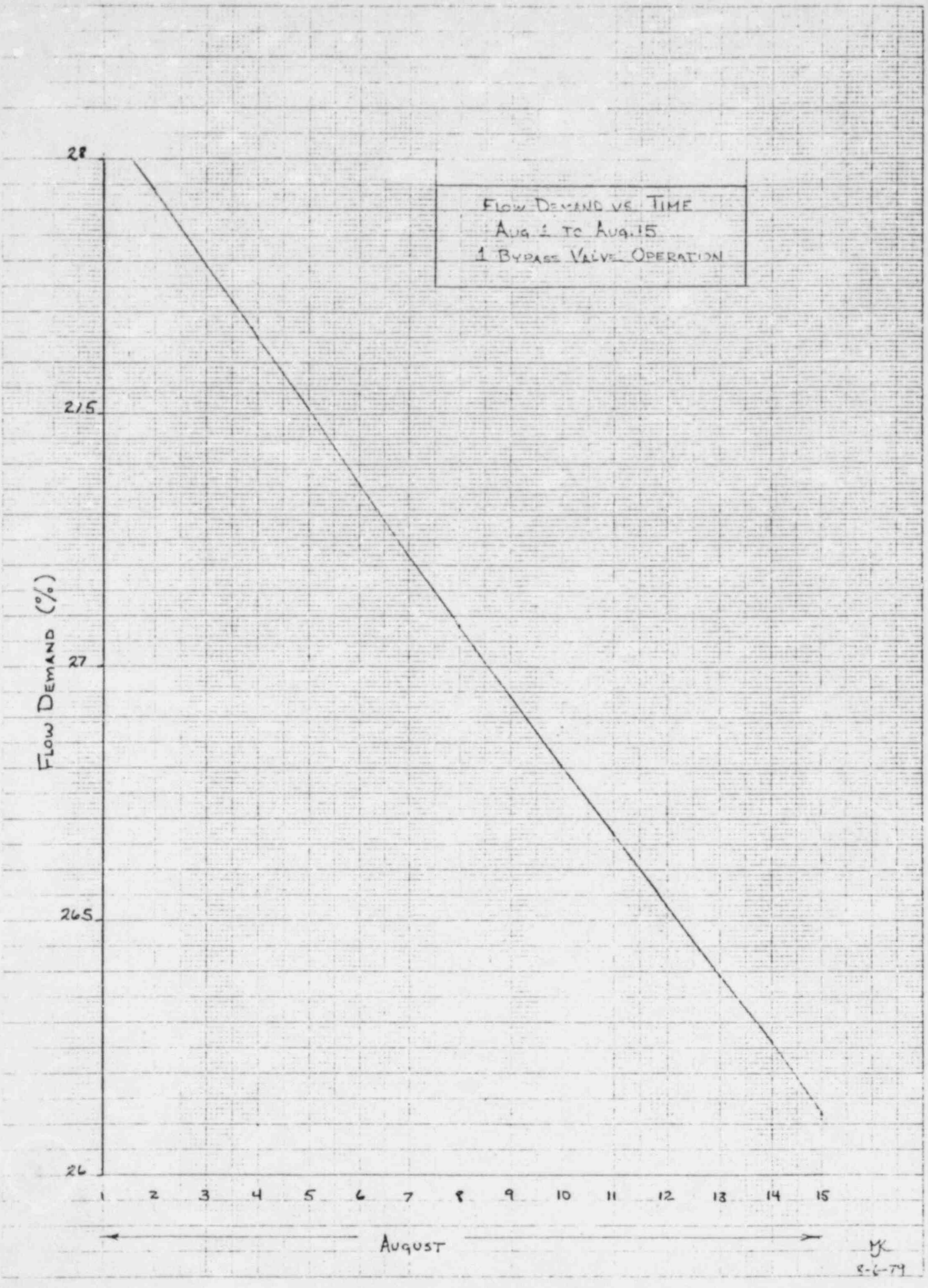
If you have any questions concerning this matter, please contact me at Extension 8268.

J. P. Moore, Jr.

JPM/RMM/dma

cc: D. K. Croneberger
E. C. Dye
B. D. Elam
R. H. Greenwood
J. G. Herbein
M. J. Konya
G. A. Kunder
R. F. Wilson
W. H. Zewe - Met Ed (Unut 2 Supv.)
J. Collins - NRC
J. R. Floyd
L. C. Rogers (B&W)
GPU Control Room Watch
Data Reduction File
TMI-2 Control Room


FLOW DEMAND VS. TIME
AUG. 1 TO SEP. 18
1 BYPASS VALVE OPERATION
BYPASS VALVE POSITION INDICATOR
IN CONTROL ROOM (%)
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
31
5
10
5
20
25
30
5
10
15
20
AUGUST
SEPTEMBER
TIME - DAYS OF THE MONTH (1979)


FLOW DEMAND VS. TIME
AUG. 1 TO AUG. 15
1 BYPASS VALVE OPERATION
28
27.5
27
26.5
26
FLOW DEMAND (%)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
AUGUST
8-6-79