

METROPOLITAN EDISON COMPANY

Subsidiary of General Public Utilities Corporation

Subject: WATER IN THE INSTRUMENT AIR LINES AT THE CONDENSATE POLISHER CONTROL PANEL AND REGENERATION SKID RESULTING IN A LOSS OF FEEDWATER CONDITION IN UNIT #2 ON OCTOBER 19, 1977

Location TMI Nuclear Station
Middletown, PA 17057
Date November 14, 1977

To: G. P. MILLER
J. L. SEELINGER

Plant Conditions:

At this time of occurrence the reactor plant was in a cold shutdown mode. The secondary plant had a vacuum and feedwater heating established with one condensate pump and feedwater heater string in service. The main turbine was on turning gear.

Summary of Events:

At the time of the occurrence the Unit #2 50,000 gallon demineralized water tank was out of service, therefore, in order to regenerate #2 condensate polisher bed, Demineralized Water was supplied via Unit #1 Demineralized Water pump to the Unit #2 Demineralized Water pump supplying Demineralized Water to the regeneration skid. Since the Unit #1 pump was supplying suction to the Unit #2 pump, resulting in an abnormally high suction pressure to the Unit #2 pump the discharge pressure of the Demineralized Water system was greater than 190 psi. The normal pressure of the Unit #2 Demineralized Water system is \leq 130 psi.

During or shortly after the attempted transfer of resin from mix bed polisher #2 to the receiving tank on the regeneration skid, the Auxiliary Operator noted water running out of the air operated recorders on the condensate polisher control panel, No. 304. Shortly thereafter the discharge valves on the condensate polishers closed resulting in a total LOSS OF FEEDWATER condition. Upon detection, the Control Room Operator immediately tried to open CO-V12, condensate polisher bypass valve; however, he was unable to open this valve from the control room. The auxiliary operator was then notified to manually open CO-V12, after about 5-10 minutes and assisted by another Auxiliary Operator CO-V12 was opened. If this would have happened while at power the unit would have been placed in a severe transient condition resulting in an Emergency Feedwater Actuation, Main Steam Relief to Atmosphere, Turbine Trip and Reactor runback with possible trip.

After discussing the problem with the operators, Mike Ross and myself, Doug Weaver was concerned that it was an instrument problem which induced this condition. As directed, his people dismantled, inspected, cleaned, and reassembled all 42 of the diaphragm operated air valves on the condensate polishing regeneration skid, since these valves would provide an interface point in the event of a ruptured diaphragm. In addition all instrument air lines have been blown down to insure that all moisture has been removed from these lines. In almost all of these valves water was either found or indications that water had been there were found. Three quarters of the valves had rusty water and rust rings

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INTER-OFFICE MEMORANDUM

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on the diaphragms indicating that water had been there for some time. The remaining quarter contained no visible indication, by rust color of the duration of time that the water was present. However, no ruptured diaphragms were found in the system.

As a result of above discussed investigation and the tracing of all instrument air lines in the vicinity, no fluid path has been found that would explain this occurrence. One remote fluid path was recognized that being that the demineralized water, because it was at an abnormally high pressure, was forced through the service air system, through three check valves, the instrument air dryer and back to the condensate polishing controls, being the lowest point in the system and the most consuming point of instrument air. However, dew point readings taken periodically after this occurrence in the instrument air system indicated that this probably was not the case.

In summary we conclude that the only way left available to try and identify how this happened, is to reenact this occurrence in a controlled fashion, however, this may not be desirable. As a result of our findings, we feel that the following should be acted upon to preclude a reoccurrence:

1. Change/replace the desiccant condition indicator on the instrument air dryers.
2. Completely realign all air and water controls on the condensate polishing regeneration system.
3. Checkout air control loop for valve C-5 to insure proper operation.
4. Submit problem report on CO-V12 as it appears that the dp across the valve was too high to allow openings.
5. Install drain trap on control lines on condensate polisher discharge valves.
6. Develop a PM program to take dew readings in the instrument air system as a minimum on a weekly basis, at the instrument air dryer and at the condensate polishing control panel.
7. Revise the Operations log to require blowing down the air compressors on each mid-shift and record the amount of water in the Auxiliary Operator's Log. Log any abnormal amounts of moisture, indicating a leak.
8. Revise the Operations log to require blowing down the instrument air line that feeds the condensate polishing control panel each mid-shift and record any abnormal moisture levels in the Auxiliary Operator's Log indicating excessive condensation problems.

G. P. MILLER
J. L. SEELINGER

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NOVEMBER 14, 1977

9. Inspect the following check valves.

1. SA-V360
2. Two check valves circled on Figure 1.

J. A. Brummer
J. A. Brummer
Instrument & Control Engineer

W. J. Marshall
for M. J. Ross
M. J. Ross
Shift Supervisor

JAB:sw

cc: J. R. Floyd
W. J. Marshall
T. E. Morck
D. M. Shovlin
Shift Supervisor
Unit #2 Shift Foremen

1000

DATE 2-19-77

SYSTEM CONDENSATE POLISHING MTX NO. 24

REFERENCE:

1 Flow Diagram or Engr. Dwg. No. 2006

2 Elem. Wiring Diagram No. _____

3 R. O. or Specification No. _____

4 Other _____

INQUIRY SOURCE:

General Question ☐

Test Result ☐

Test or Oper. Procedure ☐

Drawing Clarification ☐

Equipment Clarification ☐

Anticipated Problem ☐

Immediate Action Required ☒

QUESTION

Problem: The RESINS in The Polisher Tanks can not be SATISFACTORILY SLURRED TO the RECEIVING TANK WITH out the aid of SERVICE AIR BEING INJECTED INTO the Bottom of the RESINS. Provide A PERMANENT SOURCE OF INSTRUMENT OR SERVICE AIR TO The Bottom of each CONDENSATE POLISHER TANK.

Individual Initiating Question: Name M. K. Kline Organization GPA 5/4

B PRIORITY 1 PMT 2-19-77

Organization Serial No. _____

ANSWER: Vendor Dwg. Change Req'd by UE&C Start Up ☒ Yes ☐ No

(UEC SU Revise LXA 4579 Rev D to show SA to CO-K-19 thru UEC Startup to accomplish ECM S-4562

Date Completed 2/22/77 B&R Engineer R. Brownwell

Follow-Up Action req'd. by PTO ENOAZ ☒ Yes ☐ No By R. Brownwell

Follow-Up Action completed: Date: 2/22/77 B&R Engineer R. Brownwell

ECM S-4562

PCN _____

FCR _____

COPIES:

R.W. Heward, Jr.

R.J. Toole

C.E. Wright

W.T. Gunn

R.W. Bansel

G.P. Miller

J.G. Harbein

Unit #2 Shift

Foreman

D. Lohbert

M.J. Stromberg

S. Karkala

D.T. English

G.T. Harper

J.P. Cady (2)

W.R. Cobean

B&R Cog. Engr. R.S. [Signature]

THREE MILE ISLAND UNIT NO. 2

BURNS & ROE, INC.

FIELD QUESTIONNAIRE NO. 1577

6.0 Change Authorization as follows:

Retest Required

☒ YES☐ NO(Give specifics if other than T/P 250/2): 250/1 & 4

CPU Test Superintendent approval:

J.M. [Signature] for RST [Signature]Completion Schedule: 3-18-77

Work to be performed by

☒ UE&C☐ MEC

△ 7.0 Change completed and As-Built information requested in Section 5.0 provided below:

Completed by CONSTRUCTION - OPERATIONAL
Pressure test completed

Name A. Rhine Organization UIC SU Date 4-10-77

△ 8.0 Vendor Drawing Changes Completed (List Drawing & Revision Numbers)

LA WATER D-4519 REV. E B/R FILE NO 15-00-0405
JES 4/27/77

Name A. Rhine Date 4-11-77

THE UNIT NO. 2
BURNS AND ROE, INC.
ENGINEERING CHANGE MEMO
(REV 12/75)

COST EST. 2077.00
B&R DATE 2/21/77
GPU DATE

SERIAL NO. S-4562
DISCIPLINE Mech
SUBJECT S.A. to Cond. Polisher
ATTACHMENTS 2

REFERENCES:

L + A Dwg. No. 4519 Rev. D F.Q. 1577
" " " 3749 Rev. I
" " " 3750 Rev. H *B&R VALVE LIST
*B&R Dwg. 2114 shift 3 Rev. 6
*B&R Dwg 2141 Rev. 10

AREA:
+ FIELD
SOLUTION

DISTRIBUTION
UE&C

JOB ENGINEER (2)
GEN SUPT.
SUPT. UNIT 2
QC SPVSR.
GPU
ASST. PROJ. MG
CONST. ENG. (2)
QA SPVSR.

B&R
SEE PP-74

CHANGE:

UEC START-UP TO CONNECT 3/4" Line spec.
150-1, piping at S.A. STA. NO. 12 and field
route to a 3/4" C.S. gate valve and check valve.
From the check valve field run the header
and branch lines to each Condensate Polisher
valve M17B then M87B. (see attachments
1 and 2 of 2).

B&R to change valve list to retag:

S-726-1-473 (3/4" C.S. gate S.W.) to SA-V-
S-726-1-244 (3/4" C.S. check S.W.) to SA-V-

LATER
EST.

DESIGNER APPROVAL DATE

REASON FOR CHANGE:

GPU Request to provide permanent S.A.
supply to the bottom of each Condensate
Polisher to lift & fluff resins prior to sluicing
to Regeneration Station.

R. B. Russell 2/21/77 M. H. H. H.
B&R ENGINEER DATE PROJECT ENGINEER

FOLLOW-UP ACTION
REVISE SPEC. 1/0
* REVISE ENG. 4/5

ACKNOWLEDGEMENT:

UICC - NAME

DATE

DISCIPLINE SUPERINTENDENT
RESPONSIBLE FOR IMPLEMENTATION

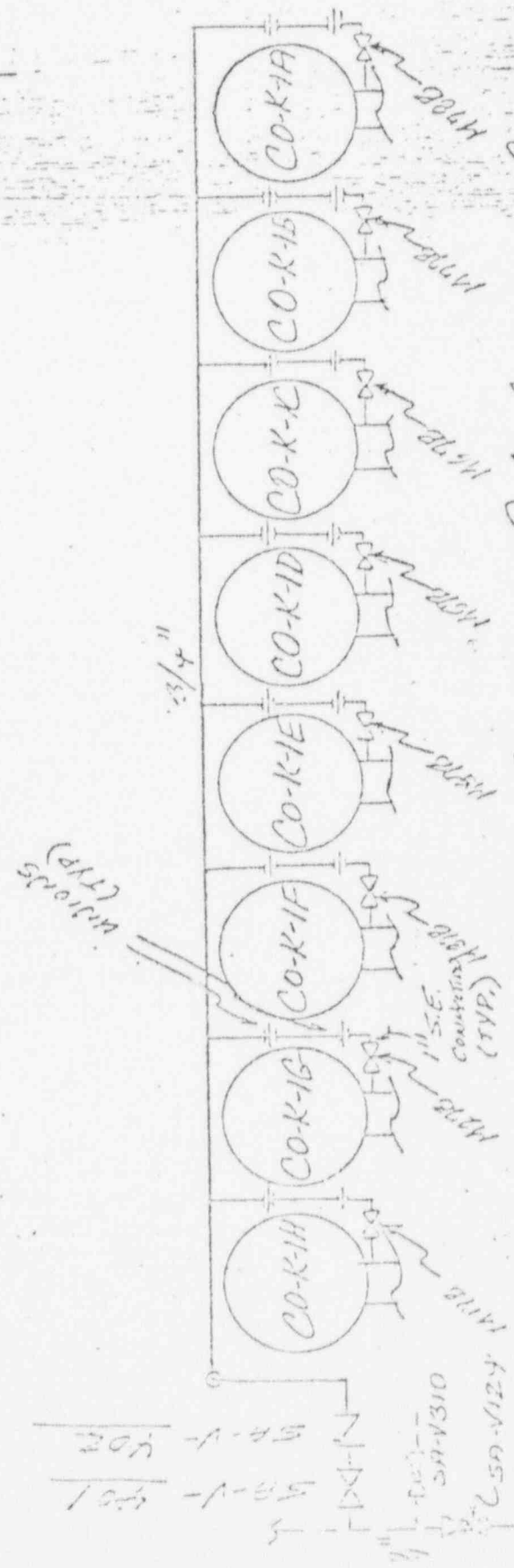
NAME DISCIPLINE

R. J. R. G. P. U.

W.O. No. _____ Date _____ Book No. _____ Page No. _____
 Drawing No. _____ Calc. No. _____ Sheet _____ of _____
 By _____ Checked _____ Approved _____
 Title _____

Attachment 1 of 2
 ECM No. S-4512

All Piping To Be 3/4" ISO-1
 And Field Run By UEC STARTUP



Condensate Polishing Skid

5A-1-401
 5A-1-402
 5A-V310
 5A-V124

