**Public Service Company of Colorado**

16805 Weld County Road 19 1/2, Platteville, Colorado 80651

March 18, 1980
Fort St. Vrain
Unit No. 1
P-80055

Mr. Karl V. Seyfrit, Director
Nuclear Regulatory Commission
Region IV
Office of Inspection and Enforcement
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76012

Reference: Facility Operating License
No. DPR-34

Docket No. 50-267

Dear Mr. Seyfrit:

Enclosed please find a copy of Reportable Occurrence Report No. 50-267/78-05, Final Supplement, submitted per the requirements of Technical Specification AC 7.5.2(b)2.

Also, please find enclosed one copy of the Licensee Event Report for Reportable Occurrence Report No. 50-267/78-05.

Very truly yours,

Don Warembourg
Manager, Nuclear Production

DW/cls

Enclosure

cc: Director, MIPC

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FORT ST. VRAIN NUCLEAR GENERATING STATION
PUBLIC SERVICE COMPANY OF COLORADO
16805 WELD COUNTY ROAD 19 1/2
PLATTEVILLE, COLORADO 80651

REPORT NO. 50-267/78-05/03-X-3

FINAL SUPPLEMENT

IDENTIFICATION OF OCCURRENCE:

A malfunction of helium circulator speed modifiers caused loss of Plant Protective System function of high speed trips. This resulted in operation under a degraded mode permitted by LCO 4.4.1, Table 4.4-3, and is reportable per Fort St. Vrain Technical Specification AC 7.5.2(b)2.

This report is submitted as a Final Supplement to Reportable Occurrence Report No. 50-267/78-05/03-L-0, Preliminary and Supplemental reports X-1 and X-2.

EVENT DESCRIPTION:

See Figure 1. The speed measuring system (SM), (1) , is designed to measure the rotational speed and alignment wobble of the helium circulator shaft. This is accomplished by the use of a reluctance type detector probe (SE), (2) , connected to a phase sensitive carrier type electronics system.

Precision machined slots in the rotating shaft of the helium circulator provide timing pulses whose frequency is proportional to shaft rotational speed.

The electronic system which produces this signal operates on the principle of a balanced bridge connected to probes consisting of two identical coils. In normal operation, the bridge is nulled for minimum zero phase shift output with the rotating shaft centered in the bearing.

Three separate channels monitor the speed of each helium circulator. The pulse signals are transmitted by the SM's, (1) , to the speed transmitter (ST's), (3) , which produces a 0 to 10 volt output signal proportional to shaft RPM for use in the summer modifiers and process trip modules. The process trip modules are the speed switches low (SSL), (4) , and speed switches high (SSH), (5) . If the circulator speed reaches either the high or low trip setting, the SSL's or SSH's initiate trip signals to the two of three solid state logic, (6) , which produces a circulator shutdown via the special control relays (XCR's), (7) .

EVENT
DESCRIPTION: (Cont'd)

Table 1 summarizes the failures experienced and reported in the previous three issues of this report.

TABLE 1

| | Date | Speed Modifier | PPS Channel | Circulator | Approximate Speed | Indicated Speed | Reactor Power % |
|---|---|---|---|---|---|---|---|
| ISSUE 0 | 1-11-78 | 21161 | A | 1A | 2300 | -0- | 13 |
| | 1-11-78 | 21162 | A | 1C | 2300 | 200 | 13 |
| | 1-11-78 | 21166 | C | 1C | 2300 | 200 | 13 |
| ISSUE 1 | 4-25-78 | 21164 | B | 1C | 6300 | -0- | 55 |
| | 5-7-78 | 21164 | B | 1C | 4000 | -0- | 33 |
| | 7-8-78 | 21170 | B | 1D | 6000 | 5200 | 50 |
| | 7-8-78 | 21164 | B | 1C | 6100 | 5000 | 50 |
| | 7-8-78 | 21164 | B | 1C | 6100 | 5000 | 50 |
| | 10-14-78 | 21172 | C | 1D | 4300 | 2100 | 37 |
| | 11-7-78 | 21161 | A | 1A | 4300 | -0- | 55 |
| | 11-12-78 | 21166 | C | 1C | 5600 | -0- | 60 |
| | 11-18-78 | 21164 | B | 1C | 5600 | -0- | 60 |
| ISSUE 2 | 12-11-78 | 21161 | A | 1A | 5900 | -0- | 50 |
| | 12-12-78 | 21161 | A | 1A | 7000 | -0- | 69 |
| | 12-29-78 | 21161 | A | 1A | 6800 | -0- | 64 |
| | 1-1-79 | 21161 | A | 1A | 6800 | -0- | 64 |
| | 1-22-79 | 21162 | A | 1C | 4500 | -0- | 28 |
| | 1-23-79 | 21162 | A | 1C | 6000 | -0- | 60 |
| | 1-23-79 | 21172 | C | 1D | 4600 | -0- | 33 |
| | 1-28-79 (1) | 21172 | C | 1D | 5200 | -0- | 42 |
| | 1-30-79 | 21172 | C | 1D | 5200 | -0- | 42 |
| | 2-1-79 | 21172 | C | 1D | 4500 | -0- | 28 |

(1) Three Failures

As an interim measure, the adjustment of the speed modifiers was checked on a weekly basis.

CAUSE
DESCRIPTION:

Instrument calibration drift due to bridge unbalance.

The balancing problem was caused by a change in resistance between the two leads of the speed element and ground at the circulator connection end. The difference in resistance occurs over a period of time in the cable connectors as a result of the temperature and humidity of the ambient air.

CORRECTIVE
ACTION:

Table 2 summarizes the corrective actions for the failures reported in the previous three issues of this report.

TABLE 2

| | Date | Speed Modifier | Corrective Action |
|---|---|---|---|
| ISSUE 0 | 1-11-78 | 21161 | Balanced speed modifier. |
| | 1-11-78 | 21162 | Balanced speed modifier. |
| | 1-11-78 | 21166 | Connected spare cable/balanced speed modifier. |
| ISSUE 1 | 4-25-78 | 21164 | Balanced speed modifier. |
| | 5-7-78 | 21164 | Connected spare cable/balanced speed modifier. |
| | 7-8-78 | 21170 | Balanced speed modifier. |
| | 7-8-78 | 21164 | Balanced speed modifier. |
| | 7-8-78 | 21164 | Balanced speed modifier. |
| | 10-14-78 | 21172 | Balanced speed modifier. |
| | 11-7-78 | 21161 | Connected spare cable/balanced speed modifier. |
| | 11-12-78 | 21166 | Balanced speed modifier. |
| | 11-18-78 | 21164 | Connected spare cable/balanced speed modifier. |
| ISSUE 2 | 12-11-78 | 21161 | Balanced speed modifier. |
| | 12-12-78 | 21161 | Balanced speed modifier. |
| | 12-29-78 | 21161 | Balanced speed modifier. |
| | 1-1-79 | 21161 | Connected spare cable/balanced speed modifier. |
| | 1-22-79 | 21162 | None - Change in temperature altered cable resistance. |
| | 1-23-79 | 21162 | Balanced speed modifier. |
| | 1-23-79 | 21172 | Connected spare cable/balanced speed modifier. |
| | 1-28-79 | 21172 | Balanced speed modifier (three times). |
| | 11-30-79 | 21172 | Connected spare cable/balanced speed modifier. |
| | 2-1-79 | 21172 | Connected spare cable/balanced speed modifier. |

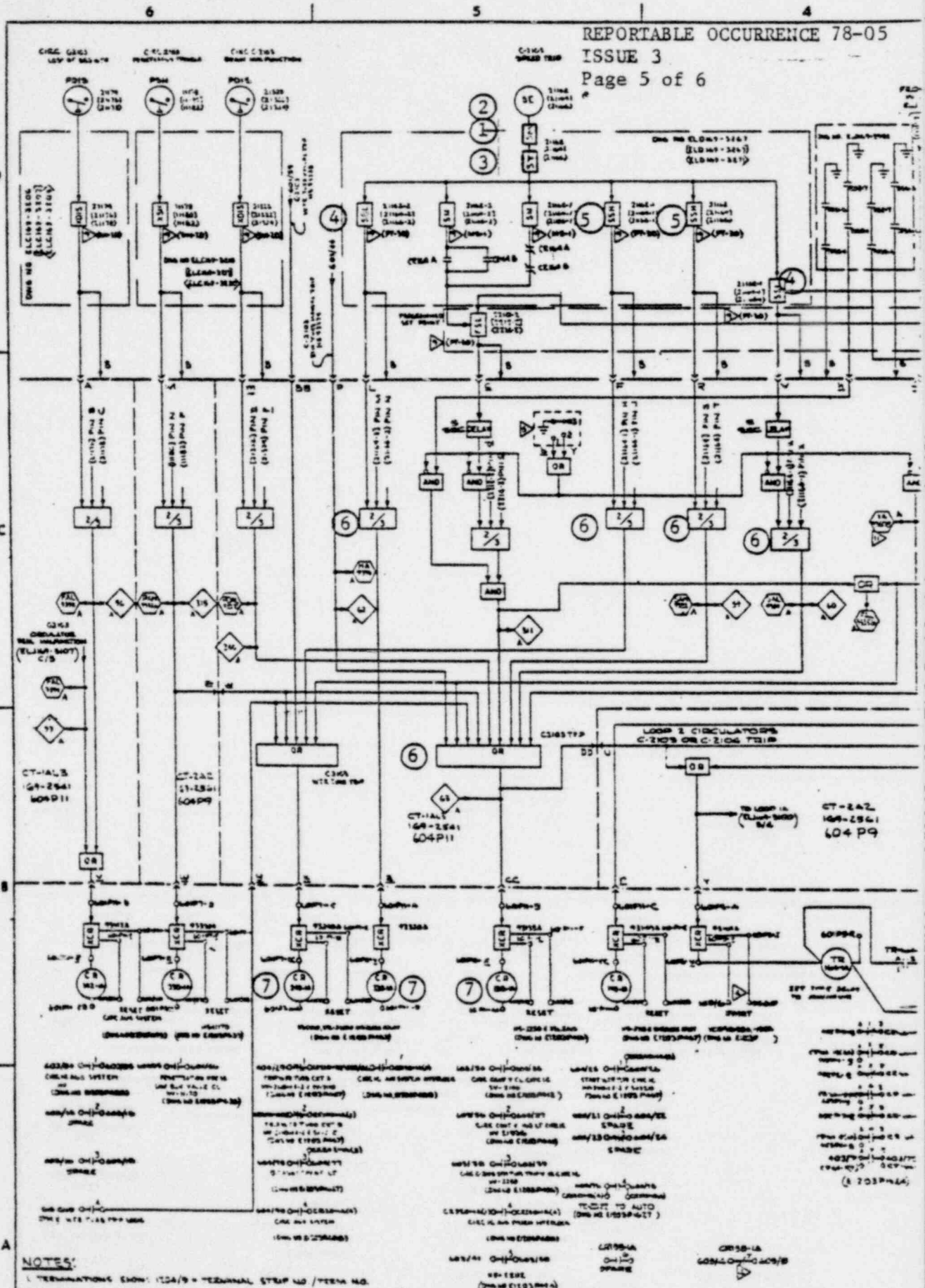
CORRECTIVE
ACTION: (Cont'd)

New cable connectors were certified to conform with the requirements and specifications of the purchase order.

The new cable connectors have been installed and tested.

No further corrective action is anticipated or required.

FIGURE 1



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