

CONTROL BLOCK:

1	2	3	4	5	6	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	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
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 (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

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EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

While performing SI 4.2.B.8, switches PS 68-93 and 94 were out of limits of T.S. tables 3.2.A. and 3.2.B. Switch #1 with containment isolation signal and both shutdown cooling suction valves open will close LPCI admission valves and switch #2 isolates shutdown cooling suction valves. There was no danger to the health or safety of the public. Similar events: BFRO-50-259/78016, 79008, 80058, 81029; 260/78002, 79017, 79024, 80022, 80057, 81023, 81028; 296/79007, 79012, 79028, 80022, 80030, 80045, 80052, 81007,

0	1	2	3	4	5	6	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	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
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CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

Setpoint drift. Setpoints on the Barksdale model B2T-M12SS pressure switches were reset to the proper value and the surveillance instruction completed satisfactorily. Additionally, a design change request (DCR 1398) has been initiated to replace these switches with an analog transmitter with a trip switch. A study of setpoint drift problems is attached.

0	1	2	3	4	5	6	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	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
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LEB SUPPLEMENTAL INFORMATION

BFRO-50- 259 / 81032 R1 Technical Specification Involved Table 3.2.A and 3.2.B

Reported Under Technical Specification 6.7.2.A(5) *Date due NRC: NA

Date of Occurrence 6/9/81 Time of Occurrence 1000 Unit 1

Identification and Description of Occurrence: During SI 4.2.B.8 reactor pressure switches PS 68-93 and 94 were found out of T.S. table 3.2.A and 3.2.B limits (100 ± 15 psi). The greatest out of tolerance was 9.8 percent. This event was not determined reportable until 1300, 6/15/81. PS 68-93 as found switch #1: 132 psi - switch #2: 126 psi, PS 68-94 as found switch #1: 131 psi - switch #2: 135 psi. Test limit is 123 psi, which is the T.S. limit of 115 psi plus 8 psi water leg.

Conditions Prior to Occurrence:

Unit 1 refueling outage.

Unit 2 in unit station service transformer outage.

Unit 3 at 99%.

Action specified in the Technical Specification: Surveillance Requirements met
due to inoperable equipment. Describe:

None

Apparent Cause of Occurrence:

Setpoint drift. This drift, historically, seems to occur during times of the year when there are ambient weather changes.

Analysis of Occurrence:

There was no danger to the health or safety of the public, no release of activity, no damage to the plant or equipment, and no resulting significant chain of events.

Corrective Action: Setpoints were reset to the proper value, and the surveillance instruction completed satisfactorily. Additionally, a design change request (DCR 1398) has been initiated to replace these switches with an analog transmitter with a trip switch. A study of setpoint drift problems is attached.

Failure Data: BFRO-50-259/78016, 79008, 80058, 81029; 260/75002, 79017, 79024, 80022, 80057, 81023, 81028; 296/79007, 79012, 79028, 80022, 80030, 80052, 81007, 80045.
Retention: Period - Lifetime; Responsibility - Document Control Supervisor

*Revision: *ALL*

Subject: SETPOINT DRIFT - BARKSDALE PRESSURE SWITCHES

Recently there has been a number of LEKs on Barksdale pressure switches; six during 1981, 21 since January 1978. Our commitment to training on these switches has been strong and continuous; therefore, we do not believe this is the problem.

Our attention was turned to the switch and the application to which it was being used. Attachment 1 plots the setpoint drift of 4 of these switches for a period of 4 years. It is readily obvious these switches are cyclic, being high in the warm months and low in the cold months. Attachments 2 and 3 provide the specifications for the Barksdale B2T-A125S switch. The important characteristics for PS-1-81, 91 are:

Element type: Bourdon Tube
Proof Pressure: 1800 psig
Rated Accuracy: $\pm 1\%$ or 12 psig
Setpoint: 154 psig - recently changed from 160 psig
Adjustable Range: 77-1200 psig

It would appear based on Attachments 2 and 3, the switch would perform very reliably. However, the reason it does not becomes apparent when Attachment 4 is reviewed. The following conclusions can be drawn from Attachment 4:

1. For our application, a piston switch is better than a diaphragm or bourdon tube. Our experience indicates the piston type Static-O-Ring to be a very reliable and accurate switch.
2. Bourdon tube switches are extremely sensitive to process surges. In our application, snubbers have been installed to help alleviate this deficiency.
3. For greatest accuracy, the setpoint should fall in the upper 65% of the adjustable range. For the most favorable life factor the setpoint should be in the lower 65% of the adjustable range. For PS-1-81, 91:

Span = 1123 and Setpoint (% Span) = 13.7%.

This places these switches in the lower portion of Zone C, which is FAIR accuracy and EXCELLENT life.

Our experience proves this correct. Other switches we have drift problems with are PS-68-93, 94. They have setpoints of 108 psig or setpoint (% span) is 9.6%.

In the final analysis, one can only conclude a misapplication of these switches, both in switch type and % of adjustable range. We recognized this years ago and DCR 1398 (12/7/77) was initiated. EN DES does not have an implementation date for DCR 1398 as it now is tied to 79-01B and environmental qualifications. In the interim we are investigating an improved switch and will keep you informed.

9/18 - 9/1A
9/18 - 9/1B
9/18 - 9/1C

ATTACHMENT 1

Set part
Charged To
154 ps.g

6/2/80

6/5/79

82/6/78

Setpoint 160psig

A.O. 1666 p. 53

AO

PSIG

New Castle, N.Y.
March 27, 1876

86, Nov — 18

86 JUNE 78

62, NAF -

• JUNE '79

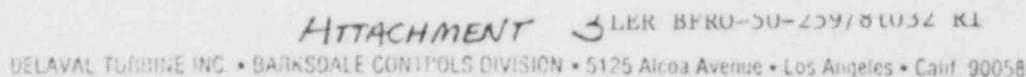
1 JAN 80

JUNE 80

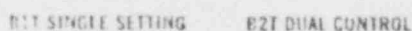
18 JAN -

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Hickel Bourdon Tube Models
Water Tight Housing (NE/TA 4)
and Terminal Strip
Turner-proof External Adjustment



OPERATING CHARACTERISTICS • ORDERING DATA

PRESSURE SWITCHES — All values given in P.S.I. (Gauge)

Proof (Test) Pressure	Adjustable Range				Approx. Actuation Value (Differential)	Weighted Material*	B1T Catalog Number	B2T Catalog Number
	Decreasing		Increasing					
	Min.	Max.	Min.	Max.				
1800	50	1180	70	1200	10 to 20	Bronze	B1T H12	B2T H12
1800	50	1173	77	1200	11 to 27	316	B1T A12SS	B2T A12SS
4800	160	3170	190	3200	15 to 30	Bronze	B1T H32	B2T H32
4800	160	3161	199	3200	16 to 39	316	B1T H32SS	B2T H32SS
7200	240	4715	325	4800	40 to 85	316	B1T A48SS	B2T A48SS
**9750	325	6385	440	6500	54 to 115	316	B1T A65SS	B2T A65SS
**18000	600	11450	1150	12000	275 to 550	316	B1T A120SS	B2T A120SS
**24000	600	17450	1150	18000	275 to 550	316	B1T A180SS	B2T A180SS

*"Bronze" represents Phosphor Bronze Tube with SAE 88 Brass Socket

"316" represents 316 Stainless Steel Tub. & Socket

**"AMINCO" female opening for 1/4" OD tube connection. To change -A65SS and -A120SS switches to 1/4" npt, add -P4 suffix to model number. Price addition required.

Approximate shipping weight 2.5 lbs.

DETAILED DATA

ELECTRICAL CHARACTERISTICS: All models incorporate Underwriters' Laboratories, Inc. listed single pole double throw snap action switching elements. Electrical rating (non-inductive) 10 amps 125 or 250 volts AC, 3 amps 480 volts AC. Automatically reset by snap action of switch. For more details and other switch classes, see pages 33-35.

ELECTRICAL CONNECTION: To screw terminals on covered terminal strip through $\frac{1}{2}$ " nps rod nut connector.

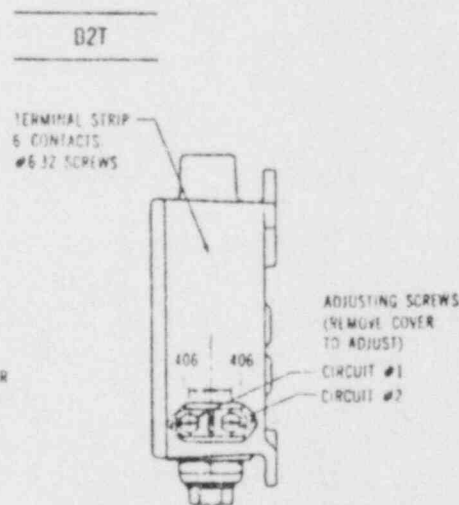
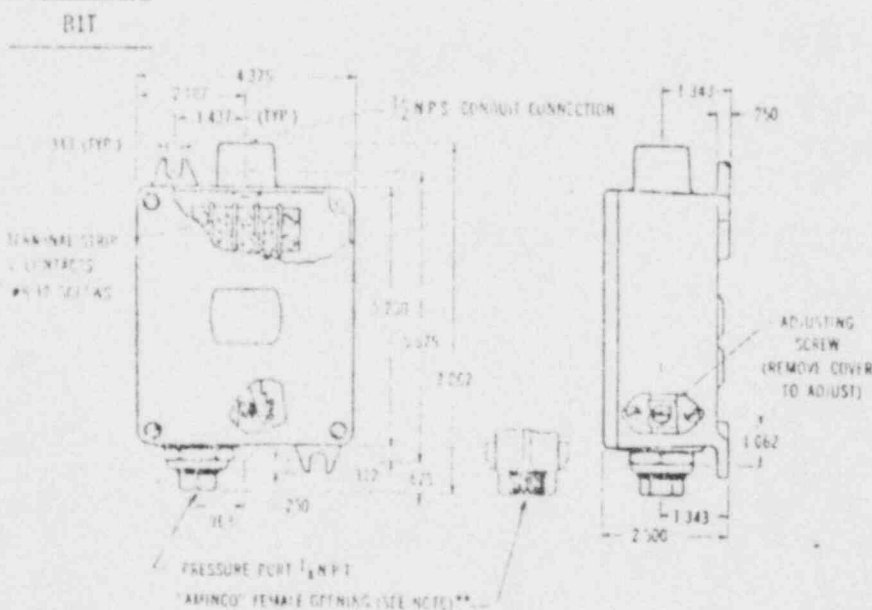
PRESSURE CONNECTION: 1/4" N.P.T. internal thread, except as noted**, models with
 fluid pressures above 8,000 P.S.I. have "AMINCO" female opening for 1/4" O.D. tube
 connection.

ADJUSTMENT INSTRUCTIONS

Turn : Adjustment screw clockwise to lower actuation point (switch setting)

WIRE CODING — PRESSURE

Circuit #1: Common — Purple
Normally Closed — Blue
Normally Open — Red
Circuit #2: Common — Brown
Normally Closed — Orange
Normally Open — Yellow



Note: All other dimensions for B2T are the same as B1T (left).

The two subclasses of family membership, *all* for *any* member, are in order for quality, substitute kinds of objects, which represent the system for quality. Examples: *the distance from the earth to the sun is 149,597,870 km* (the distance from the earth to the sun is 149,597,870 km) *the distance from the earth to the sun is 149,597,870 km* (the distance from the earth to the sun is 149,597,870 km).