

2017 FSRUG Update

Harris Plant

Automatic Isolation of 1A/2A FWH String

F-252B
251-381
I-0210

5

SI-511 6
SI-511R1 7

251-055 4
E/DCN-REV

FCR'S/DCN'S
INCORPORATED
ON THIS DWG

BILL OF MATERIAL

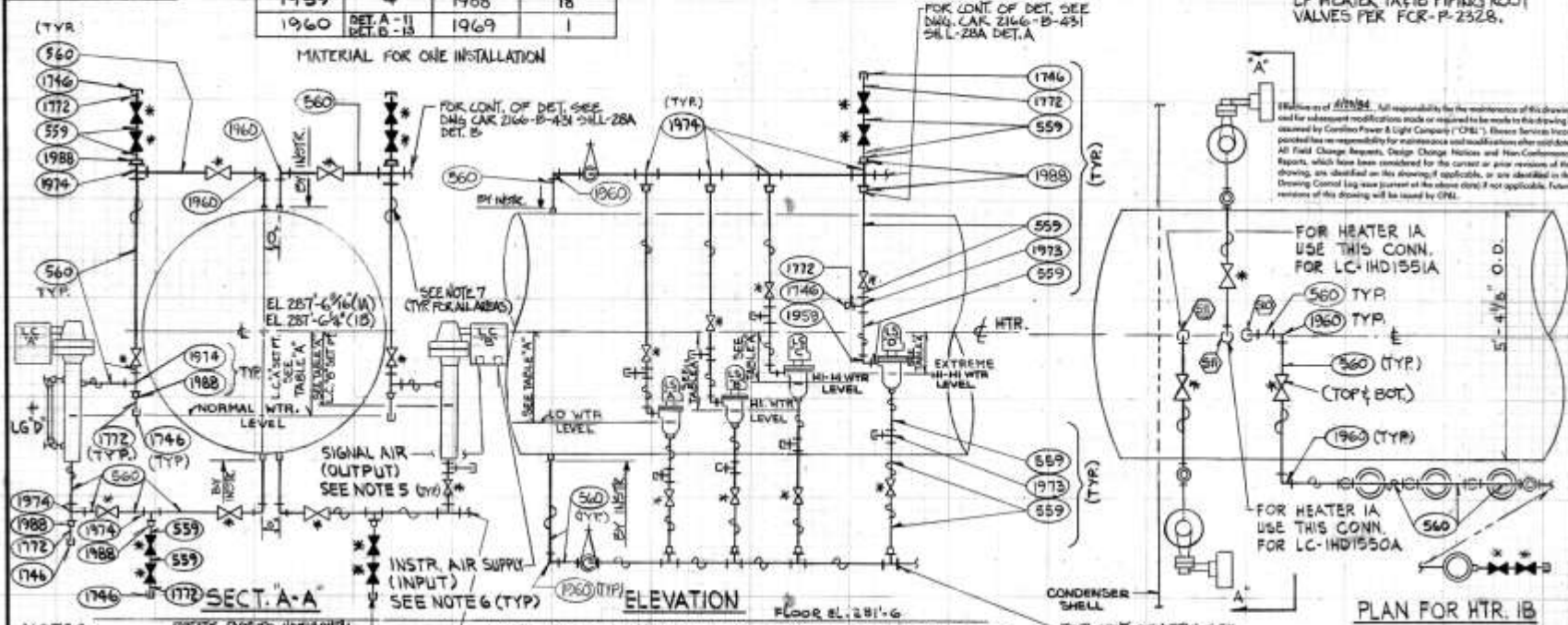
ITEM NO	QUANTITY	ITEM NO	QUANTITY
559	45 FT.		
560	50 FT.		
1746	18	1973	8
1772	18	1974	DET. A DET. B - 1/2
1959	4	1988	18
1960	DET. A - 11 DET. B - 13	1969	1

TABLE 'A'

HEATER	LC-'A'	LC-'B'	LG-'D'	LS-'A'-LO	LS-'B'(HI)	LS-'C'(HI-HI)	LS-'D'(HI-HI)
LP HTR. I-1A/1B	LC-1HD-1550A	LC-1HD-1551A	LG-1HD-1550A	LS-1HD-1550A	LS-1HD-1540A	LS-1HD-1541A	LS-1HD-1542A
ELEVATION	1'-8 3/4"	1'-4 3/8"	-	1'-9 3/8"	1'-3"	0'-11 1/8"	0'-6 1/8"
LP HTR. I-1B/1A	LC-1HD-1550B	LC-1HD-1551B	LG-1HD-1550B	LS-1HD-1550B	LS-1HD-1540B	LS-1HD-1541B	LS-1HD-1542B
ELEVATION	1'-8 3/4"	1'-4 3/8"	-	1'-10 1/2"	1'-3 3/4"	0'-11 1/2"	0'-7"

NOTE: THIS DWG SHOWS 'AS INSTALLED' LP HEATER IA & IB PIPING & ROOT VALVES PER FCR-P-252B.

MATERIAL FOR ONE INSTALLATION



- NOTES:**
- FOR ORIENTATION OF HTR. LVL. INSTR. SEE INSTR. LOCATION ARRANGEMENT DWG. G-448
 - FOR LP HEATERS NO. 1A & 1B OUTLINE 088 PF # 1364-3810 (PO. 435018)
 - * INDICATES SUPPLIED BY MECH. DESIGN UNDER P.O.# NY 435057/164 NY 435057/18 SPEC. NO. M34R & M36R.
 - + INDICATES SUPPLIED & MOUNTED BY VENDOR
 - FOR SIGNAL AIR, SEE DETAIL B-431-L-34A.
 - FOR INSTR. AIR SUPPLY SEE DETAIL B-431-L-34A & M-1.
 - HEAT TRACING FOR FREEZE PROTECTION.
 - FOR CONTINUATION OF DETAIL SEE DWG. CAR 2166-B-431 SH. L-28A

LEVEL SWITCH HOOK-UPS IS SHOWN FOR LP HTR. I-1B, HOOK-UPS FOR LP HTR. I-1A IS OPPOSITE HAND FOR LEVEL CONTROLLERS ARRANGEMENT.

LP HEATER IA & IB LEVEL INSTRUMENT HOOK-UP

REV.	DATE	BY	APPROVED
1	11-20-77	SP	
2	11-15-81	SC	
3	11-15-81	JR	
4	9-30-83	PH	

EBASCO SERVICES INCORPORATED
NEW YORK

DIV. I.B.C. OR G.B.B. APPROVED
SCALE: 1/4" = 1'-0" CH. 52
DATE: DEC 20, 1977

CAROLINA POWER & LIGHT CO.
SHEARON HARRIS NUCLEAR PP
UNIT NO. 1
INSTRUMENT INSTALLATION
DETAILS

APPROVED FOR CONSTRUCTION
CE-06479

CAR 2166
B-431
SHEET-28

Effective as of 1/1/88. All responsibility for the maintenance of this drawing and for subsequent modifications made or required to be made to this drawing is assumed by Carolina Power & Light Company ("CP&L"). Ebasco Services Inc. personnel have no responsibility for maintenance and modifications after said date. All Field Change Requests, Design Change Notices and Plan Conference Reports, which have been considered for the current or some revision of the drawing, are identified on this drawing if applicable, or are identified in the Drawing Control Log (see part of the above sheet) if not applicable. Future revisions of this drawing will be issued by CP&L.

Tag #	Function	Setpoint
LC-01HD-1550A	Normal Level Controller	0.0 (- 2 / + 2.8) IANL
LC-01HD-1551A	Alternate Level Controller	3.57 (- 0 / + 2) IANL
LS-01HD-1550A	Lo Level Switch	1.44 (\pm 0.5) IBNL
LS-01HD-1540A	Hi Level Switch	5.44 (\pm 0.5) IANL
LS-01HD-1541A	Hi-Hi Level Switch	9.32 (\pm 0.5) IANL
LS-01HD-1542A	Extreme Hi-Hi Level Switch ⁴	14.32 (\pm 0.5) IANL

December 2015

- Automatic isolation occurred on the 1A/2A FWH string due to actuation of the 1A Extreme High Level Switch.
- Plant output was reduced to 90% for several days for troubleshooting.
- Numerous high level alarms experienced the previous month.
- Level columns for the high level (1540A) and extra high level (1542A) switches were flushed.
- Preliminary investigation concluded the cause was debris in the level column(s) or common reference leg.
- No additional alarms were received until 1/27/16 (weekend before 2016 FSRUG).

January 2016

- On 1/27/16, high-high alarms on the 1A FWH began to actuate every few hours.
- Each occurrence would cause the alternate drain valve to open and drain the heater, followed by the alarm clearing and level returning to normal level.
- On 1/28/16, a FIP team concluded the likely cause was debris in the associated level column or reference leg, based on earlier investigation.
- This level column had not been flushed in December based on no previous alarms.

Cause of December 2015 & January 2016 Events

- Debris in LS-01HD-1542A sensing column caused a false high level and inadvertent actuation.
- As described in EPRI Technical Report 1003472:
 - Condensation forms in the top equalizing leg that is connected to the upper shell of the FWH.
 - The condensate flows down into the level sensing column and then drains back into the FWH through the lower reference leg.
 - Debris partially blocking the level sensing column bottom connection to the lower reference leg reduces flow out of the lower level column
 - This can cause a false high level and inadvertent level switch actuation.

Validation of Cause

- This cause was validated in January when all of the sensing columns were flushed.
- The initial flush water included a substantial amount of corrosion products (magnetite and hematite) and some biological growth
- No foreign material was found.
- As of Jan 2017 - No additional alarms or automatic isolations have occurred.