

P Pressure psia
 T Temperature °F
 H Enthalpy Btu/lb
 M Massflow lb/h
 TS Saturation temperature °F

Generator_Output 1284130 KW
 Reactor_Thermal_Output 3579.0 MJ/s
 Heat_Rate 9510.0 Btu/kWh

NOTES:
 1. DATA TAKEN FROM ALSTOM HEAT BALANCE
 75V1741-110a DATED JULY 28, 2004. REFER
 TO CALLAWAY DRAWING M-2000-00001.

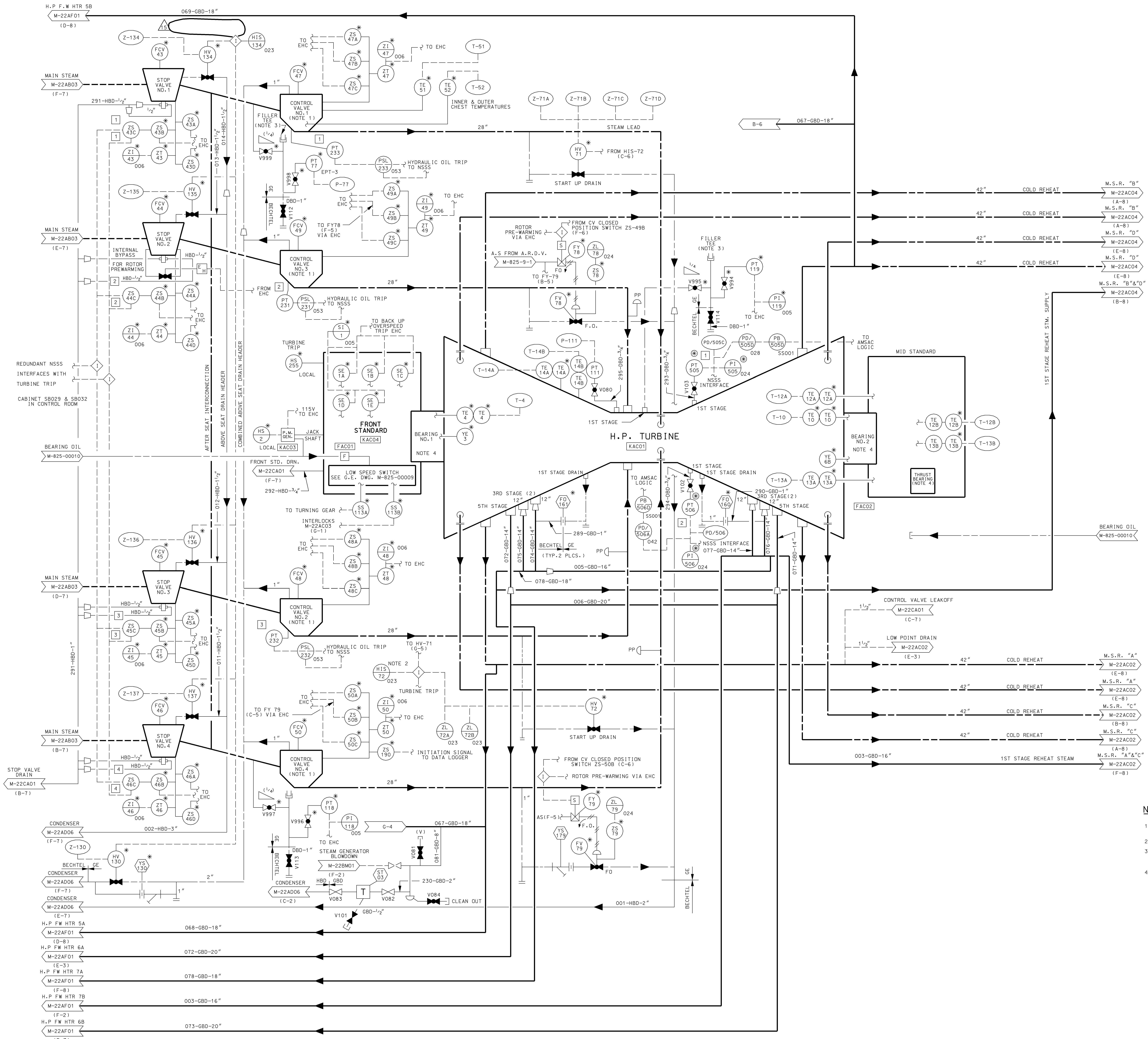
REV. OL-15
5/06

CALLAWAY PLANT

FIGURE 10.1-2

TURBINE CYCLE HEAT BALANCE
100 PERCENT
OF MANUFACTURER'S GUARANTEED
RATING

Figure 10.1-3 Deleted

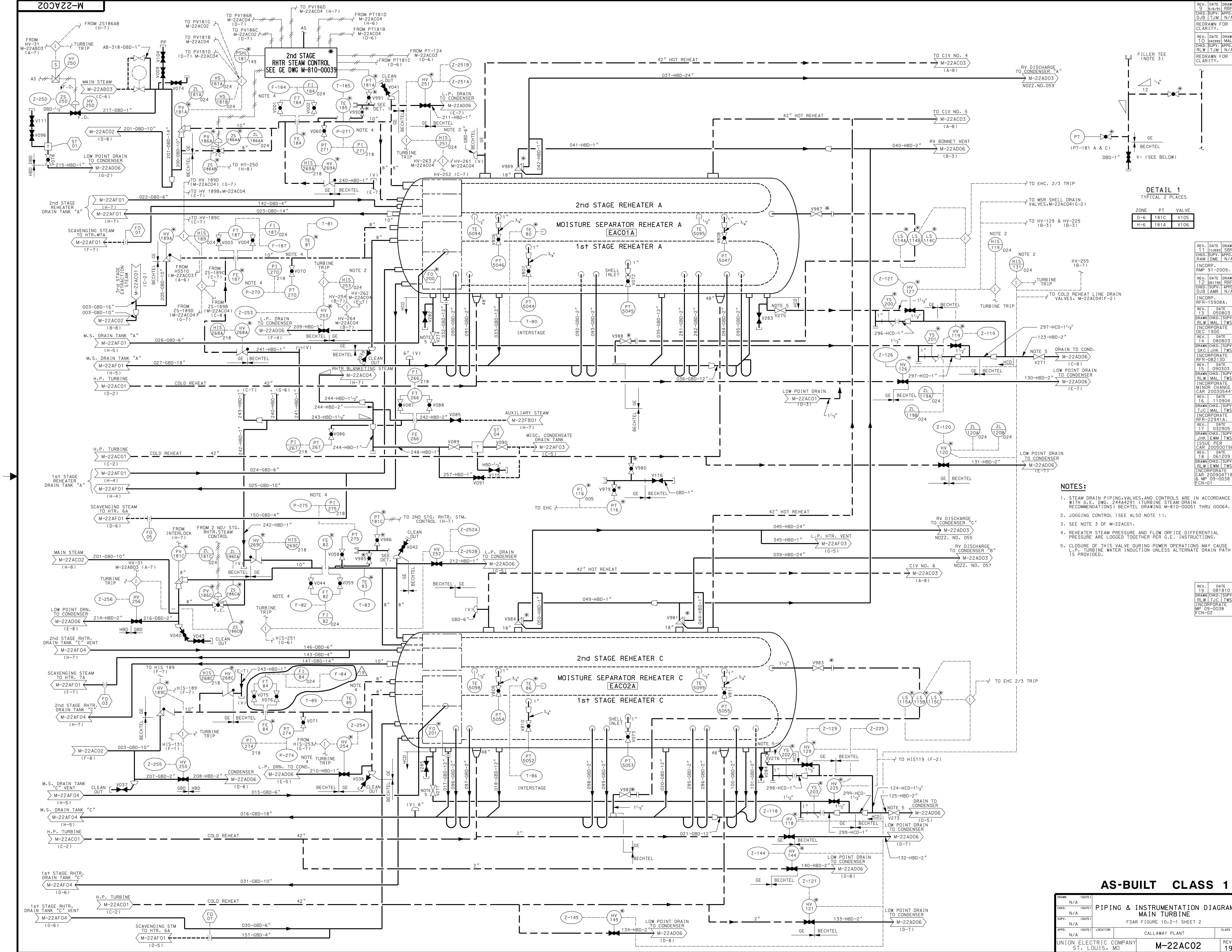


- NOTES:**
- CONTROL VALVE NUMBERS REPRESENT THE SEQUENCE OF VALVE OPENING. VALVES 1 AND 2 OPEN TOGETHER.
 - JOGGING CONTROL
 - FOR PRESSURE TRANSMITTER PIPING INSTRUCTIONS AND FLUSHING REQUIREMENTS SEE G.E. DWG. NO. 27244312 (BECHTEL FOREIGN PRINT NO. M-855-00152).
 - SHAFT RIDERS ARE MOUNTED ON THE BEARINGS AS INDICATED ON THIS DRAWING, HOWEVER, THEY ARE USED FOR BACKUP STATIC VIBRATION DATA COLLECTION ONLY. FOR VIBRATION MONITORING INSTRUMENTATION INCLUDING VIBRATION, DIFFERENTIAL/SHELL EXPANSION, ECCENTRICITY, AND THRUST BEARING WEAR, SEE DWG. NO. M-22AC05.

AS-BUILT CLASS 1

DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
N/A	1	N/A	N/A	N/A	CALLAWAY PLANT	
UNION ELECTRIC COMPANY						
ST. LOUIS, MO						
M-22AC01						REV. 15

DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
2/27/91	1	RLW	RLW	N/A		
REDRAWN FOR CLARITY						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
8/20/91	2	SBR	RLW	N/A		
INCORPORATE RFR-08118A.						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
9/20/91	3	SBR	RLW	N/A		
INCORPORATE GDC I TUM N/A						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
10/30/91	4	SBR	RLW	N/A		
INCORPORATE RFR-09304B (MEMOR MOD)						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
11/09/04	5	RLW	RLW	N/A		
INCORPORATE RFR-23293A						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
10/20/05	6	RLW	RLW	N/A		
INCORPORATE MP 03-2006						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/31/06	7	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
07/22/09	8	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
09/01/10	9	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
02/03/11	10	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	11	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	12	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	13	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	14	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	15	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	16	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	17	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	18	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	19	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						
DATE	REV.	BY	CHKD.	APPD.	LOCATION	CLASS
05/14/11	20	RLW	RLW	N/A		
INCORPORATE SUPP. EWM RLW TWS						



REV. DATE DRAWN 3/8/91 RBF
 CHKD: SUPV: APPD: DJB TJM N/A
 REDRAWN FOR CLARITY.

REV. DATE DRAWN 11/19/93 SBR
 CHKD: SUPV: APPD: RAM LME N/A
 INCORP: RMP 91-2009.

REV. DATE DRAWN 12/29/93 JHK
 CHKD: SUPV: APPD: DJB LAMR N/A
 INCORP: RFR-15908A.

REV. DATE 05/03/03
 INCORPORATE DEC 1900

REV. DATE 08/03/03
 INCORPORATE RFR-082130

REV. DATE 09/03/03
 INCORPORATE CAR 200305441

REV. DATE 11/09/04
 DRAWN CHKD: SUPV: TJC MAL TWS
 INCORPORATE RFR-22941A.

REV. DATE 03/29/05
 DRAWN CHKD: SUPV: JHK LEM TWS
 ISSUE PER CAR 20050798

REV. DATE 06/12/09
 DRAWN CHKD: SUPV: RLW LEM TWS
 INCORPORATE CAR 200904718 & MP 09-0038
 FCN-01

DETAIL 1
 TYPICAL 2 PLACES

ZONE	PT	VALVE
D-5	181C	VT05
H-6	181A	VT06

- NOTES:**
- STEAM DRAIN PIPING, VALVES, AND CONTROLS ARE IN ACCORDANCE WITH G.E. DWG. 244A4291 (TURBINE STEAM DRAIN RECOMMENDATIONS) BECHTEL DRAWING M-810-00051 THRU 00064.
 - JOGGING CONTROL (SEE ALSO NOTE 1).
 - SEE NOTE 3 OF M-22AC01.
 - REHEATER STEAM PRESSURE AND FLOW ORIFICE DIFFERENTIAL PRESSURE ARE LOGGED TOGETHER PER G.E. INSTRUCTIONS.
 - CLOSURE OF THIS VALVE DURING POWER OPERATIONS MAY CAUSE L.P. TURBINE WATER INDUCTION UNLESS ALTERNATE DRAIN PATH IS PROVIDED.

AS-BUILT CLASS 1

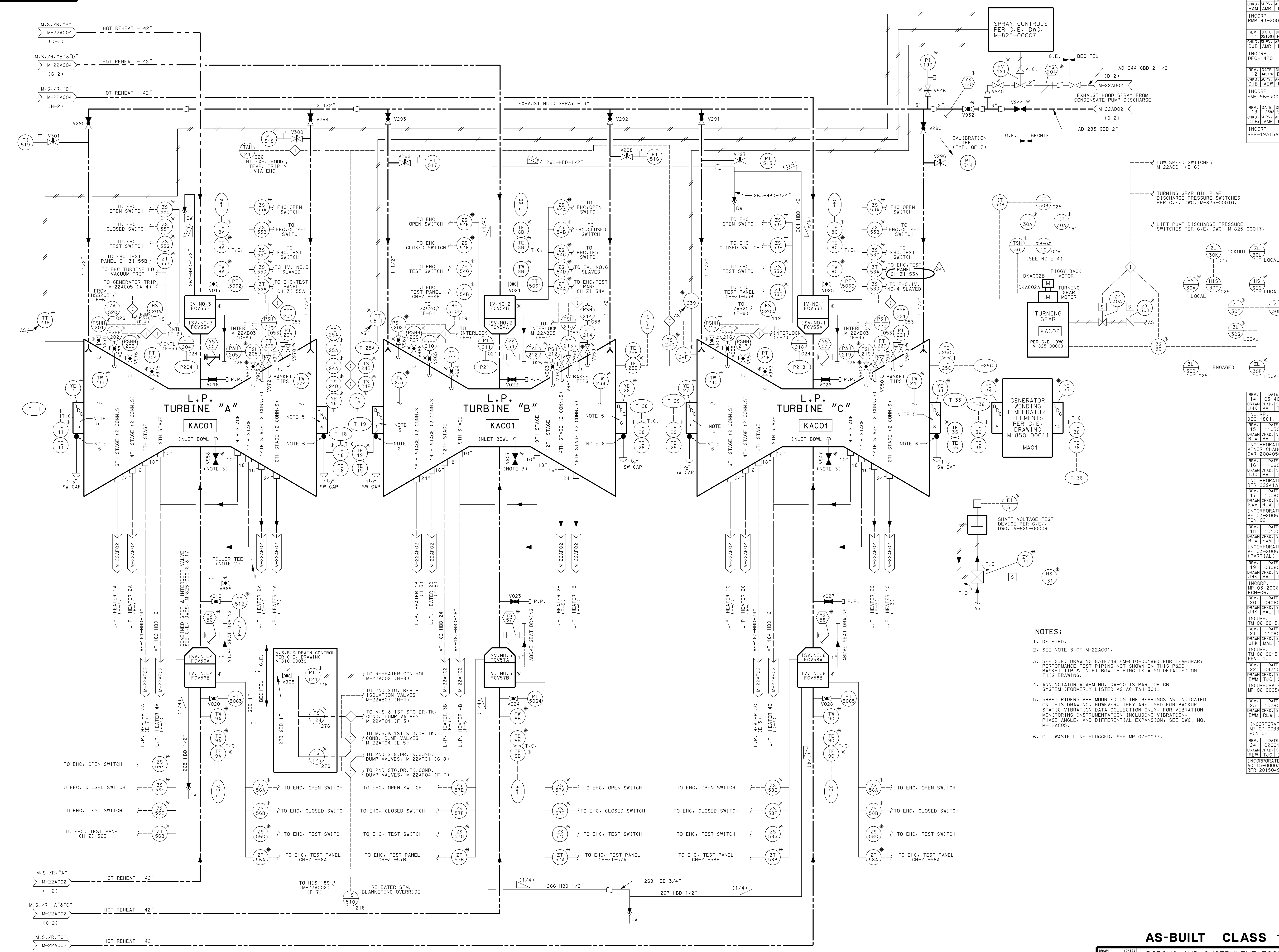
PIPING & INSTRUMENTATION DIAGRAM MAIN TURBINE
 FSAR FIGURE 10.2-1 SHEET 2

NO.	DATE	LOCATION	CLASS
19	08/31/00		
20	09/03/03		
21	03/29/05		
22	06/12/09		
23	08/03/03		
24	08/03/03		
25	09/03/03		
26	11/09/04		
27	03/29/05		
28	06/12/09		
29	08/03/03		
30	09/03/03		

UNION ELECTRIC COMPANY
 ST. LOUIS, MO

M-22AC02

REV. 19



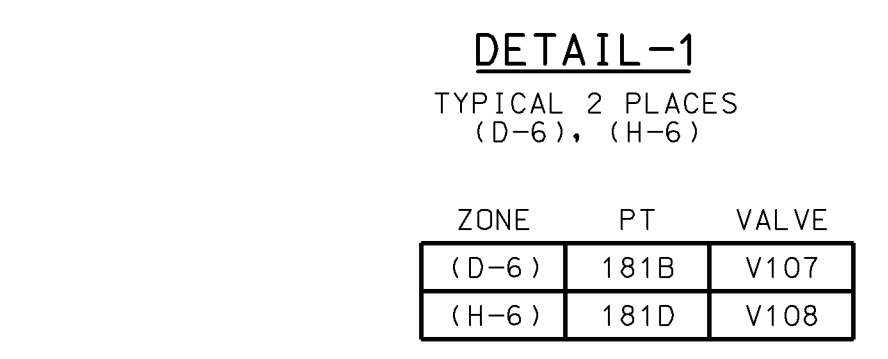
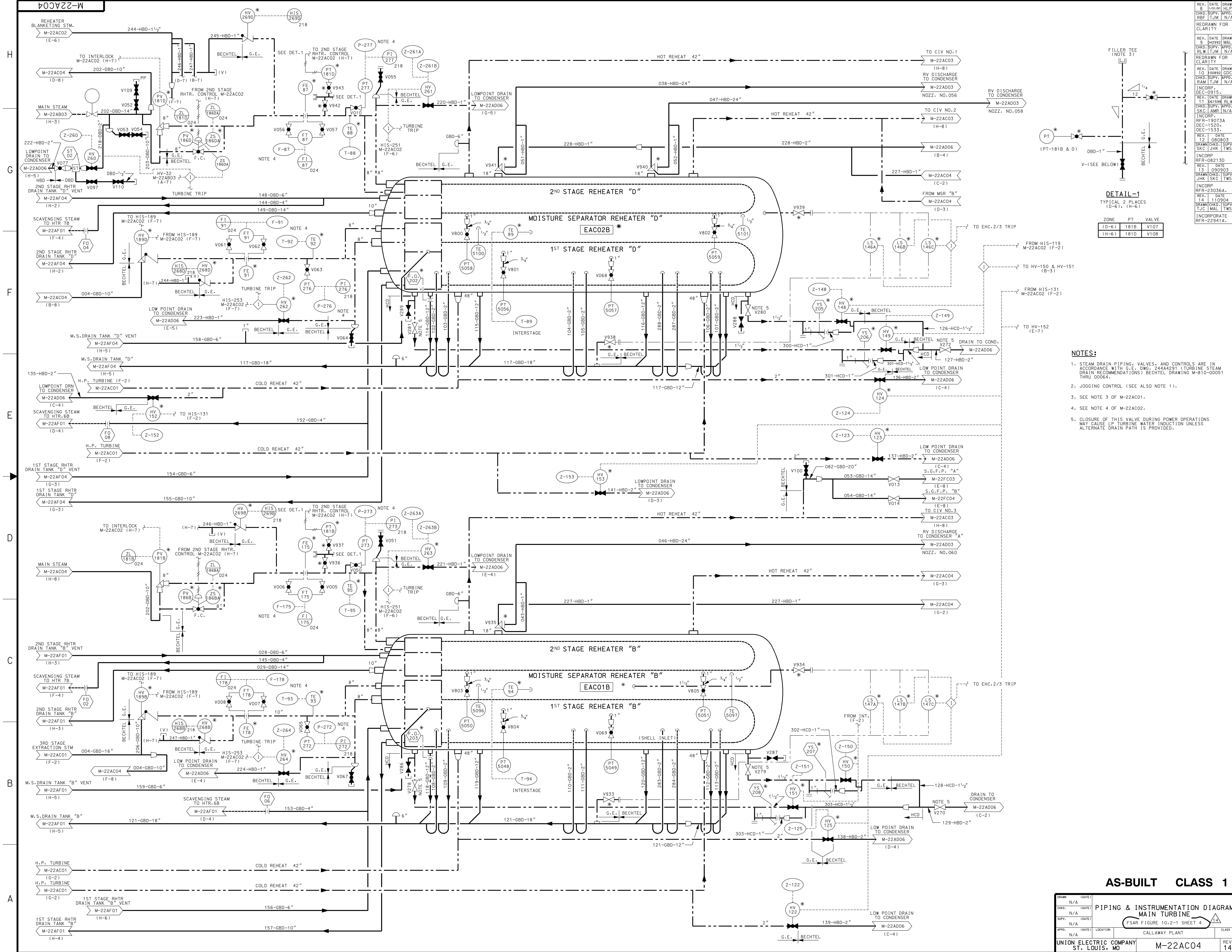
- NOTES:**
1. DELETED.
 2. SEE NOTE 3 OF M-22AC01.
 3. SEE G.E. DRAWING 831E748 (M-810-00186) FOR TEMPORARY PERFORMANCE TEST PIPING NOT SHOWN ON THIS P&ID. BASKET TIP & INLET BOWL PIPING IS ALSO DETAILED ON THIS DRAWING.
 4. ANNUNCIATOR ALARM NO. QA-10 IS PART OF CB SYSTEM (FORMERLY LISTED AS AC-TAH-30).
 5. SHAFT RIDERS ARE MOUNTED ON THE BEARINGS AS INDICATED ON THIS DRAWING, HOWEVER, THEY ARE USED FOR BACKUP STATIC VIBRATION DATA COLLECTION ONLY. FOR VIBRATION MONITORING INSTRUMENTATION INCLUDING VIBRATION PHASE ANGLE, AND DIFFERENTIAL EXPANSION, SEE DWG. NO. M-22AC05.
 6. OIL WASTE LINE PLUGGED. SEE MP 07-0033.

REV. DATE	DRWN	CHKD.	APPD.	INCORP.
11 0429M	EWM	JHK	RAM	N/A
INCORP.	RMP 93-2001.			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
12 0429M	EWM	JHK	RAM	N/A
INCORP.	DEC-1420			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
13 1123M	SKC	JHK	RAM	N/A
INCORP.	RF-19315A			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
14 0310M	SKC	JHK	RAM	N/A
INCORP.	DEC-1881.			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
15 110504	EWM	JHK	RAM	N/A
INCORP.	MP 03-2006			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
16 110904	EWM	JHK	RAM	N/A
INCORP.	MP 03-2006			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
17 100805	EWM	JHK	RAM	N/A
INCORP.	MP 03-2006			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
18 101205	EWM	JHK	RAM	N/A
INCORP.	MP 03-2006			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
19 030606	EWM	JHK	RAM	N/A
INCORP.	MP 03-2006			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
20 090606	EWM	JHK	RAM	N/A
INCORP.	MP 06-0055A			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
21 110806	EWM	JHK	RAM	N/A
INCORP.	MP 06-0015			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
22 042107	EWM	JHK	RAM	N/A
INCORP.	MP 07-0033			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
23 102908	EWM	JHK	RAM	N/A
INCORP.	MP 07-0033			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
24 020916	EWM	JHK	RAM	N/A
INCORP.	MP 06-0055A			
REV. DATE	DRWN	CHKD.	APPD.	INCORP.
15-0000391	EWM	JHK	RAM	N/A
INCORP.	RF-201504943			

AS-BUILT CLASS 1

DRWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY			CLASS
ST. LOUIS, MO			M-22AC03
			REV. 24

PIPING AND INSTRUMENTATION
DIAGRAM
MAIN TURBINE
FSAR FIGURE 10.2-1 SHEET 3



- NOTES:**
- STEAM DRAIN PIPING, VALVES, AND CONTROLS ARE IN ACCORDANCE WITH G.E. DWG. 2444281 (TURBINE STEAM DRAIN RECOMMENDATIONS) BECHTEL DRAWING M-810-00051 THRU 00064.
 - JOGGING CONTROL (SEE ALSO NOTE 1).
 - SEE NOTE 3 OF M-22AC01.
 - SEE NOTE 4 OF M-22AC02.
 - CLOSURE OF THIS VALVE DURING POWER OPERATIONS MAY CAUSE LP TURBINE WATER INDUCTION UNLESS ALTERNATE DRAIN PATH IS PROVIDED.

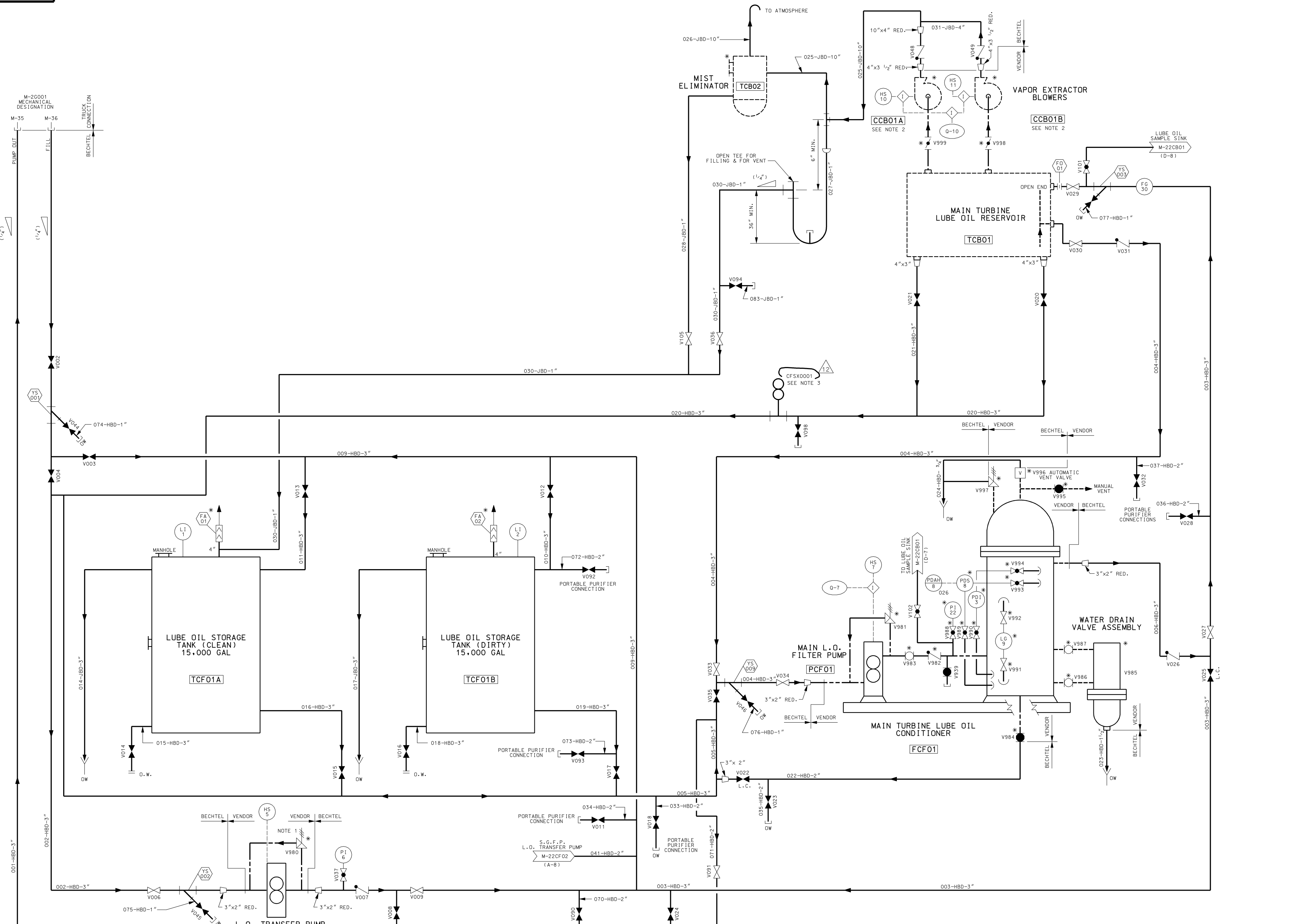
AS-BUILT CLASS 1

DATE	BY	CHKD.	APPD.	LOCATION	CLASS
N/A	N/A	N/A	N/A	CALLAWAY PLANT	

PIPING & INSTRUMENTATION DIAGRAM
 MAIN TURBINE
 FSAR FIGURE 10.2-1 SHEET 4

UNION ELECTRIC COMPANY	M-22AC04	REV. 14
ST. LOUIS, MO		

REV.	DATE	BY	CHKD.	APPD.	LOCATION	CLASS
1	08/08/03	JHK	SKC	TWS		
2	12/08/03	JHK	SKC	TWS		
3	09/03/03	JHK	SKC	TWS		
4	11/03/04	JHK	SKC	TWS		
5	08/08/03	JHK	SKC	TWS		
6	12/08/03	JHK	SKC	TWS		
7	08/08/03	JHK	SKC	TWS		
8	11/03/04	JHK	SKC	TWS		
9	08/08/03	JHK	SKC	TWS		
10	12/08/03	JHK	SKC	TWS		
11	08/08/03	JHK	SKC	TWS		
12	12/08/03	JHK	SKC	TWS		
13	09/03/03	JHK	SKC	TWS		
14	11/03/04	JHK	SKC	TWS		
15	08/08/03	JHK	SKC	TWS		
16	12/08/03	JHK	SKC	TWS		
17	08/08/03	JHK	SKC	TWS		
18	11/03/04	JHK	SKC	TWS		
19	08/08/03	JHK	SKC	TWS		
20	12/08/03	JHK	SKC	TWS		



- NOTES:**
1. RELIEF VALVE IS INTEGRAL TO THE PUMP.
 2. INSTRUMENT LOGIC AND SCHEMATIC DIAGRAMS ASSOCIATED WITH CCB01A AND CCB01B ARE SHOWN IN SYSTEM CB.
 3. ORIFICE FLANGE TO BE INSTALLED ONLY WHEN DRAINING RESERVOIR; BLANK FLANGE TO BE INSTALLED WHEN TURBINE IS OPERATING.
 4. DELETED.
 5. DELETED.

AS-BUILT CLASS 1

DRWN	N/A	(DATE)	PIPING AND INSTRUMENTATION DIAGRAM	
CHKD	N/A	(DATE)	LUBE OIL STORAGE, TRANSFER AND PURIFICATION SYSTEM	
SUPV	N/A	(DATE)	FSAR FIGURE 10.2-1 SHEET 5	
APPD	N/A	(DATE)	LOCATION	CLASS
			CALLAWAY ENERGY CENTER	
UNION ELECTRIC COMPANY ST. LOUIS, MO			M-22CF01	REV. 12

REV. DATE DRAWN 082991 JHK
CHKD: SUPV: APPD: RBF TJM N/A
REDRAWN FOR CLARITY

REV. DATE DRAWN 061193 RBF
CHKD: SUPV: APPD: DJB TAM N/A
INCORP. RFR-06943B.

REV. DATE DRAWN 070898 RBF
CHKD: SUPV: APPD: DJB TAM N/A
INCORP. DEC-1444

REV. DATE DRAWN 111497 RBF
CHKD: SUPV: APPD: DJB JHC N/A
INCORP. MP 93-2035 FCN-01

REV. DATE DRAWN 012305 SKC
CHKD: SUPV: APPD: JHK AMR N/A
INCORP. RMP-93-2035 FCN-02

REV. DATE 090303
DRAWN: CHKD: SUPV: RLW MAL TWS
INCORPORATE MINOR CHANGE CAR 200305155

REV. DATE 110504
DRAWN: CHKD: SUPV: JHK EWM TWS
INCORP. CAR 200400648

REV. DATE 110904
DRAWN: CHKD: SUPV: MAL RLW TWS
INCORP. RFR 22941A.

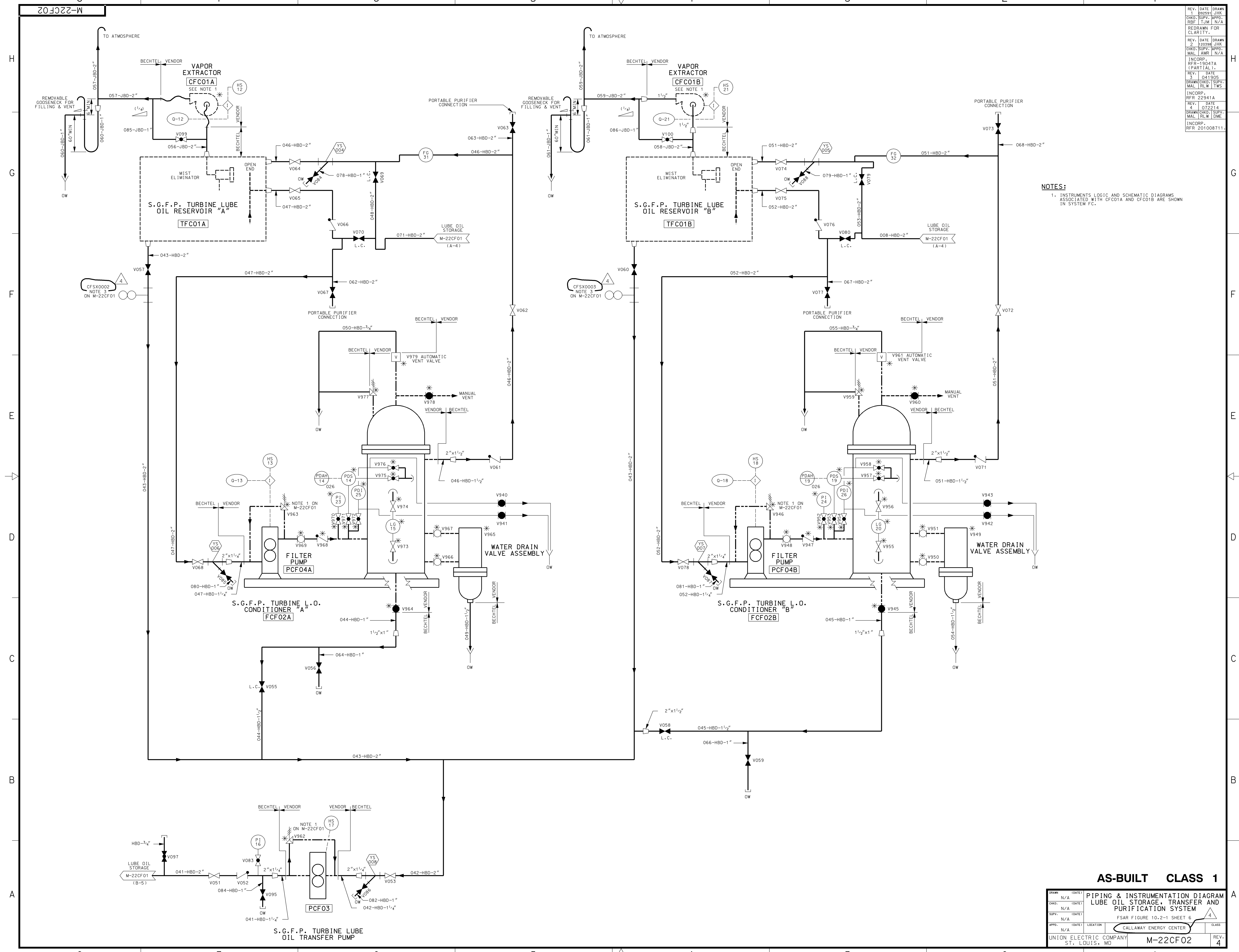
REV. DATE 021405
DRAWN: CHKD: SUPV: JHK EWM TWS
ISSUE PER CAR 200500583.

REV. DATE 052512
DRAWN: CHKD: SUPV: MAL RLW SKC
INCORP. RFR CAR 201110691.

REV. DATE 072214
DRAWN: CHKD: SUPV: MAL RLW DME
INCORP. RFR 201008711.

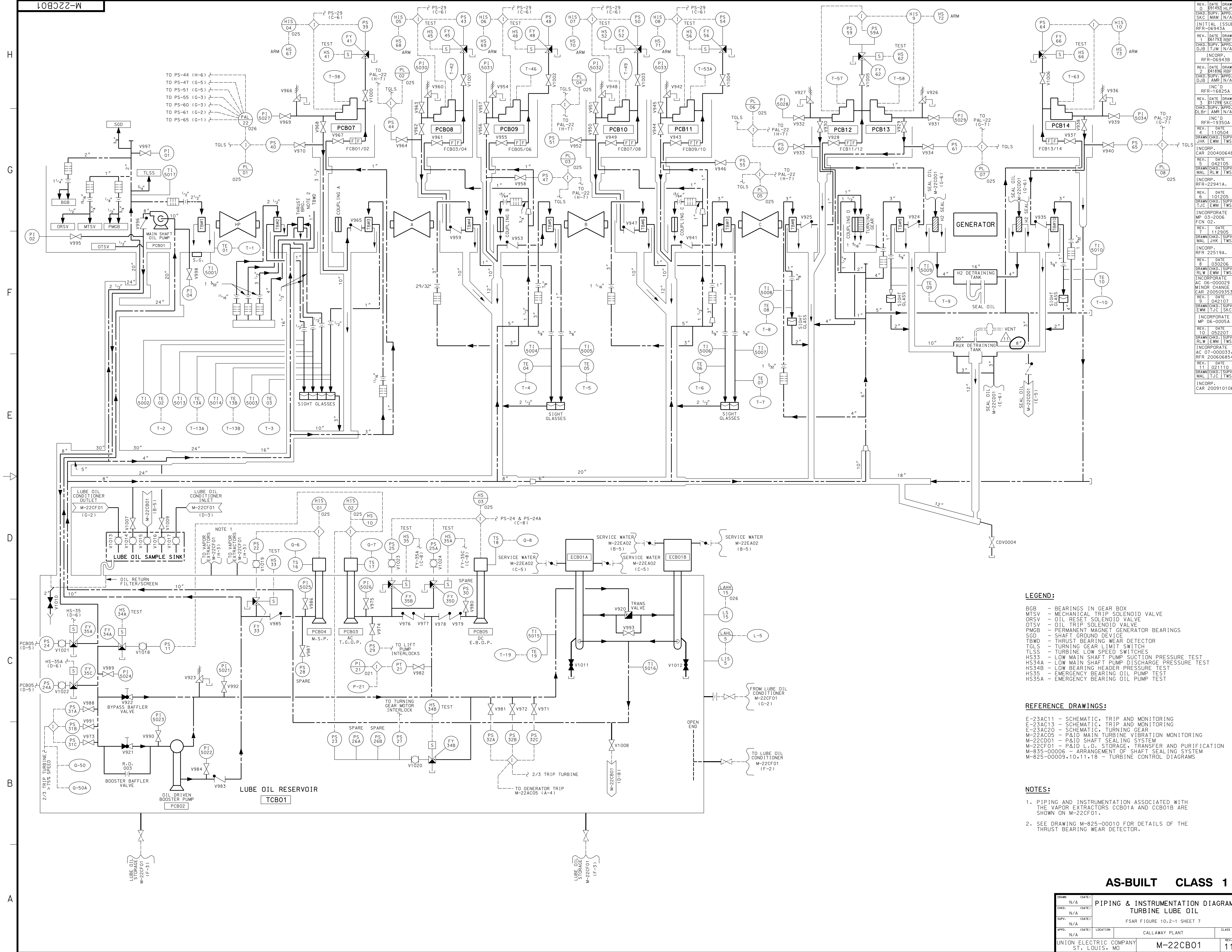
REV.	DATE	DRAWN	CHKD.	DATE	APPR.
1	02/25/91	JHK	LJM	N/A	N/A
REDEWAIN FOR CLARITY.					
2	02/28/91	JHK	LJM	N/A	N/A
INCORP. RFR-19047A (PARTIAL).					
3	04/19/95	DR	ML	RLW	TWS
INCORP. RFR-22941A TRK-1 DATE 07/21/94					
DRAWING(S) SUPV. MAL/RLW/DME					
INCORP. RFR-201008711.					

NOTES:
 1. INSTRUMENTS LOGIC AND SCHEMATIC DIAGRAMS ASSOCIATED WITH CFC01A AND CFC01B ARE SHOWN IN SYSTEM FC.



AS-BUILT CLASS 1

DRWN	DATE	PIPING & INSTRUMENTATION DIAGRAM		
N/A	DATE	LUBE OIL STORAGE, TRANSFER AND PURIFICATION SYSTEM		
CHKD.	DATE	FSAR FIGURE 10.2-1 SHEET 6		
SUPV.	DATE	CALLAWAY ENERGY CENTER		
APPR.	DATE	LOCATION	CLASS	REV.
N/A	N/A	ST. LOUIS, MO	M-22CF02	4



REV.	DATE	DRAWN	CHKD.	DATE	APP'D.	SKC	DATE	APP'D.	SKC
1	0919	ML	N/A						
2	0118	RBF							
3	0119	RBF							
4	0617	RBF							
5	0618	RBF							
6	0619	RBF							
7	0620	RBF							
8	0621	RBF							
9	0622	RBF							
10	0623	RBF							
11	0624	RBF							
12	0625	RBF							
13	0626	RBF							
14	0627	RBF							
15	0628	RBF							
16	0629	RBF							
17	0630	RBF							
18	0631	RBF							
19	0632	RBF							
20	0633	RBF							
21	0634	RBF							
22	0635	RBF							
23	0636	RBF							
24	0637	RBF							
25	0638	RBF							
26	0639	RBF							
27	0640	RBF							
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36	0649	RBF							
37	0650	RBF							
38	0651	RBF							
39	0652	RBF							
40	0653	RBF							
41	0654	RBF							
42	0655	RBF							
43	0656	RBF							
44	0657	RBF							
45	0658	RBF							
46	0659	RBF							
47	0660	RBF							
48	0661	RBF							
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67	0680	RBF							
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83	0696	RBF							
84	0697	RBF							
85	0698	RBF							
86	0699	RBF							
87	0700	RBF							

- LEGEND:**
- BGB - BEARINGS IN GEAR BOX
 - MTSV - MECHANICAL TRIP SOLENOID VALVE
 - ORSV - OIL RESET SOLENOID VALVE
 - OTSV - OIL TRIP SOLENOID VALVE
 - PMGB - PERMANENT MAGNET GENERATOR BEARINGS
 - SGD - SHAFT GROUND DEVICE
 - TBWD - THRUST BEARING WEAR DETECTOR
 - TGLS - TURNING GEAR LIMIT SWITCH
 - TLSS - TURBINE LOW SPEED SWITCHES
 - HS33 - LOW MAIN SHAFT PUMP SUCTION PRESSURE TEST
 - HS34A - LOW MAIN SHAFT PUMP DISCHARGE PRESSURE TEST
 - HS34B - LOW BEARING HEADER PRESSURE TEST
 - HS35 - EMERGENCY BEARING OIL PUMP TEST
 - HS35A - EMERGENCY BEARING OIL PUMP TEST

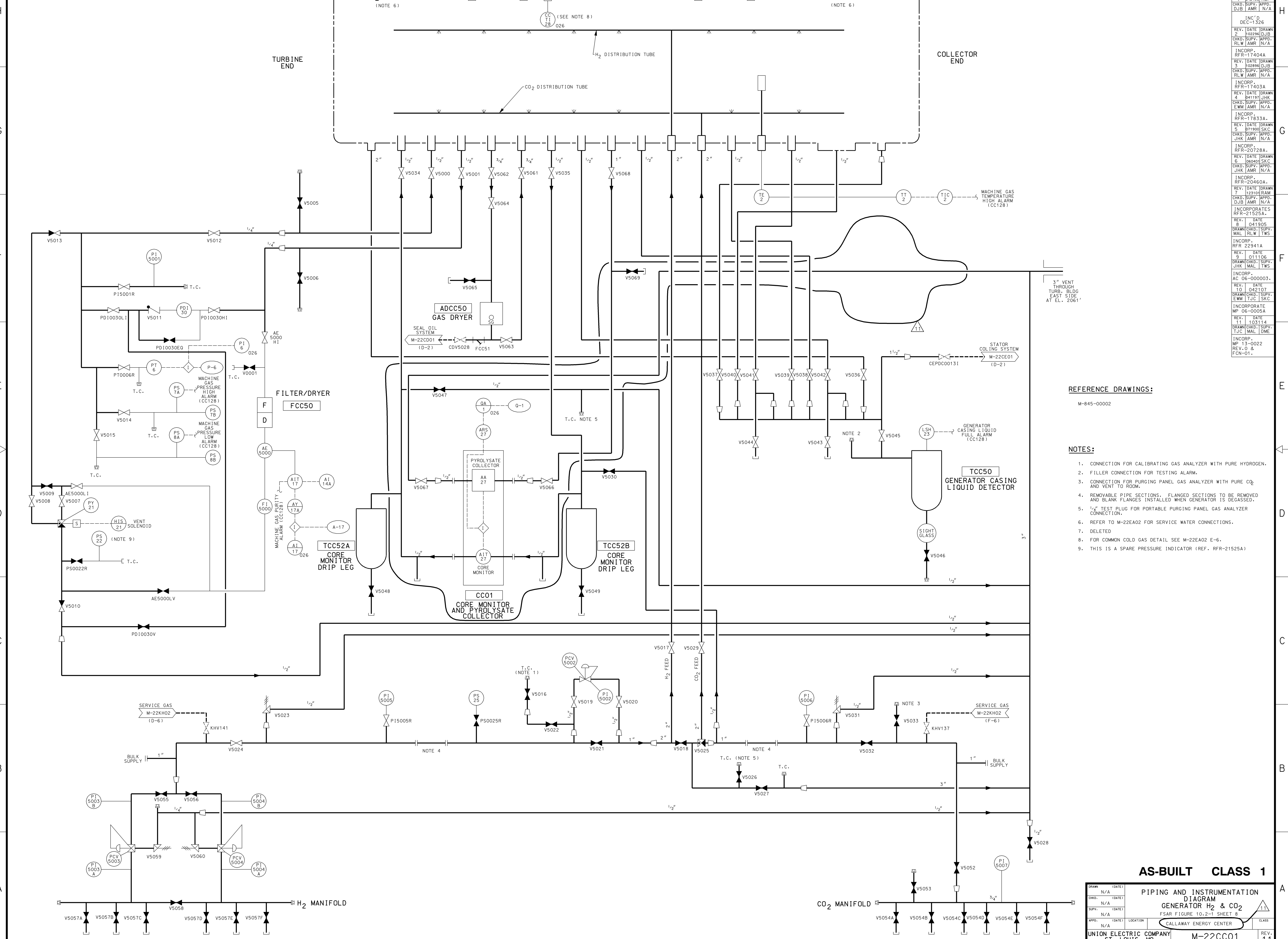
- REFERENCE DRAWINGS:**
- E-23AC11 - SCHEMATIC, TRIP AND MONITORING
 - E-23AC13 - SCHEMATIC, TRIP AND MONITORING
 - E-23AC20 - SCHEMATIC, TURNING GEAR
 - M-22AC05 - P&ID MAIN TURBINE VIBRATION MONITORING
 - M-22CD01 - P&ID SHAFT SEALING SYSTEM
 - M-22CF01 - P&ID L.O. STORAGE, TRANSFER AND PURIFICATION
 - M-835-00006 - ARRANGEMENT OF SHAFT SEALING SYSTEM
 - M-825-00009, 10, 11, 18 - TURBINE CONTROL DIAGRAMS

- NOTES:**
1. PIPING AND INSTRUMENTATION ASSOCIATED WITH THE VAPOR EXTRACTORS CCB01A AND CCB01B ARE SHOWN ON M-22CF01.
 2. SEE DRAWING M-825-00010 FOR DETAILS OF THE THRUST BEARING WEAR DETECTOR.

AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APP'D.	N/A	DATE	
LOCATION	CALLAWAY PLANT		CLASS
UNION ELECTRIC COMPANY			M-22CB01
ST. LOUIS, MO			11

PIPING & INSTRUMENTATION DIAGRAM
TURBINE LUBE OIL
FSAR FIGURE 10.2-1 SHEET 7



REFERENCE DRAWINGS:

M-845-00002

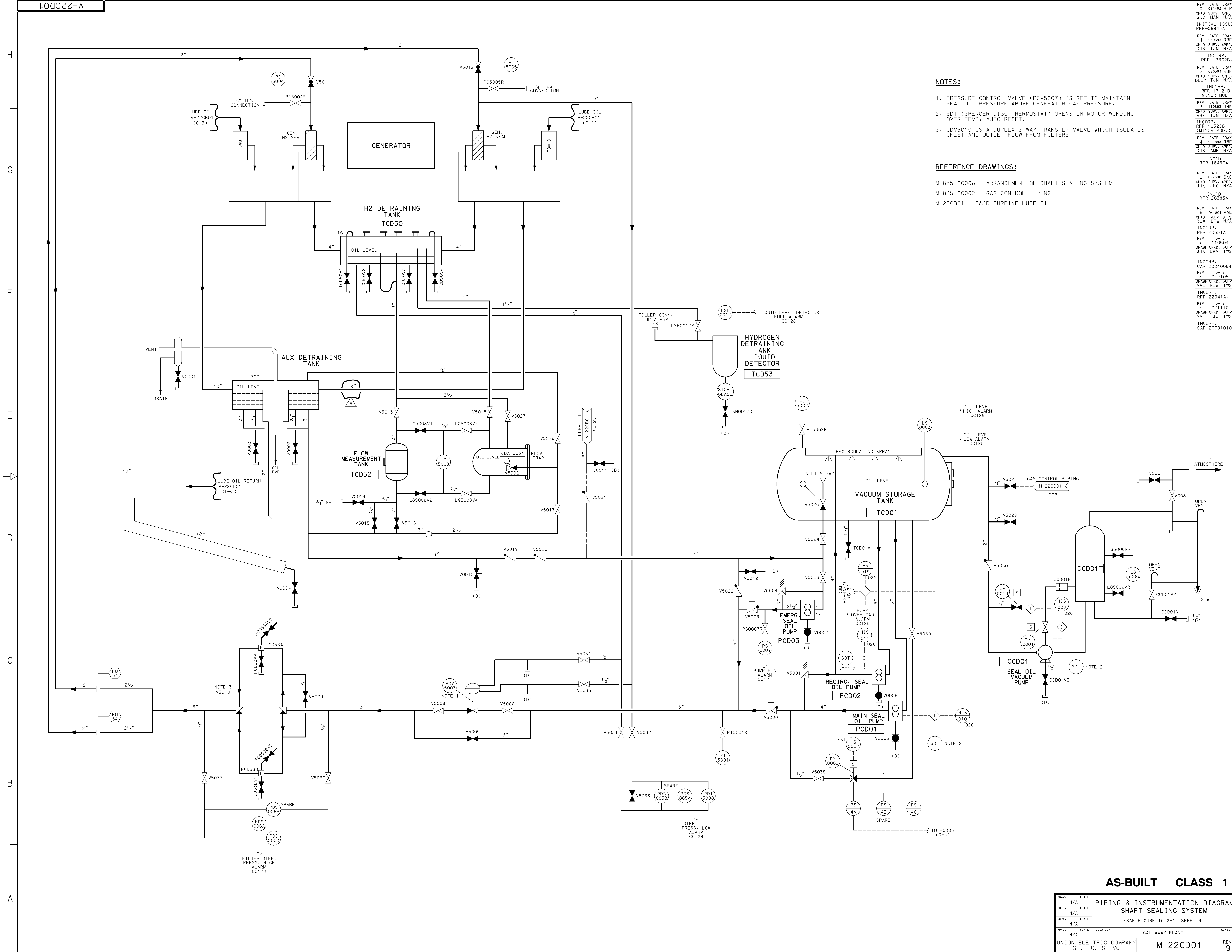
NOTES:

1. CONNECTION FOR CALIBRATING GAS ANALYZER WITH PURE HYDROGEN.
2. FILLER CONNECTION FOR TESTING ALARM.
3. CONNECTION FOR PURGING PANEL GAS ANALYZER WITH PURE CO₂ AND VENT TO ROOM.
4. REMOVABLE PIPE SECTIONS. FLANGED SECTIONS TO BE REMOVED AND BLANK FLANGES INSTALLED WHEN GENERATOR IS DEGASSED.
5. 1/2" TEST PLUG FOR PORTABLE PURGING PANEL GAS ANALYZER CONNECTION.
6. REFER TO M-22EA02 FOR SERVICE WATER CONNECTIONS.
7. DELETED
8. FOR COMMON COLD GAS DETAIL SEE M-22EA02 E-6.
9. THIS IS A SPARE PRESSURE INDICATOR (REF. RFR-21525A)

AS-BUILT CLASS 1

DRAWING INFORMATION			
DATE	REV.	BY	CHKD.
11/13/02	1	JKH	JKH
PROJECT INFORMATION			
LOCATION	DESCRIPTION	SCALE	SHEET NO.
CALLAWAY ENERGY CENTER	GENERATOR H ₂ & CO ₂	1:1	11
UNION ELECTRIC COMPANY			REV. 11
ST. LOUIS, MO			

REV.	DATE	DRAWN	CHKD.	APPD.
0	04/23/01	JKH	JKH	N/A
1	04/24/01	JKH	JKH	N/A
2	02/28/02	JKH	JKH	N/A
3	02/28/02	JKH	JKH	N/A
4	04/19/02	JKH	JKH	N/A
5	07/18/02	JKH	JKH	N/A
6	08/04/02	JKH	JKH	N/A
7	08/04/02	JKH	JKH	N/A
8	01/11/03	JKH	JKH	N/A
9	01/11/03	JKH	JKH	N/A
10	02/10/03	JKH	JKH	N/A
11	03/11/04	JKH	JKH	N/A
12	03/11/04	JKH	JKH	N/A
13	03/11/04	JKH	JKH	N/A
14	03/11/04	JKH	JKH	N/A
15	03/11/04	JKH	JKH	N/A
16	03/11/04	JKH	JKH	N/A
17	03/11/04	JKH	JKH	N/A
18	03/11/04	JKH	JKH	N/A
19	03/11/04	JKH	JKH	N/A
20	03/11/04	JKH	JKH	N/A
21	03/11/04	JKH	JKH	N/A
22	03/11/04	JKH	JKH	N/A
23	03/11/04	JKH	JKH	N/A
24	03/11/04	JKH	JKH	N/A
25	03/11/04	JKH	JKH	N/A
26	03/11/04	JKH	JKH	N/A
27	03/11/04	JKH	JKH	N/A
28	03/11/04	JKH	JKH	N/A
29	03/11/04	JKH	JKH	N/A
30	03/11/04	JKH	JKH	N/A
31	03/11/04	JKH	JKH	N/A
32	03/11/04	JKH	JKH	N/A
33	03/11/04	JKH	JKH	N/A
34	03/11/04	JKH	JKH	N/A
35	03/11/04	JKH	JKH	N/A
36	03/11/04	JKH	JKH	N/A
37	03/11/04	JKH	JKH	N/A
38	03/11/04	JKH	JKH	N/A
39	03/11/04	JKH	JKH	N/A
40	03/11/04	JKH	JKH	N/A
41	03/11/04	JKH	JKH	N/A
42	03/11/04	JKH	JKH	N/A
43	03/11/04	JKH	JKH	N/A
44	03/11/04	JKH	JKH	N/A
45	03/11/04	JKH	JKH	N/A
46	03/11/04	JKH	JKH	N/A
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51	03/11/04	JKH	JKH	N/A
52	03/11/04	JKH	JKH	N/A
53	03/11/04	JKH	JKH	N/A
54	03/11/04	JKH	JKH	N/A
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56	03/11/04	JKH	JKH	N/A
57	03/11/04	JKH	JKH	N/A
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59	03/11/04	JKH	JKH	N/A
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66	03/11/04	JKH	JKH	N/A
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68	03/11/04	JKH	JKH	N/A
69	03/11/04	JKH	JKH	N/A
70	03/11/04	JKH	JKH	N/A
71	03/11/04	JKH	JKH	N/A
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76	03/11/04	JKH	JKH	N/A
77	03/11/04	JKH	JKH	N/A
78	03/11/04	JKH	JKH	N/A
79	03/11/04	JKH	JKH	N/A
80	03/11/04	JKH	JKH	N/A
81	03/11/04	JKH	JKH	N/A
82	03/11/04	JKH	JKH	N/A
83	03/11/04	JKH	JKH	N/A
84	03/11/04	JKH	JKH	N/A
85	03/11/04	JKH	JKH	N/A
86	03/11/04	JKH	JKH	N/A
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92	03/11/04	JKH	JKH	N/A
93	03/11/04	JKH	JKH	N/A
94	03/11/04	JKH	JKH	N/A
95	03/11/04	JKH	JKH	N/A
96	03/11/04	JKH	JKH	N/A
97	03/11/04	JKH	JKH	N/A
98	03/11/04	JKH	JKH	N/A
99	03/11/04	JKH	JKH	N/A
100	03/11/04	JKH	JKH	N/A



- NOTES:**
- PRESSURE CONTROL VALVE (PCV5007) IS SET TO MAINTAIN SEAL OIL PRESSURE ABOVE GENERATOR GAS PRESSURE.
 - SDT (SPENCER DISC THERMOSTAT) OPENS ON MOTOR WINDING OVER TEMP. AUTO RESET.
 - CDV5010 IS A DUPLEX 3-WAY TRANSFER VALVE WHICH ISOLATES INLET AND OUTLET FLOW FROM FILTERS.

- REFERENCE DRAWINGS:**
- M-835-00006 - ARRANGEMENT OF SHAFT SEALING SYSTEM
 - M-845-00002 - GAS CONTROL PIPING
 - M-22CB01 - P&ID TURBINE LUBE OIL

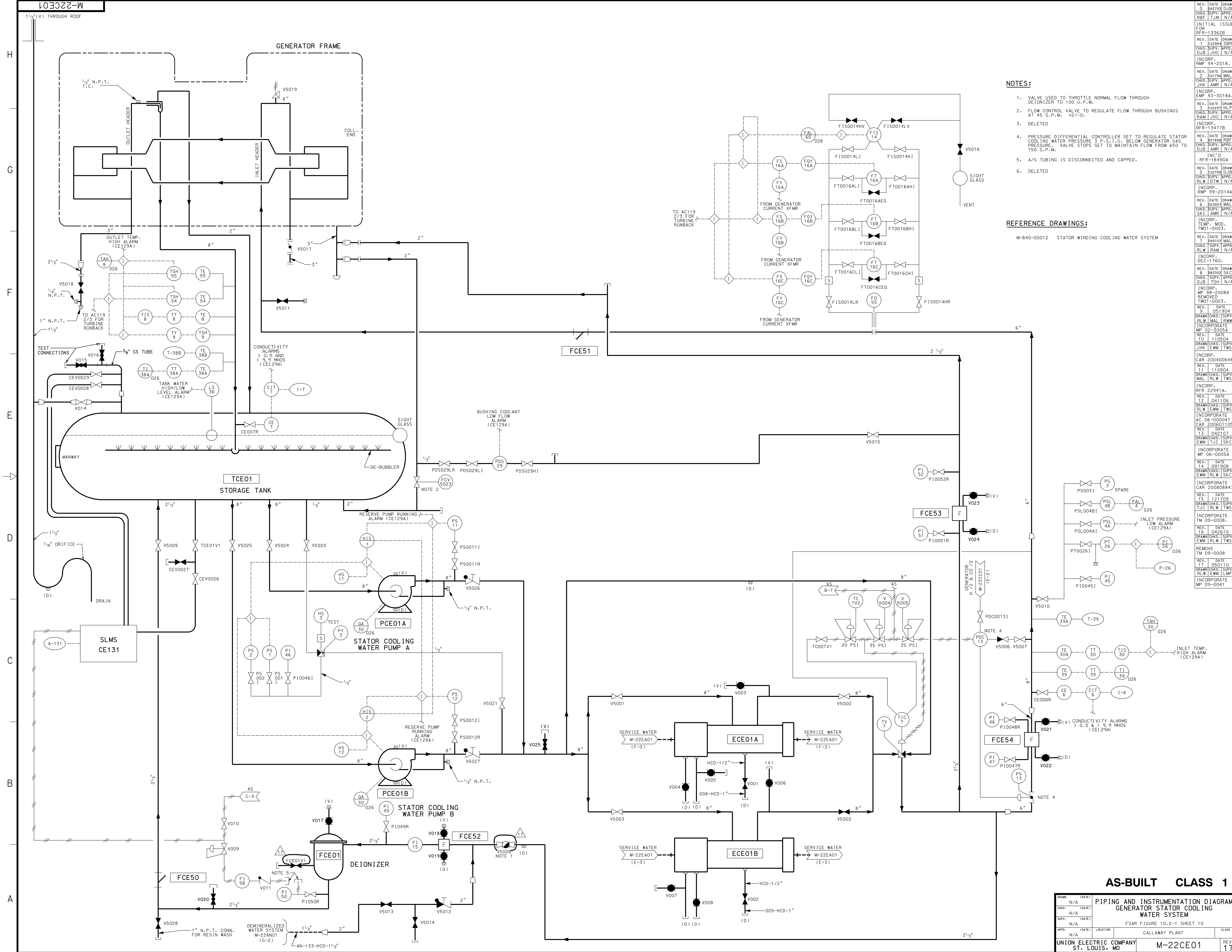
REV.	DATE	DRAWN	CHKD.	APPD.	SKC	MAM	N/A
INITIAL ISSUE							
REV. DATE DRAWN	091492	JHK					
CHKD. SUPV. APPD. D.B.	06343A						
INCORP. RFR-13362B.							
REV. DATE DRAWN	060398	RBF					
CHKD. SUPV. APPD. D.B.	13121B						
INCORP. RFR-13121B MINOR MOD.							
REV. DATE DRAWN	110504	JHK					
CHKD. SUPV. APPD. D.B.	10328B						
INCORP. RFR-10328B (MINOR MOD.)							
REV. DATE DRAWN	021896	RBF					
CHKD. SUPV. APPD. D.B.	20351A						
INCORP. RFR-20351A.							
REV. DATE DRAWN	110504	JHK					
CHKD. SUPV. APPD. D.B.	20385A						
INCORP. RFR-20385A							
REV. DATE DRAWN	022300	SKC					
CHKD. SUPV. APPD. D.B.	022300						
INCORP. RFR-022300							
REV. DATE DRAWN	042105	MAL					
CHKD. SUPV. APPD. D.B.	20910106						
INCORP. RFR-20910106							

AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY ST. LOUIS, MO			REV. 9

PIPING & INSTRUMENTATION DIAGRAM
SHAFT SEALING SYSTEM
FSAR FIGURE 10.2-1 SHEET 9

M-22CD01



- NOTES:**
1. VALVE USED TO THROTTLE NORMAL FLOW THROUGH DEIONIZER TO 100 G.P.M.
 2. FLOW CONTROL VALVE TO REGULATE FLOW THROUGH BUSHINGS AT 45 G.P.M. +/-2/-0.
 3. DELETED
 4. PRESSURE DIFFERENTIAL CONTROLLER SET TO REGULATE STATOR COOLING WATER PRESSURE 3 P.S.I.G. BELOW GENERATOR GAS PRESSURE. VALVE STOPS SET TO MAINTAIN FLOW FROM 650 TO 750 G.P.M.
 5. A/S TUBING IS DISCONNECTED AND CAPPED.
 6. DELETED

REFERENCE DRAWINGS:

M-840-0012 STATOR WINDING COOLING WATER SYSTEM

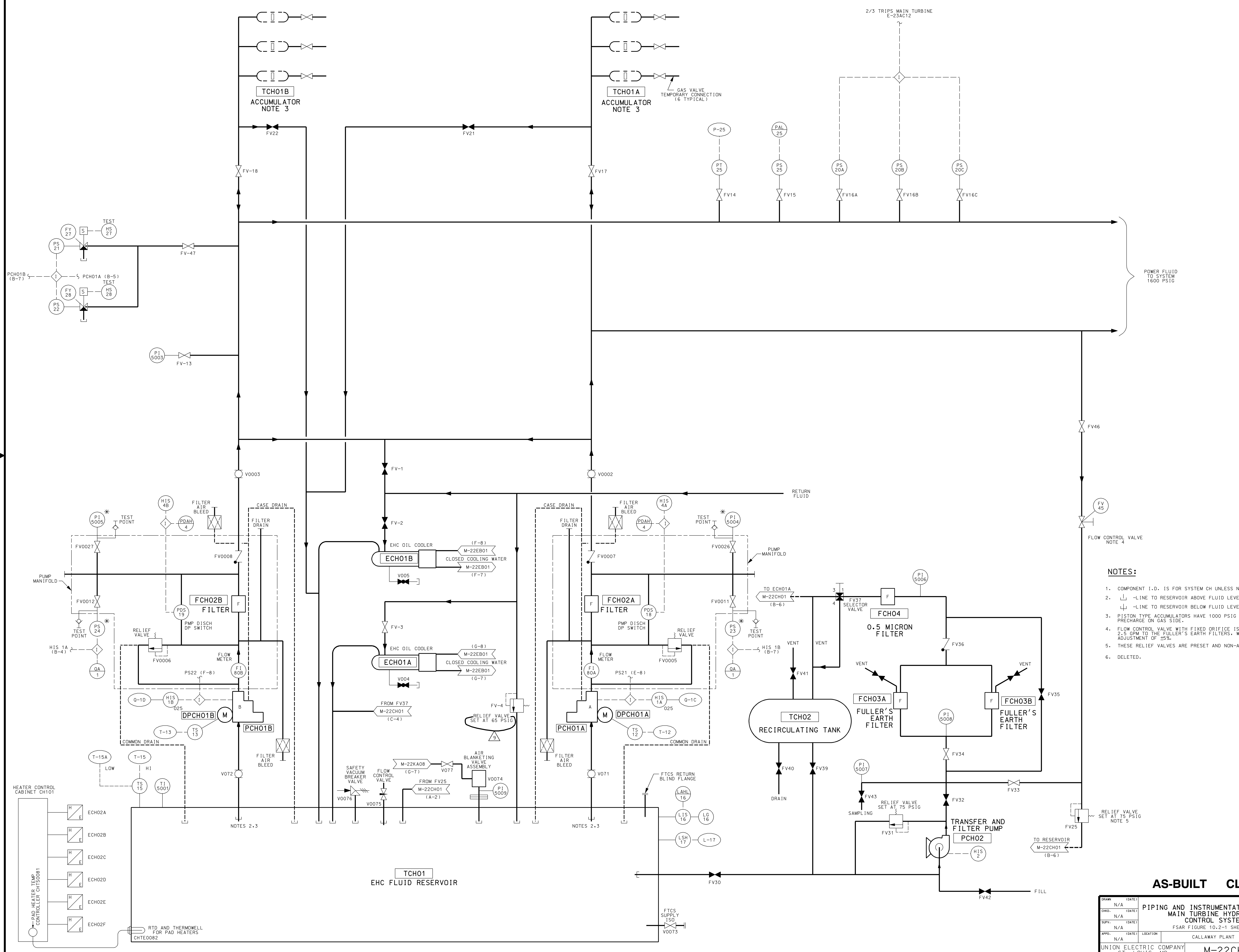
AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY			REV. 17
ST. LOUIS, MO			M-22CE01

FSAR FIGURE 10.2-1 SHEET 10

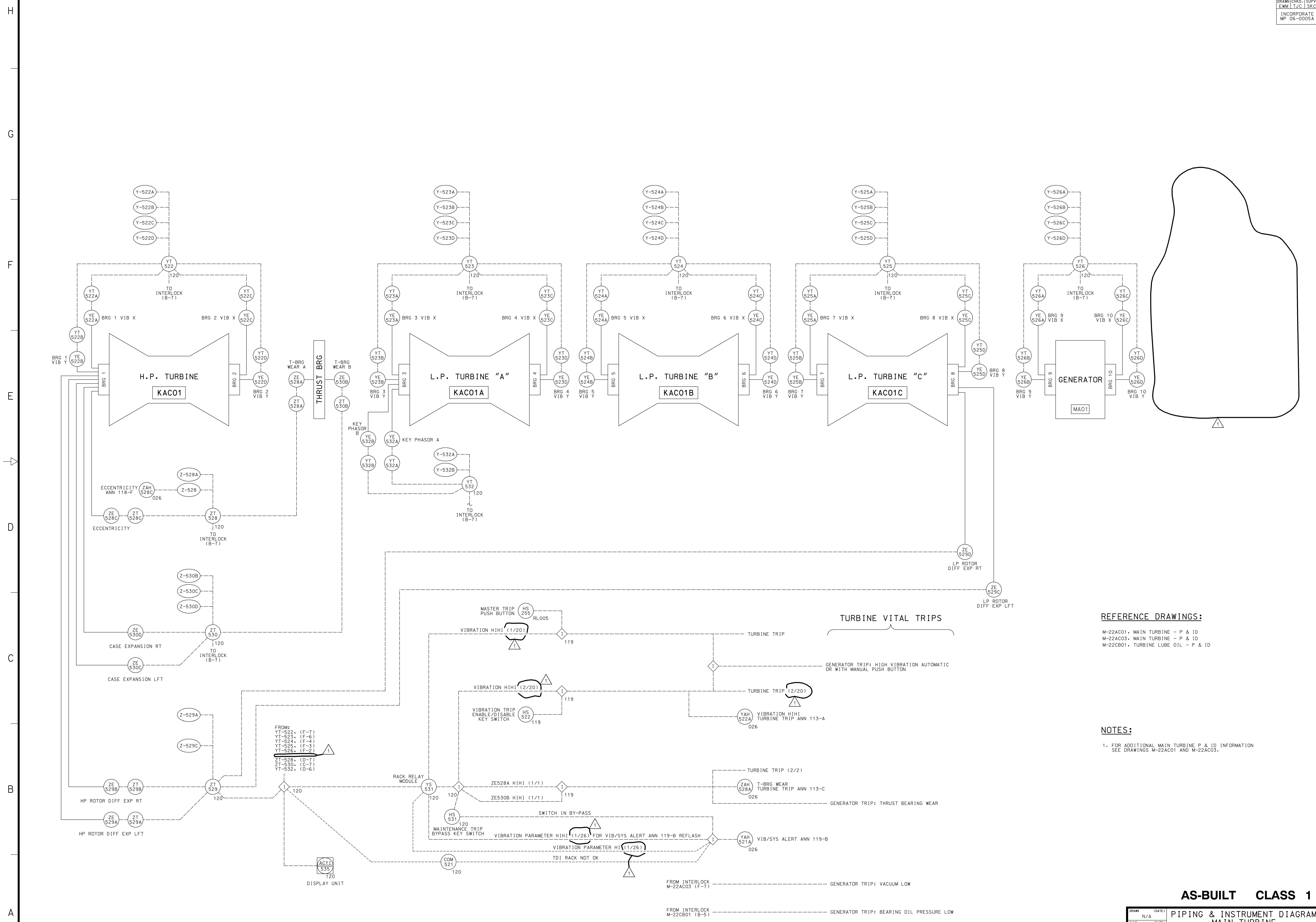
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.	LOCATION	CLASS
1	042798	DJB	RBF	TJM	N/A		
INITIAL ISSUE FOR RFR-13362B							
2	122398	SBR	JHC	N/A			
INCORP. RMP 94-2018.							
3	101786	MAL	JHK	AMR	N/A		
INCORP. EMP 93-3018A.							
4	022397	HLP	JHC	N/A			
INCORP. RFR-13477B							
5	021898	RBF	JHC	AMR	N/A		
INCORP. RFR-18490A							
6	022801	MAL	JHK	AMR	N/A		
INCORP. TCMF - MOD. TMO1-0003.							
7	040101	MAL	JHK	AMR	N/A		
INCORP. TCMF - MOD. TMO1-0003.							
8	051304	SKC	AMR	N/A			
INCORP. MP 98-2008A & REMOVED TMO1-0003.							
9	051304	SKC	AMR	N/A			
INCORP. MP 98-2008A & REMOVED TMO1-0003.							
10	110904	SKC	AMR	N/A			
INCORP. CAR 200400648							
11	110904	SKC	AMR	N/A			
INCORP. RFR 22941A.							
12	041106	SKC	AMR	N/A			
INCORP. AC 06-00047 CAR 200501105							
13	042107	SKC	AMR	N/A			
INCORP. MP 06-0005A							
14	091908	SKC	AMR	N/A			
INCORP. CAR 200808843							
15	121709	SKC	AMR	N/A			
INCORP. TM 09-0008.							
16	042610	SKC	AMR	N/A			
INCORP. TM 09-0008							
17	050110	SKC	AMR	N/A			
INCORP. MP 09-0041							

REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
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RFR-06939A.					
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
2	0319M	RBF	DJB	TJM	N/A
INCORP.					
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
3	0419M	MAL	RLW	JHK	N/A
INCORP.					
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
4	0607M	SKC	JHK	AMR	N/A
INCORP.					
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
5	0617M	SKC	JHK	AMR	N/A
INCORP.					
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
6	1105M	MAL	RLW	JHK	N/A
INCORP.					
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
7	1006M	MAL	RLW	JHK	N/A
INCORP.					
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
8	0502M	MAL	RLW	JHK	N/A
INCORP.					
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
9	0205M	MAL	RLW	JHK	N/A
INCORP.					
REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
10	0206M	MAL	RLW	JHK	N/A
INCORP.					



- NOTES:**
- COMPONENT I.D. IS FOR SYSTEM CH UNLESS NOTED OTHERWISE.
 - LINE TO RESERVOIR ABOVE FLUID LEVEL.
 - LINE TO RESERVOIR BELOW FLUID LEVEL.
 - PISTON TYPE ACCUMULATORS HAVE 1000 PSIG NITROGEN PRECHARGE ON GAS SIDE.
 - FLOW CONTROL VALVE WITH FIXED ORIFICE IS SET TO PROVIDE 2.5 GPM TO THE FULLER'S EARTH FILTERS, WITH FLOW ADJUSTMENT OF 35%.
 - THESE RELIEF VALVES ARE PRESET AND NON-ADJUSTABLE.
 - DELETED.

AS-BUILT CLASS 1	
DRAWING TITLE: PIPING AND INSTRUMENTATION DIAGRAM MAIN TURBINE HYDRAULIC CONTROL SYSTEM	
SHEET NO: FSAR FIGURE 10.2-1 SHEET 11	
UNION ELECTRIC COMPANY	ST. LOUIS, MO
PROJECT: CALLAWAY PLANT	CLASS: M-22CH01
REV. 9	



REFERENCE DRAWINGS:

- M-22AC01, MAIN TURBINE - P & ID
- M-22AC03, MAIN TURBINE - P & ID
- M-22CB01, TURBINE LUBE OIL - P & ID

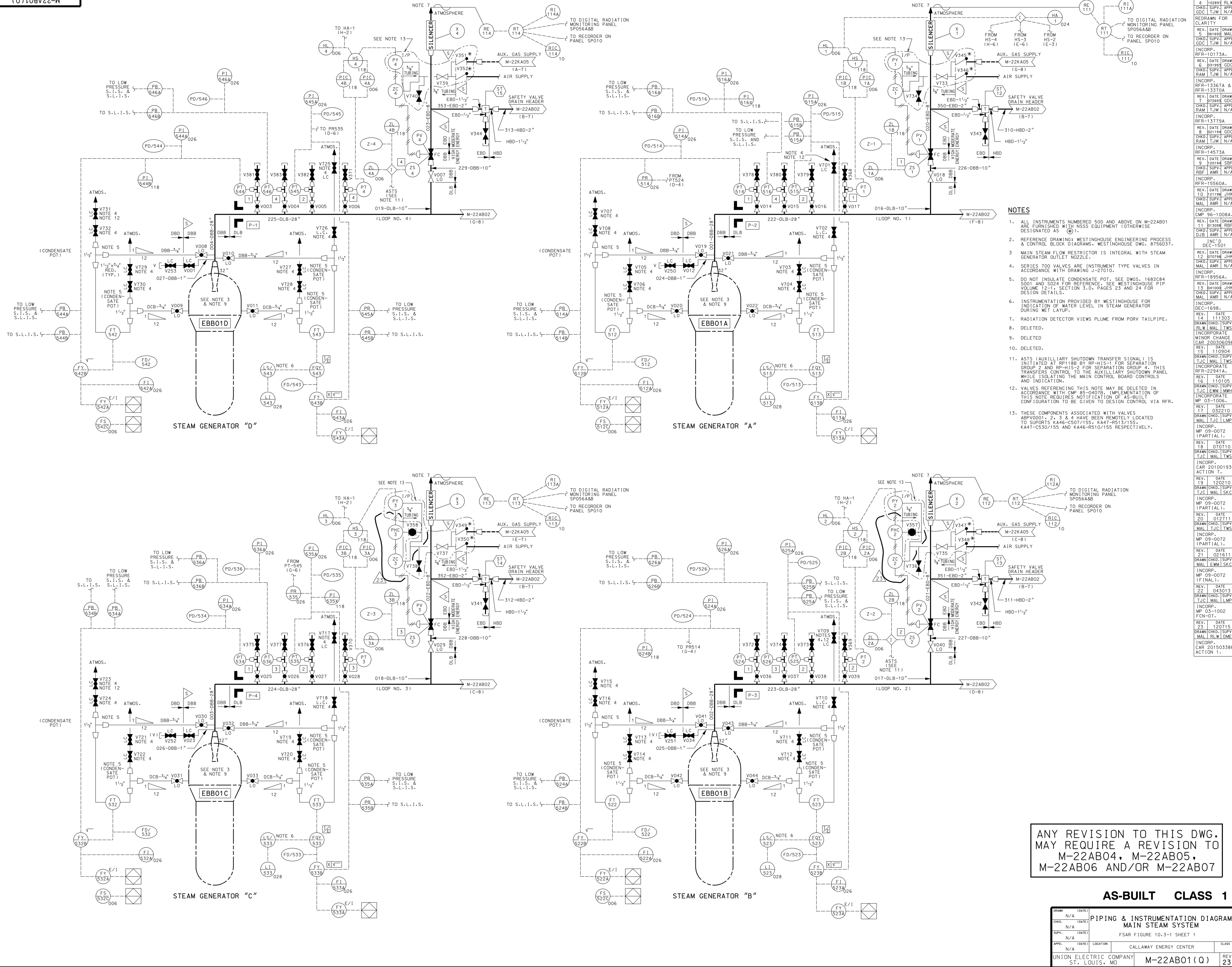
NOTES:

- 1. FOR ADDITIONAL MAIN TURBINE P & ID INFORMATION SEE DRAWINGS M-22AC01 AND M-22AC03.

AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY			REV. 1
ST. LOUIS, MO			M-22AC05

PIPING & INSTRUMENT DIAGRAM
 MAIN TURBINE
 VIBRATION MONITORING
 FSAR FIGURE 10.2-1 SHEET 12



- NOTES**
- ALL INSTRUMENTS NUMBERED 500 AND ABOVE ON M-22AB01 ARE FURNISHED WITH NSSS EQUIPMENT (OTHERWISE DESIGNATED AS (E)).
 - REFERENCE DRAWING: WESTINGHOUSE ENGINEERING PROCESS & CONTROL BLOCK DIAGRAMS, WESTINGHOUSE DWG. 8796037.
 - MAIN STEAM FLOW RESTRICTOR IS INTEGRAL WITH STEAM GENERATOR OUTLET NOZZLE.
 - SERIES 700 VALVES ARE INSTRUMENT TYPE VALVES IN ACCORDANCE WITH DRAWING J-27610.
 - DO NOT INSULATE CONDENSATE POT. SEE DWGS. 1682C84 S001 AND S024 FOR REFERENCE. SEE WESTINGHOUSE PIP VOL. 12-1, SECTION 3.0, PAGES 23 AND 24 FOR DESIGN DETAILS.
 - INSTRUMENTATION PROVIDED BY WESTINGHOUSE FOR INDICATION OF WATER LEVEL IN STEAM GENERATOR DURING WET LAYOUT.
 - RADIATION DETECTOR VIEWS PLUME FROM PORV TAILPIPE.
 - DELETED.
 - DELETED.
 - DELETED.
 - ASTS (AUXILIARY SHUTDOWN TRANSFER SIGNAL) IS INITIATED AT RP118B BY RP-HIS-1 FOR SEPARATION GROUP 2 AND RP-HIS-2 FOR SEPARATION GROUP 4. THIS TRANSFERS CONTROL TO THE AUXILIARY SHUTDOWN PANEL WHILE ISOLATING THE MAIN CONTROL BOARD CONTROLS AND INDICATION.
 - VALVES REFERENCING THIS NOTE MAY BE DELETED IN ACCORDANCE WITH CWP 85-0407B. IMPLEMENTATION OF THIS NOTE REQUIRES NOTIFICATION OF AS-BUILT CONFIGURATION TO BE GIVEN TO DESIGN CONTROL VIA RFR.
 - THESE COMPONENTS ASSOCIATED WITH VALVES ABP0001, 2, 3 AND 4 HAVE BEEN REMOTELY LOCATED TO SUPPORTS KA46-C507/155, KA47-R513/155, KA47-C530/155 AND KA46-R510/155 RESPECTIVELY.

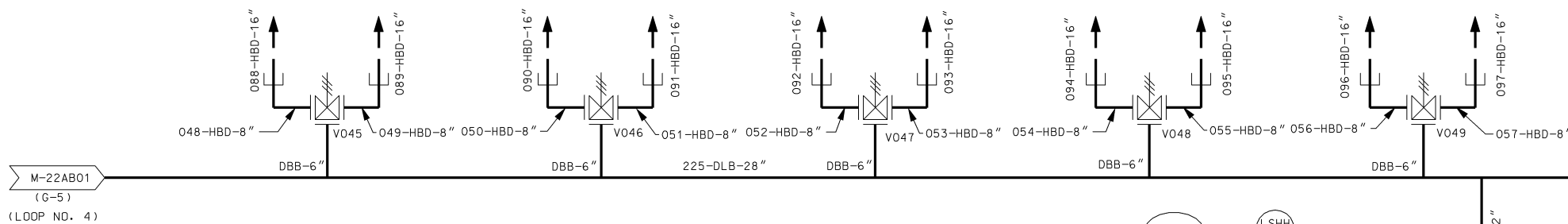
ANY REVISION TO THIS DWG. MAY REQUIRE A REVISION TO M-22AB04, M-22AB05, M-22AB06 AND/OR M-22AB07

AS-BUILT CLASS 1

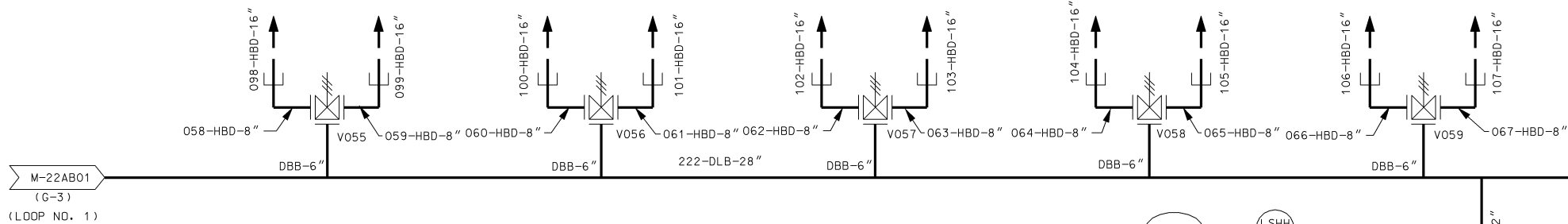
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BY	WJ	APP.	WJ
CHECKED	WJ	DATE	10/27/10
SUPV.	WJ	LOCATION	CALLAWAY ENERGY CENTER
APP.	WJ	CLASS	CLASS 1
UNION ELECTRIC COMPANY		M-22AB01(Q)	
ST. LOUIS, MO		REV. 23	

REV. DATE DRAWN
 1 10/27/10 WJ
 2 11/11/10 WJ
 3 01/14/11 WJ
 4 02/17/11 WJ
 5 06/18/12 MAL
 6 03/19/13 GDC
 7 07/28/13 GDC
 8 02/11/14 GDC
 9 12/01/14 SRB
 10 08/01/15 JHK
 11 01/09/16 JHK
 12 03/22/16 JHK
 13 04/08/16 JHK
 14 11/03/16 JHK
 15 11/09/16 JHK
 16 11/01/16 JHK
 17 03/22/16 JHK
 18 07/07/10 JHK
 19 02/21/10 JHK
 20 01/27/11 JHK
 21 02/16/11 JHK
 22 04/01/13 JHK
 23 12/07/15 JHK

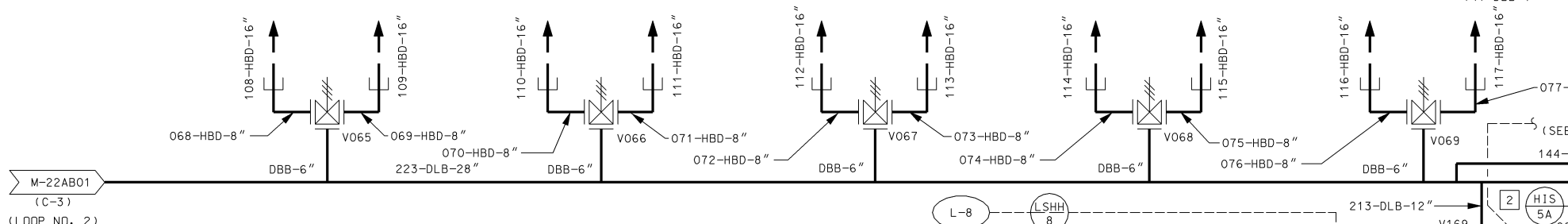
SPRING LOADED SAFETY VALVES



SPRING LOADED SAFETY VALVES



SPRING LOADED SAFETY VALVES



SPRING LOADED SAFETY VALVES

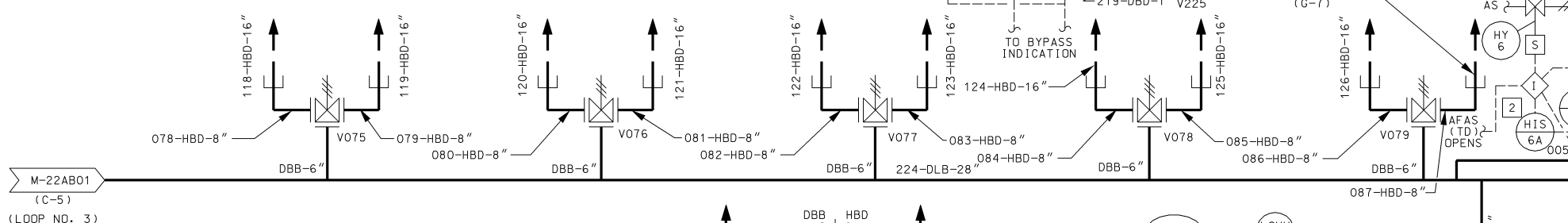
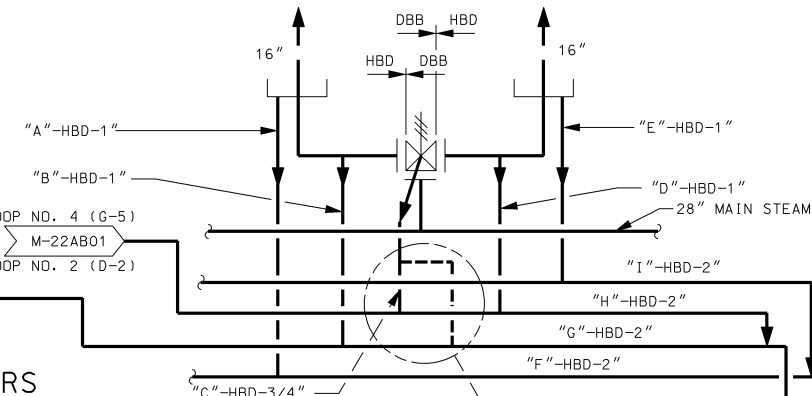
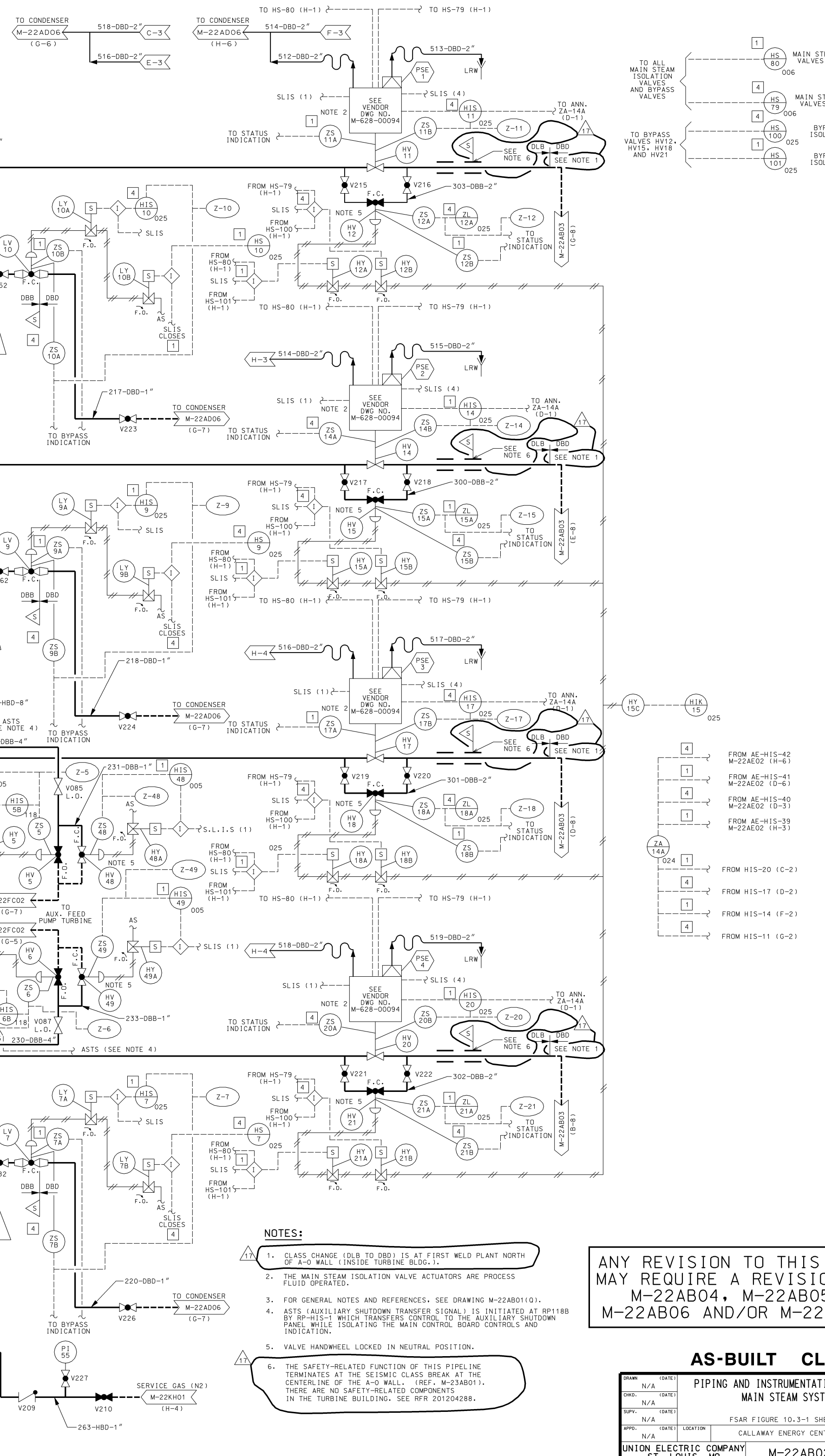
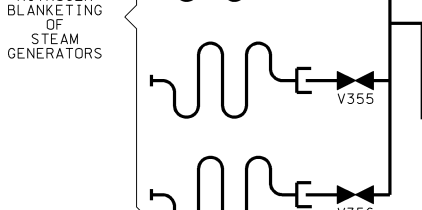


TABLE FOR LINE NUMBERS

Table with columns for Description (A-I) and Safety Valve Numbers (V045-V079). It provides a mapping between the letter designations and the specific valve IDs.



TYPICAL FOR EACH SAFETY VALVE ARRANGEMENT

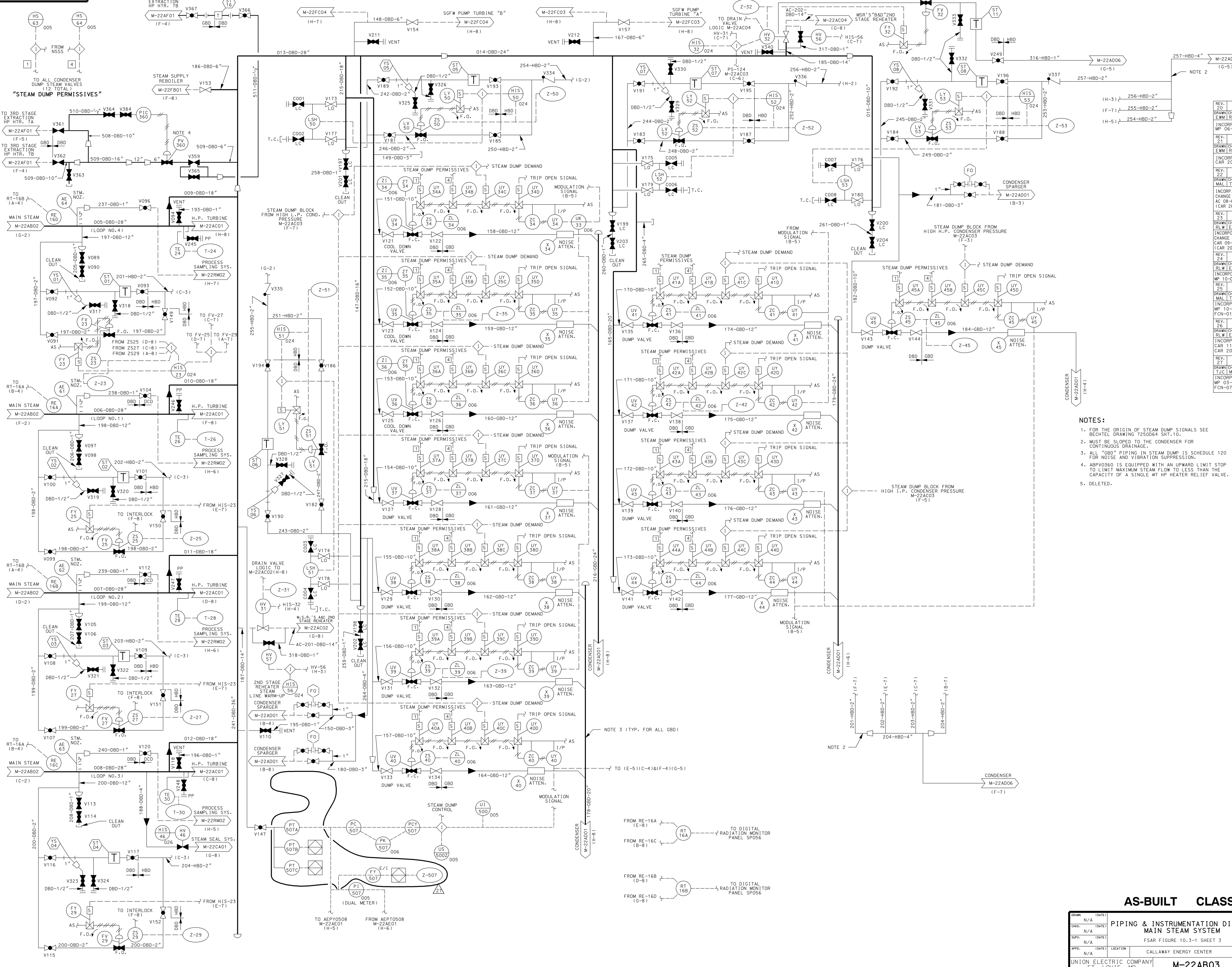


- NOTES:
1. CLASS CHANGE (DLB TO DBD) IS AT FIRST WELD PLANT NORTH OF A-O WALL...
2. THE MAIN STEAM ISOLATION VALVE ACTUATORS ARE PROCESS FLUID OPERATED.
3. FOR GENERAL NOTES AND REFERENCES, SEE DRAWING M-22AB01(D).
4. ASTS (AUXILIARY SHUTDOWN TRANSFER SIGNAL) IS INITIATED AT RP118B...
5. VALVE HANDWHEEL LOCKED IN NEUTRAL POSITION.
6. THE SAFETY-RELATED FUNCTION OF THIS PIPELINE TERMINATES AT THE SEISMIC CLASS BREAK AT THE CENTERLINE OF THE A-O WALL...

ANY REVISION TO THIS DWG. MAY REQUIRE A REVISION TO M-22AB04, M-22AB05, M-22AB06 AND/OR M-22AB07

AS-BUILT CLASS 1 PIPING AND INSTRUMENTATION DIAGRAM MAIN STEAM SYSTEM. Includes drawing information, revision history, and project details like 'FSAR FIGURE 10.3-1 SHEET 2' and 'UNION ELECTRIC COMPANY ST. LOUIS, MO'.

Vertical text on the right edge containing drawing numbers, revision dates, and names of the drawing office and project.



REV.	DATE	DESCRIPTION
20	05/10/06	INCORPORATE SUPV. EWM RLW TWS
21	05/05/07	INCORPORATE SUPV. MAL RLW TWS
22	10/01/08	INCORPORATE SUPV. MAL TJC TWS
23	07/22/09	INCORPORATE SUPV. MAL TJC TWS
24	05/28/10	INCORPORATE SUPV. MAL TJC TWS
25	11/30/11	INCORPORATE SUPV. MAL TJC TWS
26	12/09/11	INCORPORATE SUPV. MAL TJC TWS
27	04/30/13	INCORPORATE SUPV. MAL TJC TWS
28	03/10/13	INCORPORATE SUPV. MAL TJC TWS
29	03/10/13	INCORPORATE SUPV. MAL TJC TWS
30	03/10/13	INCORPORATE SUPV. MAL TJC TWS

- NOTES:**
- FOR THE ORIGIN OF STEAM DUMP SIGNALS SEE BECHTEL DRAWING 725064 SHT.10.
 - MUST BE SLOPED TO THE CONDENSER FOR CONTINUOUS DRAINAGE.
 - ALL "GBO" PIPING IN STEAM DUMP IS SCHEDULE 120 FOR NOISE AND VIBRATION SUPPRESSION.
 - ABPV0360 IS EQUIPPED WITH AN UPWARD LIMIT STOP TO LIMIT MAXIMUM STEAM FLOW TO LESS THAN THE CAPACITY OF A SINGLE #7 HP HEATER RELIEF VALVE.
 - DELETED.

AS-BUILT CLASS 1

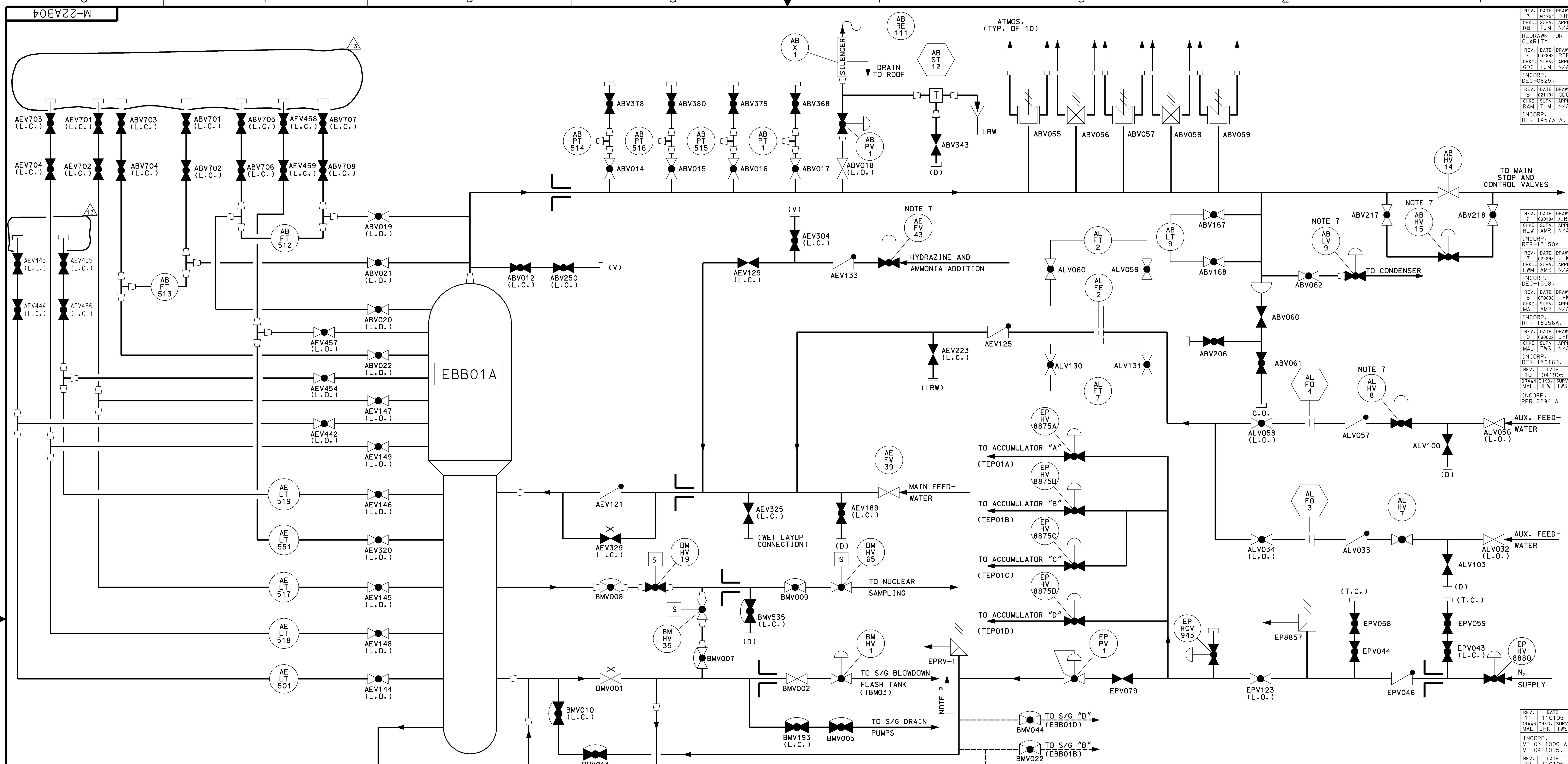
DRWN	N/A	(DATE)	PIPING & INSTRUMENTATION DIAGRAM MAIN STEAM SYSTEM FSAR FIGURE 10.3-1 SHEET 3
CHKD	N/A	(DATE)	
SUPV	N/A	(DATE)	
APPD	N/A	(DATE)	
CLASS	N/A	(DATE)	

CALLAWAY ENERGY CENTER

UNION ELECTRIC COMPANY
ST. LOUIS, MO

M-22AB03

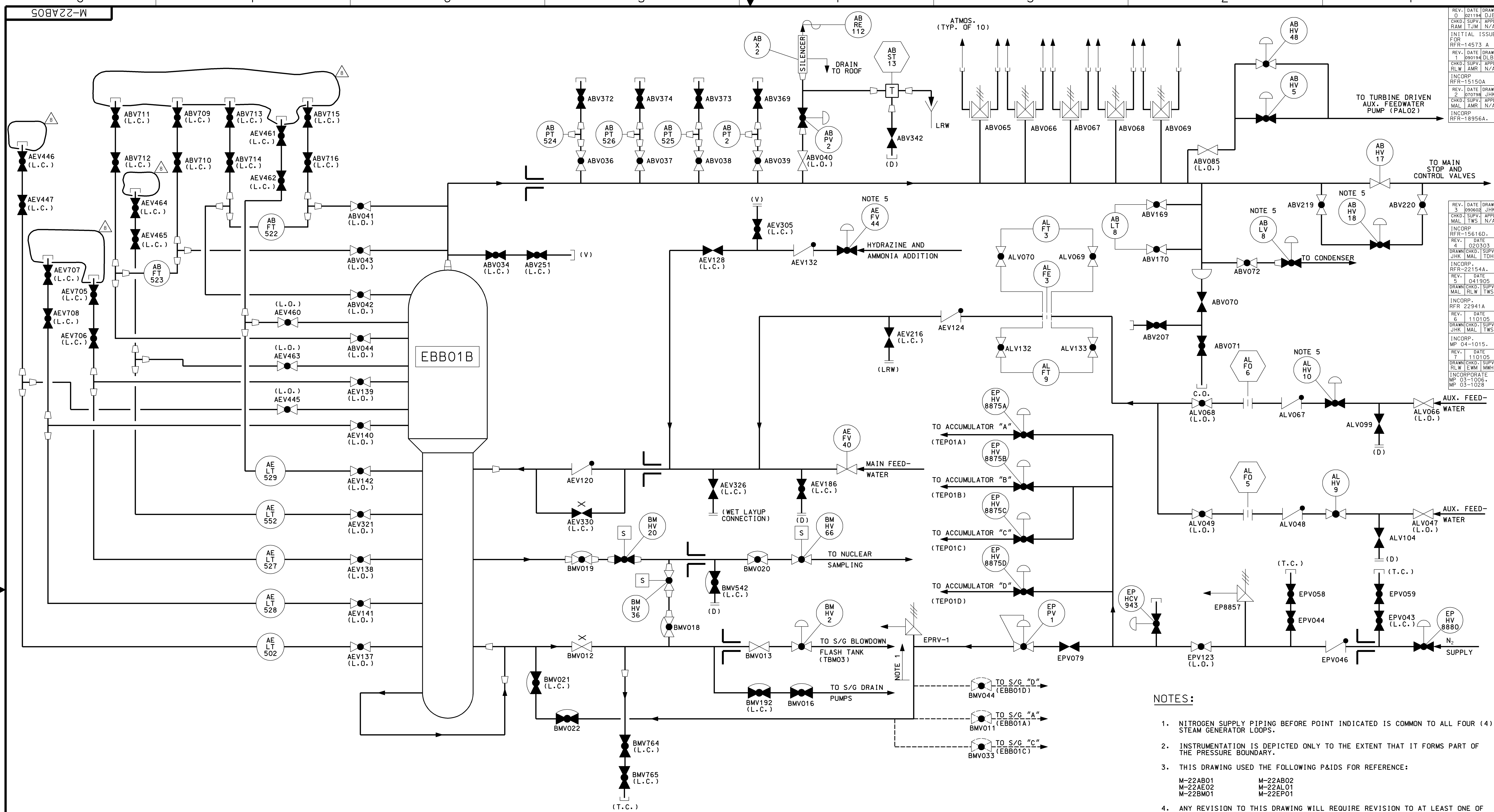
REV. 27



- NOTES:**
- DELETED.
 - NITROGEN SUPPLY PIPING BEFORE POINT INDICATED IS COMMON TO ALL FOUR (4) STEAM GENERATOR LOADPS.
 - DELETED.
 - INSTRUMENTATION IS DEPICTED ONLY TO THE EXTENT THAT IT FORMS PART OF THE PRESSURE BOUNDARY.
 - THIS DRAWING USED THE FOLLOWING P&IDS FOR REFERENCE:
 M-22AB01 M-22AB02
 M-22AE02 M-22AL01
 M-22BM01 M-22EP01
 - ANY REVISION TO THIS DRAWING WILL REQUIRE REVISION TO AT LEAST ONE OF THE DRAWINGS REFERENCED IN NOTE 5.
 - VALVE HANDWHEEL LOCKED IN NEUTRAL POSITION.

AS-BUILT CLASS 1

DRAWN	N/A	DATE		STEAM GENERATORS SECONDARY SIDE COMPOSITE LOOP 1	
CHKD.	N/A	DATE		FSAR FIGURE 10.3-1 SHEET 4	
SUPV.	N/A	DATE		CALLAWAY PLANT	
APPD.	N/A	DATE		LOCATION	CLASS
UNION ELECTRIC COMPANY ST. LOUIS, MO				M-22AB04	REV. 13



- NOTES:**
1. NITROGEN SUPPLY PIPING BEFORE POINT INDICATED IS COMMON TO ALL FOUR (4) STEAM GENERATOR LOOPS.
 2. INSTRUMENTATION IS DEPICTED ONLY TO THE EXTENT THAT IT FORMS PART OF THE PRESSURE BOUNDARY.
 3. THIS DRAWING USED THE FOLLOWING P&IDS FOR REFERENCE:
M-22AB01 M-22AB02
M-22AE02 M-22AL01
M-22BM01 M-22EPO1
 4. ANY REVISION TO THIS DRAWING WILL REQUIRE REVISION TO AT LEAST ONE OF THE DRAWINGS REFERENCED IN NOTE 3.
 5. VALVE HANDWHEEL LOCKED IN NEUTRAL POSITION.

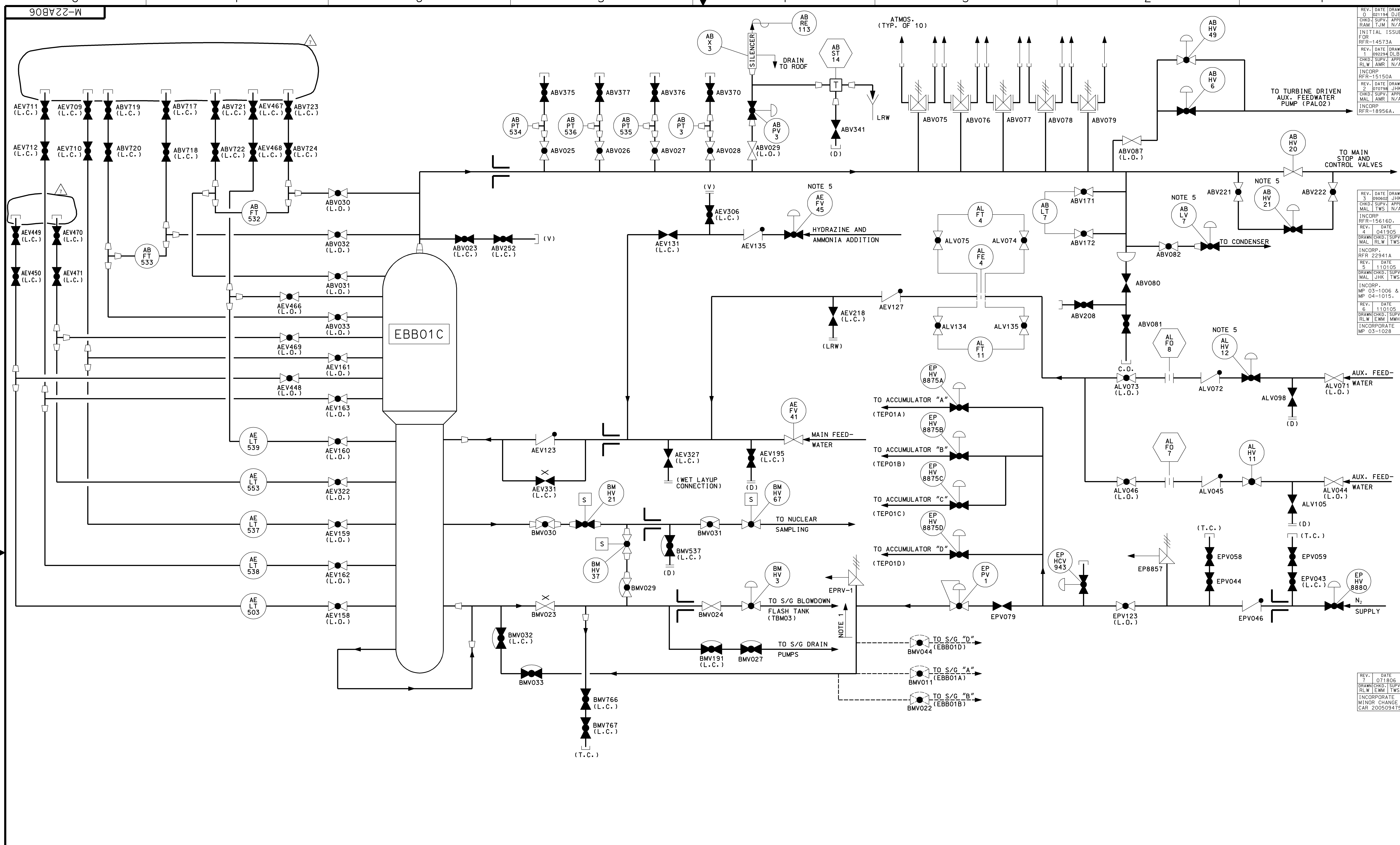
REV. DATE DRAWN
0 02/19/84 DJS
CHKD: SUPV: APPR:
RAM TJM N/A
INITIAL ISSUE
REFR-14573 A
REV. DATE DRAWN
1 09/01/84 DLB
CHKD: SUPV: APPR:
RLW AMR N/A
INCORP:
REFR-15150A
REV. DATE DRAWN
2 07/07/86 JHK
CHKD: SUPV: APPR:
MAL AMR N/A
INCORP:
REFR-18956A.

REV. DATE DRAWN
3 09/06/86 JHK
CHKD: SUPV: APPR:
MAL TWS N/A
INCORP:
REFR-15616D.
REV. DATE DRAWN
4 02/03/83
DRAWN:CHKD: SUPV:
JHK MAL TDH
INCORP:
REFR-15616D.
REV. DATE DRAWN
5 04/19/85
DRAWN:CHKD: SUPV:
MAL RLW TWS
INCORP:
REFR-22941A
REV. DATE DRAWN
6 11/01/85
DRAWN:CHKD: SUPV:
JHK MAL TWS
INCORP:
MP 04-1015.
REV. DATE DRAWN
7 11/01/85
DRAWN:CHKD: SUPV:
RLW EWM MMH
INCORPORATE
MP 03-1006,
MP 03-1028

REV. DATE DRAWN
8 07/18/86
DRAWN:CHKD: SUPV:
RLW EWM TWS
INCORPORATE
MINOR CHANGE
CAR 200509475

AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD:	N/A	DATE	
SUPV:	N/A	DATE	
APPD:	N/A	DATE	
UNION ELECTRIC COMPANY		ST. LOUIS, MO	
STEAM GENERATORS SECONDARY SIDE COMPOSITE LOOP 2		FSAR FIGURE 10.3-1 SHEET 5	CLASS
CALLAWAY PLANT			
M-22AB05			REV. 8



REV. DATE DRAWN
 1 02/19/84 DJB
 CHKD: SUPV: APPR:
 RAM TJM N/A
 INITIAL ISSUE
 RFR-14573A
 REV. DATE DRAWN
 2 07/07/86 JHK
 CHKD: SUPV: APPR:
 RLW EMM TWS
 INCORP: MINOR CHANGE
 MAL AMR N/A
 RFR-15150A
 INCORP: MINOR CHANGE
 MAL AMR N/A
 RFR-18956A.

REV. DATE DRAWN
 3 09/02/86 JHK
 CHKD: SUPV: APPR:
 MAL TWS N/A
 INCORP: MINOR CHANGE
 MAL TWS N/A
 RFR-15616D
 REV. DATE DRAWN
 4 04/19/85
 DRAWN: CHKD: SUPV:
 RLW EMM TWS
 INCORP: MINOR CHANGE
 MAL JHK TWS
 RFR-22941A
 REV. DATE DRAWN
 5 11/01/85
 DRAWN: CHKD: SUPV:
 MAL JHK TWS
 INCORP: MINOR CHANGE
 MAL JHK TWS
 RFR-03-1006 &
 MP 04-1015.
 REV. DATE DRAWN
 6 11/01/85
 DRAWN: CHKD: SUPV:
 RLW EMM TWS
 INCORP: MINOR CHANGE
 MAL JHK TWS
 RFR-03-1028

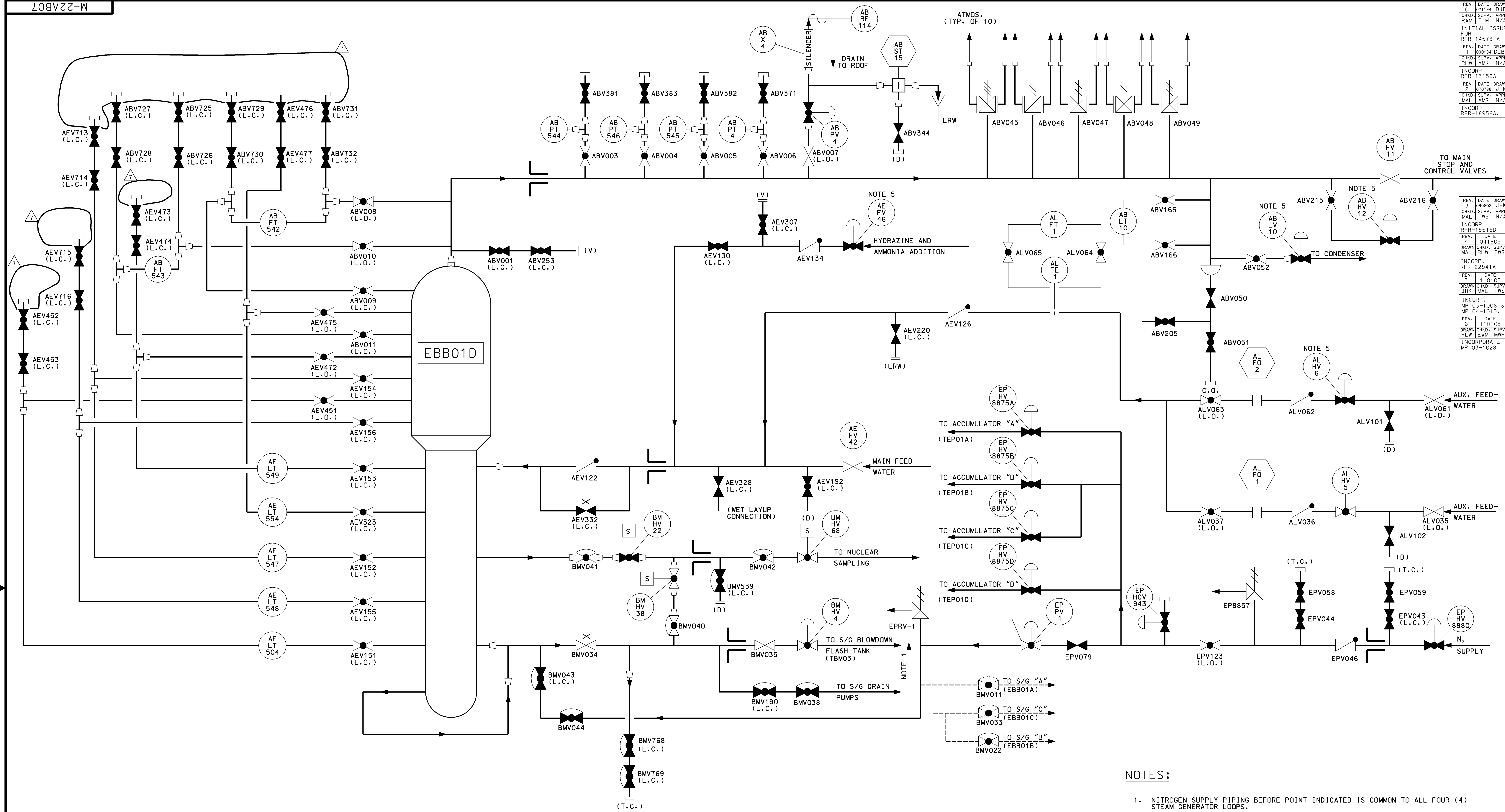
REV. DATE DRAWN
 7 07/18/86
 DRAWN: CHKD: SUPV:
 RLW EMM TWS
 INCORP: MINOR CHANGE
 MAL JHK TWS
 CAR-200509475

- NOTES:**
1. NITROGEN SUPPLY PIPING BEFORE POINT INDICATED IS COMMON TO ALL FOUR (4) STEAM GENERATOR LOOPS.
 2. INSTRUMENTATION IS DEPICTED ONLY TO THE EXTENT THAT IT FORMS PART OF THE PRESSURE BOUNDARY.
 3. THIS DRAWING USED THE FOLLOWING P&IDS FOR REFERENCE:
 M-22AB01 M-22AB02
 M-22AE02 M-22AL01
 M-22BM01 M-22EP01
 4. ANY REVISION TO THIS DRAWING WILL REQUIRE REVISION TO AT LEAST ONE OF THE DRAWINGS REFERENCED IN NOTE 3.
 5. VALVE HANDWHEEL LOCKED IN NEUTRAL POSITION.

AS-BUILT CLASS 1

DRAWN (DATE):		STEAM GENERATORS	
N/A (N/A)		SECONDARY SIDE	
CHKD: (DATE):		COMPOSITE	
N/A (N/A)		LOOP 3	
SUPV: (DATE):		FSAR FIGURE 10.3-1 SHEET 6	
N/A (N/A)		CLASS	
APPD: (DATE):		LOCATION	
N/A (N/A)		CALLAWAY PLANT	
UNION ELECTRIC COMPANY		M-22AB06	
ST. LOUIS, MO		REV. 7	

REV.	DATE	DRAWN
1	02/19/84	DJS
CHKD.	SUPV.	APPR.
RAM	TJM	N/A
INITIAL ISSUE		
REV.	DATE	DRAWN
2	09/14/84	DLB
CHKD.	SUPV.	APPR.
RLW	AMR	N/A
INCORP.		
REV.	DATE	DRAWN
3	07/29/84	JHK
CHKD.	SUPV.	APPR.
MAL	AMR	N/A
INCORP.		
REV.	DATE	DRAWN
4	04/19/85	DJS
CHKD.	SUPV.	APPR.
RLW	AMR	N/A
INCORP.		
REV.	DATE	DRAWN
5	11/01/85	JHK
CHKD.	SUPV.	APPR.
MAL	AMR	N/A
INCORP.		
REV.	DATE	DRAWN
6	11/01/85	JHK
CHKD.	SUPV.	APPR.
MAL	AMR	N/A
INCORP.		
REV.	DATE	DRAWN
7	03-10-86	JHK
CHKD.	SUPV.	APPR.
RLW	AMR	N/A
INCORP.		
REV.	DATE	DRAWN
8	04-10-86	JHK
CHKD.	SUPV.	APPR.
RLW	AMR	N/A
INCORP.		



NOTES:

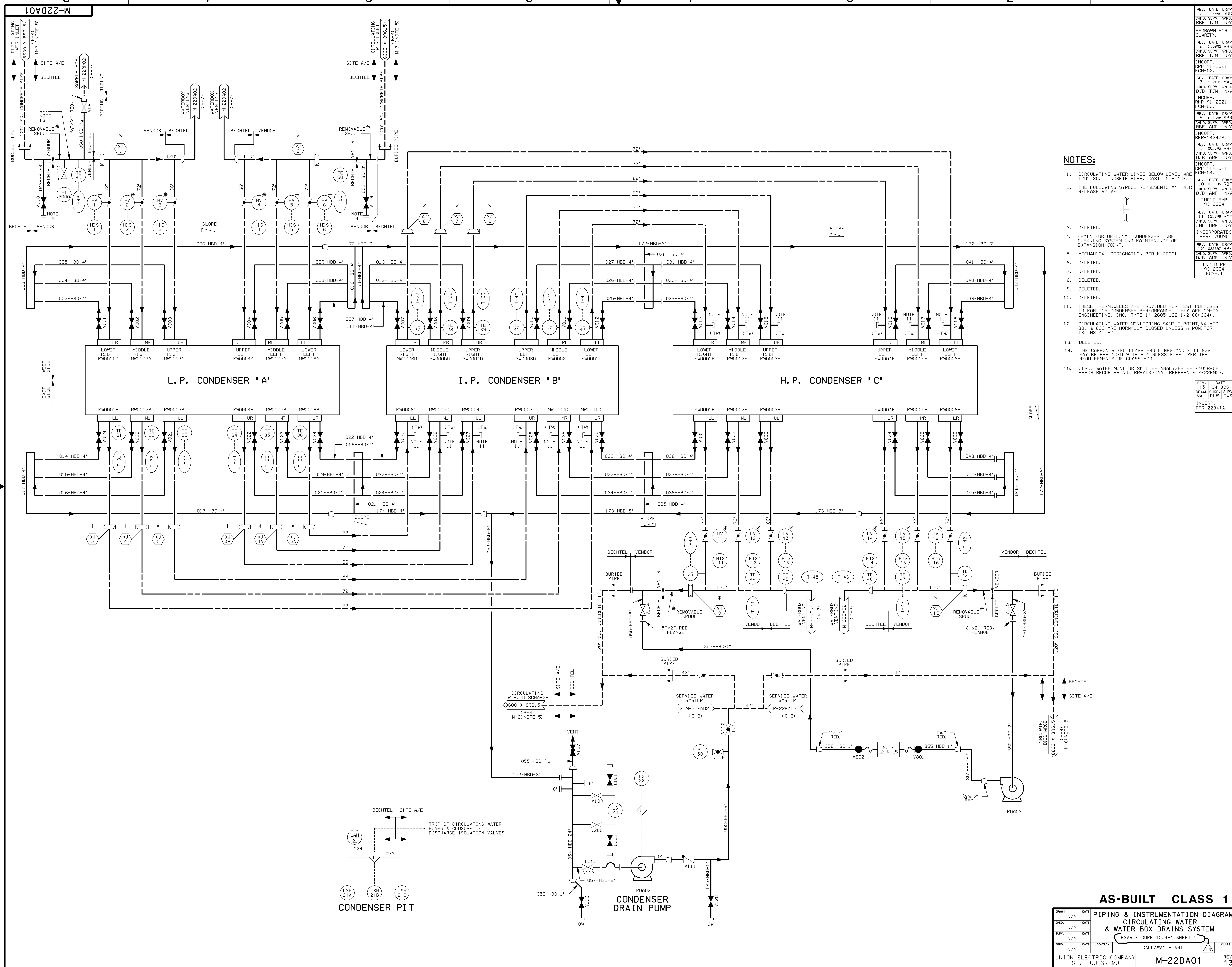
1. NITROGEN SUPPLY PIPING BEFORE POINT INDICATED IS COMMON TO ALL FOUR (4) STEAM GENERATOR LOOPS.
2. INSTRUMENTATION IS DEPICTED ONLY TO THE EXTENT THAT IT FORMS PART OF THE PRESSURE BOUNDARY.
3. THIS DRAWING USED THE FOLLOWING P&IDs FOR REFERENCE:
M-22AB01 M-22AB02
M-22AE02 M-22AL01
M-22BM01 M-22EP01
4. ANY REVISION TO THIS DRAWING WILL REQUIRE REVISION TO AT LEAST ONE OF THE DRAWINGS REFERENCED IN NOTE 3.
5. VALVE HANDWHEEL LOCKED IN NEUTRAL POSITION.

REV.	DATE	DRAWN
1	07/18/86	JHK
CHKD.	SUPV.	APPR.
RLW	AMR	N/A
INCORPORATE		
MINOR CHANGE		
CAR 200809475		

AS-BUILT CLASS 1

DRAWN		DATE		CLASS	
N/A					
CHKD.		DATE		CLASS	
N/A					
SUPV.		DATE		CLASS	
N/A					
APPR.		DATE		CLASS	
N/A					
UNION ELECTRIC COMPANY		ST. LOUIS, MO		REV. 7	
M-22AB07					

STEAM GENERATORS
SECONDARY SIDE
COMPOSITE
LOOP 4
FSAR FIGURE 10.3-1 SHEET 7



- NOTES:**
1. CIRCULATING WATER LINES BELOW LEVEL ARE 120" SQ. CONCRETE PIPE, CAST IN PLACE.
 2. THE FOLLOWING SYMBOL REPRESENTS AN AIR RELEASE VALVE:
 3. DELETED.
 4. DRAIN FOR OPTIONAL CONDENSER TUBE CLEANING SYSTEM AND MAINTENANCE OF EXPANSION JOINT.
 5. MECHANICAL DESIGNATION PER M-22G01.
 6. DELETED.
 7. DELETED.
 8. DELETED.
 9. DELETED.
 10. DELETED.
 11. THESE THERMOWELLS ARE PROVIDED FOR TEST PURPOSES TO MONITOR CONDENSER PERFORMANCE. THEY ARE OMEGA ENGINEERING, INC. TYPE 1"-2605 U22 1/2-CC304).
 12. CIRCULATING WATER MONITORING SAMPLE POINT VALVES 801 & 802 ARE NORMALLY CLOSED UNLESS A MONITOR IS INSTALLED.
 13. DELETED.
 14. THE CARBON STEEL CLASS HBD LINES AND FITTINGS MAY BE REPLACED WITH STAINLESS STEEL PER THE REQUIREMENTS OF CLASS HCD.
 15. CIRC. WATER MONITOR SKID PH ANALYZER PHL-4016-GH FEEDS RECORDER NO. RM-AK20AA, REFERENCE M-22RM03.

AS-BUILT CLASS 1

PIPING & INSTRUMENTATION DIAGRAM
CIRCULATING WATER
& WATER BOX DRAINS SYSTEM

ES&R FIGURE 10.4-1 SHEET 1

CALLAWAY PLANT

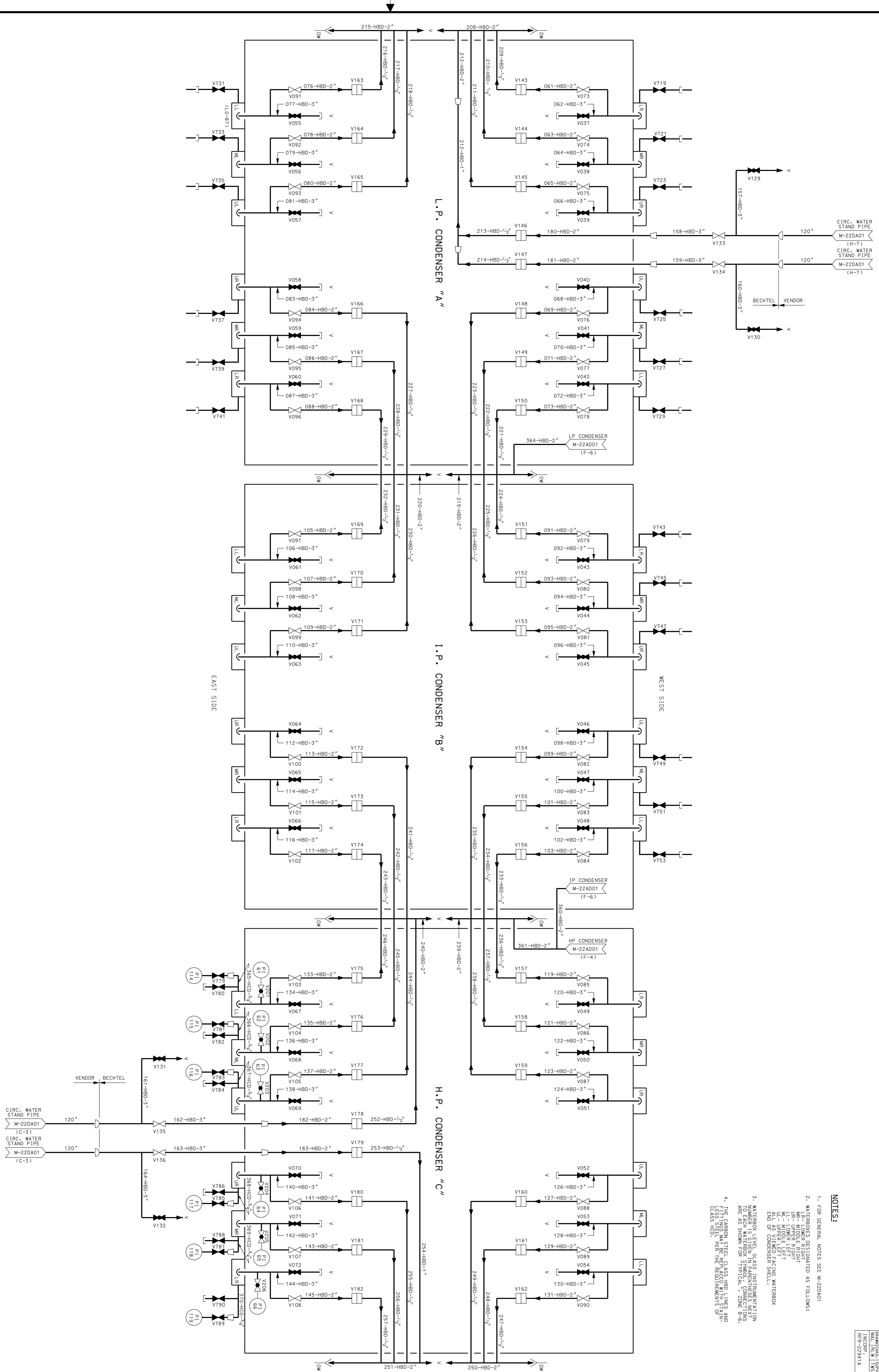
UNION ELECTRIC COMPANY
ST. LOUIS, MO

M-22DA01

REV. 13

REV.	DATE	DRAWN	CHKD.	APP'D.	INCORP.
1	08/21/01	ODC	RBF	TJM	N/A
2	11/06/02	SR	RBF	TJM	N/A
3	01-2021	FCN-02			
4	12/21/03	MAL			
5	01-2021	FCN-03			
6	02/19/03	SR	RBF	JMK	N/A
7	05/19/03	RBF			
8	01-2021	FCN-04			
9	01-2021	FCN-05			
10	01-2021	FCN-06			
11	01-2021	FCN-07			
12	02/28/07	RBF			
13	03-2034	FCN-01			
14	04/19/05				
15	04/19/05				

Figure 10.4-1 (Sheet 2) Deleted



- NOTES:**
- FOR GENERAL NOTES SEE M-22DA01
 - WATERBOXES DESIGNATED AS FOLLOWS:
 MB - MIDDLE RIGHT
 ML - MIDDLE LEFT
 UB - UPPER RIGHT
 UL - UPPER LEFT
 LB - LOWER RIGHT
 LL - LOWER LEFT
 ALL AS VENDED / AGING WATERBOX
 END OF CONDENSER SHELL.
 - WATERBOX LEVEL CLASS INSTRUMENTATION NUMBER IS GIVEN IN PARENTHESES NEXT TO THE INSTRUMENT SYMBOL. CONDENSER ARE AS VENDED FOR SHOWN.
 - THE CARBON STEEL CLASS HBD LINES AND LESS STEEL PER THE REQUIREMENTS OF CLASS HBD.

AS-BUILT CLASS 1

PIPING AND INSTRUMENTATION DIAGRAM

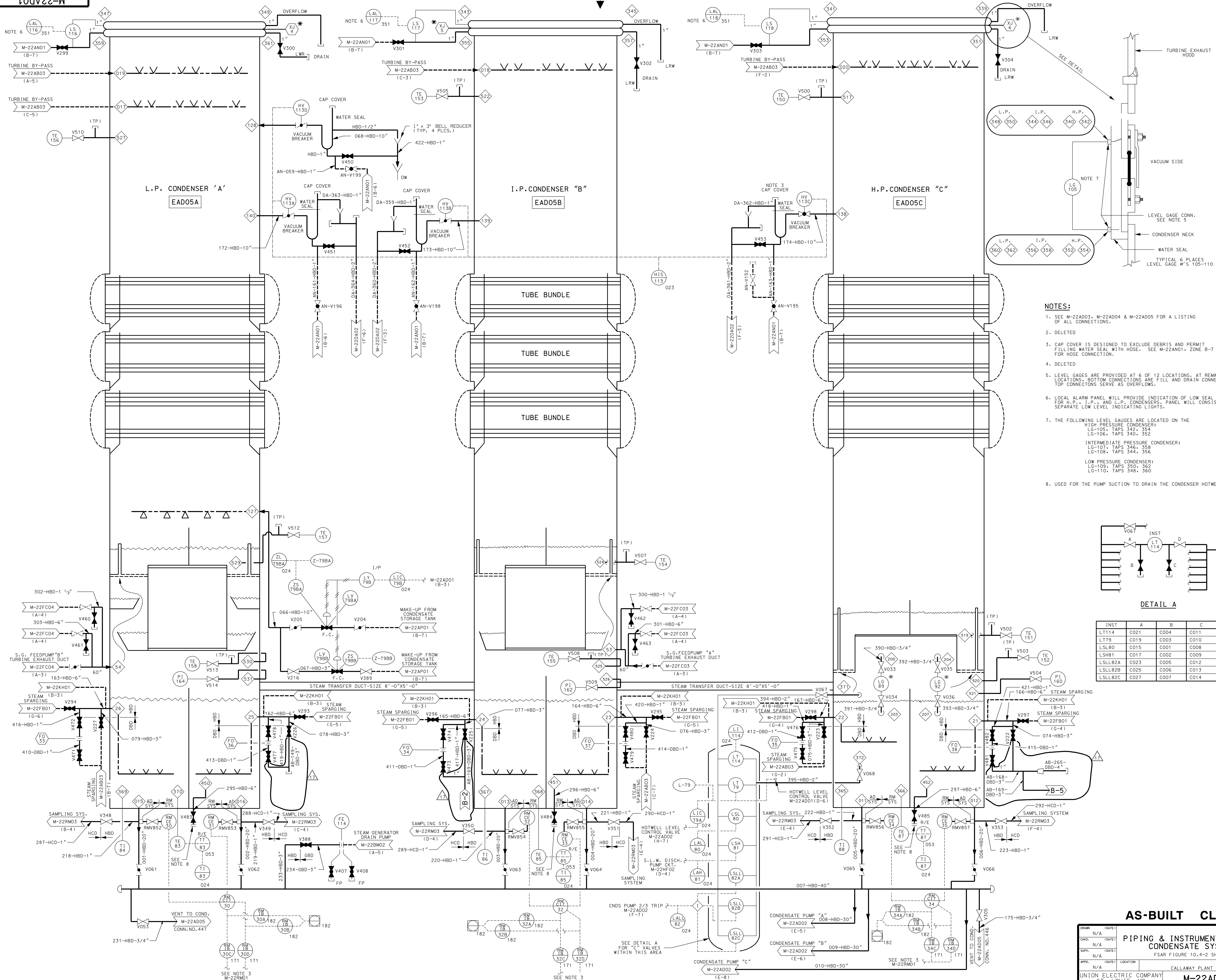
WATERBOX VENTING SYSTEM

DATE: N/A
 CHECKED: N/A
 DESIGNED: N/A
 DRAWN: N/A

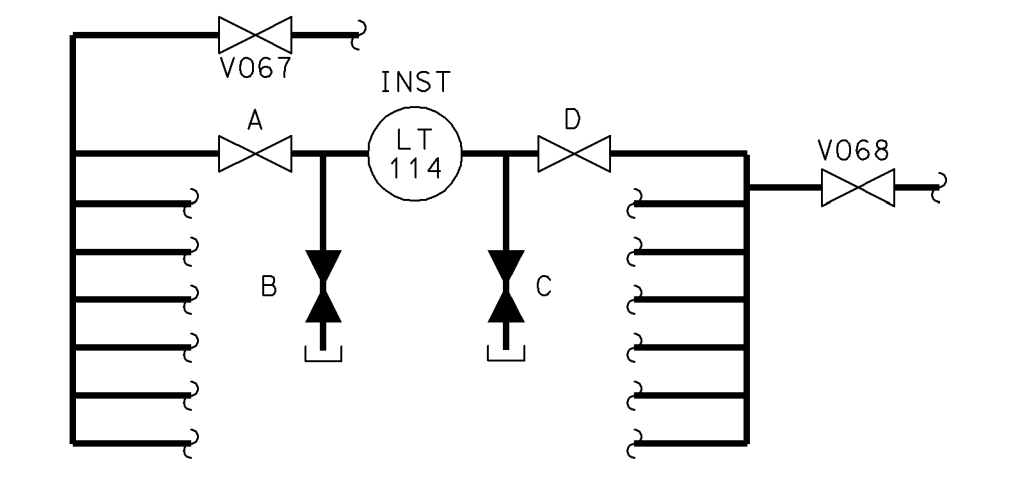
PROJECT: CALLAWAY PLANT
 SHEET: M-22DA02
 OF: 3

UNION ELECTRIC COMPANY
 ST. LOUIS, MO

REV. 15



- NOTES:**
- SEE M-22AD03, M-22AD04 & M-22AD05 FOR A LISTING OF ALL CONNECTIONS.
 - DELETED
 - CAP COVER IS DESIGNED TO EXCLUDE DEBRIS AND PERMIT FILLING WATER SEAL WITH HOSE. SEE M-22AN01, ZONE B-7 FOR HOSE CONNECTION.
 - DELETED
 - LEVEL GAGES ARE PROVIDED AT 6 OF 12 LOCATIONS. AT REMAINING 6 LOCATIONS, BOTTOM CONNECTIONS ARE FILL AND DRAIN CONNECTIONS. TOP CONNECTIONS SERVE AS OVERFLOWS.
 - LOCAL ALARM PANEL WILL PROVIDE INDICATION OF LOW SEAL WATER LEVEL FOR H.P., I.P., AND L.P. CONDENSERS. PANEL WILL CONSIST OF THREE SEPARATE LOW LEVEL INDICATING LIGHTS.
 - THE FOLLOWING LEVEL GAGES ARE LOCATED ON THE HIGH PRESSURE CONDENSER:
 LG-105, TAPS 342, 354
 LG-106, TAPS 340, 352
 INTERMEDIATE PRESSURE CONDENSER:
 LG-107, TAPS 346, 358
 LG-108, TAPS 344, 356
 LOW PRESSURE CONDENSER:
 LG-109, TAPS 350, 362
 LG-110, TAPS 348, 360
 - USED FOR THE PUMP SUCTION TO DRAIN THE CONDENSER HOTWELL.



INST	A	B	C	D
LT114	CO21	CO04	CO11	CO22
LT79	CO19	CO03	CO10	CO20
LSL80	CO15	CO01	CO08	CO16
LSH81	CO17	CO02	CO09	CO18
LSLL82A	CO23	CO05	CO12	CO24
LSLL82B	CO25	CO06	CO13	CO26
LSLL82C	CO27	CO07	CO14	CO28

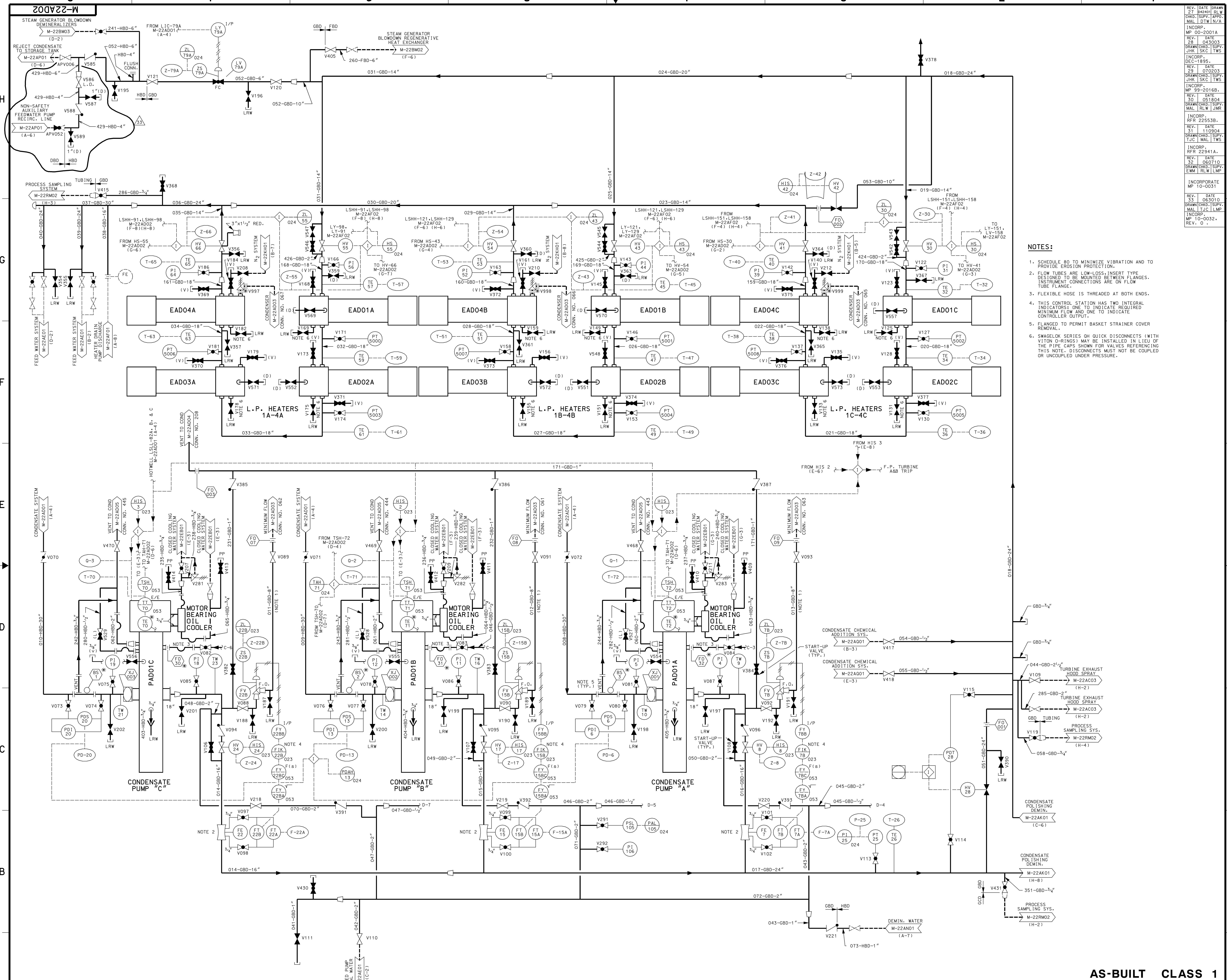
AS-BUILT CLASS 1

**PIPING & INSTRUMENT DIAGRAM
CONDENSATE SYSTEM**

FSAR FIGURE 10.4-2 SHEET 1

DRWN	N/A	(DATE)		CLASS	
CHKD	N/A	(DATE)		CALLAWAY PLANT	
SUPV	N/A	(DATE)		UNION ELECTRIC COMPANY	M-22AD01
APPV	N/A	(DATE)		ST. LOUIS, MO	REV. 17

REV. DATE DRAWN 07/03/90 HIL
 CHD: SUPV: APPV: RBF TJM N/A
 REDRAWN FOR CLARITY
 REV. DATE DRAWN 04/28/92 MAL
 CHD: SUPV: APPV: RBF TJM N/A
 REDRAWN FOR CLARITY
 REV. DATE DRAWN 09/08/93 RBF
 CHD: SUPV: APPV: DJB TJM N/A
 INCORP. RFR-13902A.
 REV. DATE DRAWN 08/12/94 MAL
 CHD: SUPV: APPV: RBF AMR N/A
 INCORP. RFR-13819B.
 REV. DATE DRAWN 09/12/98 RAM
 CHD: SUPV: APPV: DJB DME N/A
 INCORPORATE MP 93-2024
 REV. DATE DRAWN 10/09/98 MAL
 CHD: SUPV: APPV: EWM JHK TWS
 INCORPORATE MP 97-2003A.
 REV. DATE DRAWN 11/09/98 RLW
 CHD: SUPV: APPV: DJB AMR N/A
 INCORPORATE DEC-1645.
 REV. DATE DRAWN 12/11/00 MAL
 CHD: SUPV: APPV: SFC AMR N/A
 INCORP. MP 98-2020 FCN-01.
 REV. DATE 13/07/03
 DRAWN/CHKD: SUPV: EWM JHK TWS
 INCORPORATE MP 99-2016B FCN-13.
 REV. DATE 14/09/03
 DRAWN/CHKD: SUPV: RLW MAL TWS
 INCORPORATE MINOR CHANGE CAR 200305155



- NOTES:**
- SCHEDULE 80 TO MINIMIZE VIBRATION AND TO PROVIDE EROSION PROTECTION.
 - FLOW TUBES ARE LOW-LOSS, INSERT TYPE. INSTRUMENT CONNECTIONS ARE ON FLOW TUBE FLANGE.
 - FLEXIBLE HOSE IS THREADED AT BOTH ENDS.
 - THIS CONTROL STATION HAS TWO INTEGRAL INDICATORS: ONE TO INDICATE REQUIRED MINIMUM FLOW AND ONE TO INDICATE CONTROLLER OUTPUT.
 - FLANGED TO PERMIT BASKET STRAINER COVER REMOVAL.
 - SWAGelok SERIES OH QUICK DISCONNECTS (WITH VITON O-RINGS) MAY BE INSTALLED IN LIEU OF THE PIPE CAPS SHOWN FOR VALVES REFERENCING THIS NOTE. DISCONNECTS MUST NOT BE COUPLED OR UNCOUPLED UNDER PRESSURE.

REV.	DATE	BY	CHKD.	APPD.	DESCRIPTION
1	04/01/81	JHK	JHK		ISSUE FOR CONSTRUCTION
2	07/20/81	JHK	JHK		REVISED FOR INSTRUMENTATION
3	05/18/84	JHK	JHK		REVISED FOR PIPING CHANGES
4	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
5	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
6	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
7	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
8	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
9	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
10	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
11	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
12	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
13	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
14	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
15	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
16	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
17	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
18	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
19	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION
20	05/07/85	JHK	JHK		REVISED FOR INSTRUMENTATION

AS-BUILT CLASS 1			
DRWN:	JHK	DATE:	04/01/81
CHKD:	JHK	DATE:	04/01/81
SUPV:	JHK	DATE:	04/01/81
APPD:	JHK	DATE:	04/01/81
UNION ELECTRIC COMPANY		ST. LOUIS, MO	
M-22AD02		REV. 33	

CONDENSER CONNECTION NUMBER	CONDENSER LOCATION			L. LINE NUMBER	L. LINE CLASS	L. LINE SIZE	CONNECTIN SIZE	CONDENSER ISOLATION VALVE NUMBER	SERVICE	DRAWING INTERFACE NUMBER	INTERFACE DRAWING ZONE	REMARKS			
	C	B	A												
													HP	IP	LP
													CONDENSER ISOLATION VALVE		
161		X		154	HBD	6"	6"		L.P. HTR. NO. 4B R.V.	AF03	C-4				
162		X		156	HBD	6"	6"		L.P. HTR. NO. 3A R.V.	AF03	D-3				
163		X		153	HBD	6"	6"		L.P. HTR. NO. 4A R.V.	AF03	C-3				
164	X					66"	66"		UPPER CIRC. WTR. CONN.	DA01	E-4				
165	X					66"	66"		UPPER CIRC. WTR. CONN.	DA01	E-3				
166	X					66"	66"		UPPER CIRC. WTR. CONN.	DA01	F-5				
167		X				66"	66"		UPPER CIRC. WTR. CONN.	DA01	E-5				
168			X			66"	66"		UPPER CIRC. WTR. CONN.	DA01	F-7				
169			X			66"	66"		UPPER CIRC. WTR. CONN.	DA01	F-7				
170			X			66"	66"		UPPER CIRC. WTR. CONN.	DA01	E-7				
171	X					66"	66"		UPPER CIRC. WTR. CONN.	DA01	F-3				
172	X					66"	66"		UPPER CIRC. WTR. CONN.	DA01	F-4				
173	X					66"	66"		UPPER CIRC. WTR. CONN.	DA01	F-5				
174	X					66"	66"		UPPER CIRC. WTR. CONN.	DA01	E-5				
175			X			66"	66"		UPPER CIRC. WTR. CONN.	DA01	E-7				
176	X					72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	F-3				
177	X					72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	F-4				
178	X					72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	F-5				
179	X					72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	E-6				
180			X			72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	F-7				
181			X			72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	F-7				
182			X			72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	E-7				
183	X					72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	E-4				
184	X					72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	E-3				
185	X					72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	F-6				
186	X					72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	E-5				
187			X			72"	72"		MIDDLE CIRC. WTR. CONN.	DA01	E-7				
188	X					72"	72"		LOWER CIRC. WTR. CONN.	DA01	E-4				
189	X					72"	72"		LOWER CIRC. WTR. CONN.	DA01	E-2				
190	X					72"	72"		LOWER CIRC. WTR. CONN.	DA01	F-6				
191	X					72"	72"		LOWER CIRC. WTR. CONN.	DA01	E-5				
192			X			72"	72"		LOWER CIRC. WTR. CONN.	DA01	F-7				
193			X			72"	72"		LOWER CIRC. WTR. CONN.	DA01	F-8				
194			X			72"	72"		LOWER CIRC. WTR. CONN.	DA01	E-8				
195	X					72"	72"		LOWER CIRC. WTR. CONN.	DA01	F-2				
196	X					72"	72"		LOWER CIRC. WTR. CONN.	DA01	F-4				
197	X					72"	72"		LOWER CIRC. WTR. CONN.	DA01	F-5				
198	X					72"	72"		LOWER CIRC. WTR. CONN.	DA01	E-6				
199			X			72"	72"		LOWER CIRC. WTR. CONN.	DA01	E-6				
200	X					1"		ADV-033	HOTWELL GAUGE GLASS	AD01	C-3				
201	X					1"						PLUGGED			
202	X					1"									
203	X					1"		ADV-034	HOTWELL GAUGE GLASS	AD01	C-3				
204	X					1"		ADV-035	HOTWELL GAUGE GLASS	AD01	C-3				
205	X					1"						PLUGGED			
206	X					1"									
207	X					1"		ADV-036	HOTWELL GAUGE GLASS	AD01	B-3				
208		X			171	HBD	1"	ADV-382/383/384	CONDENSATE PUMP DISCHARGE VENT	AD02	G-3				
209	X					1"						PLUGGED			
210	X					1"									
211	X				294	HBD	1"	RMV-028	SAMPLE PUMP DISCHARGE	RM03	B-4				
212	X				293	HBD	1"	RMV-177/233	SAMPLE PUMP VENT	RM03	G-3				
213	X					1"									
214	X					1"									
215	X					1"						PLUGGED			
216		X				1"									
217		X				1"									
218		X				1"									
219	X				AF-345	HBD	1"	AFV-594	HTR. DRAIN PUMP SEAL WATER RETURN	AF01	A-6	PLUGGED			
220	X					1"									
221	X					1"						PLUGGED			
222	X					1"									
223	X					1"									
224	X					HBD	3"		WTR. BOX VENTS	DA02	C-2				
225	X					HBD	3"		WTR. BOX VENTS	DA02	C-2				
226	X					HBD	3"		WTR. BOX VENTS	DA02	C-2				
227	X					HBD	3"		WTR. BOX VENTS	DA02	C-1				
228	X					HBD	3"		WTR. BOX VENTS	DA02	C-3				
229	X					HBD	3"		WTR. BOX VENTS	DA02	C-1				
230	X					HBD	3"		WTR. BOX VENTS	DA02	F-2				
231	X					HBD	3"		WTR. BOX VENTS	DA02	F-2				
232	X					HBD	3"		WTR. BOX VENTS	DA02	F-2				
233	X					HBD	3"		WTR. BOX VENTS	DA02	F-2				
234	X					HBD	3"		WTR. BOX VENTS	DA02	F-1				
235	X					HBD	3"		WTR. BOX VENTS	DA02	F-3				
236	X					HBD	3"		WTR. BOX VENTS	DA02	C-2				
237	X					HBD	3"		WTR. BOX VENTS	DA02	C-2				
238	X					HBD	3"		WTR. BOX VENTS	DA02	F-4				
239	X					HBD	3"		WTR. BOX VENTS	DA02	F-5				
240	X					HBD	3"		WTR. BOX VENTS	DA02	F-4				

NOTES:
 1. FOR NOTES, SEE DWG. M-22AD03.

REV.	DATE	DRAWN
3	07/20/00	MAL
CHKD.	SRV.	RFID.
RBF	TJM	N/A
REDRAWN FOR CLARITY.		
REV.	DATE	DRAWN
1	04/23/00	E.W.M.
CHKD.	SRV.	APPV.
DJB	LAEW	N/A
INCORP. MP 97-2001 FCN-01		
REV.	DATE	DRAWN
4	04/19/05	E.W.M.
CHKD.	SRV.	APPV.
MAL	RLW	TWS
INCORP. RFR 22941A		

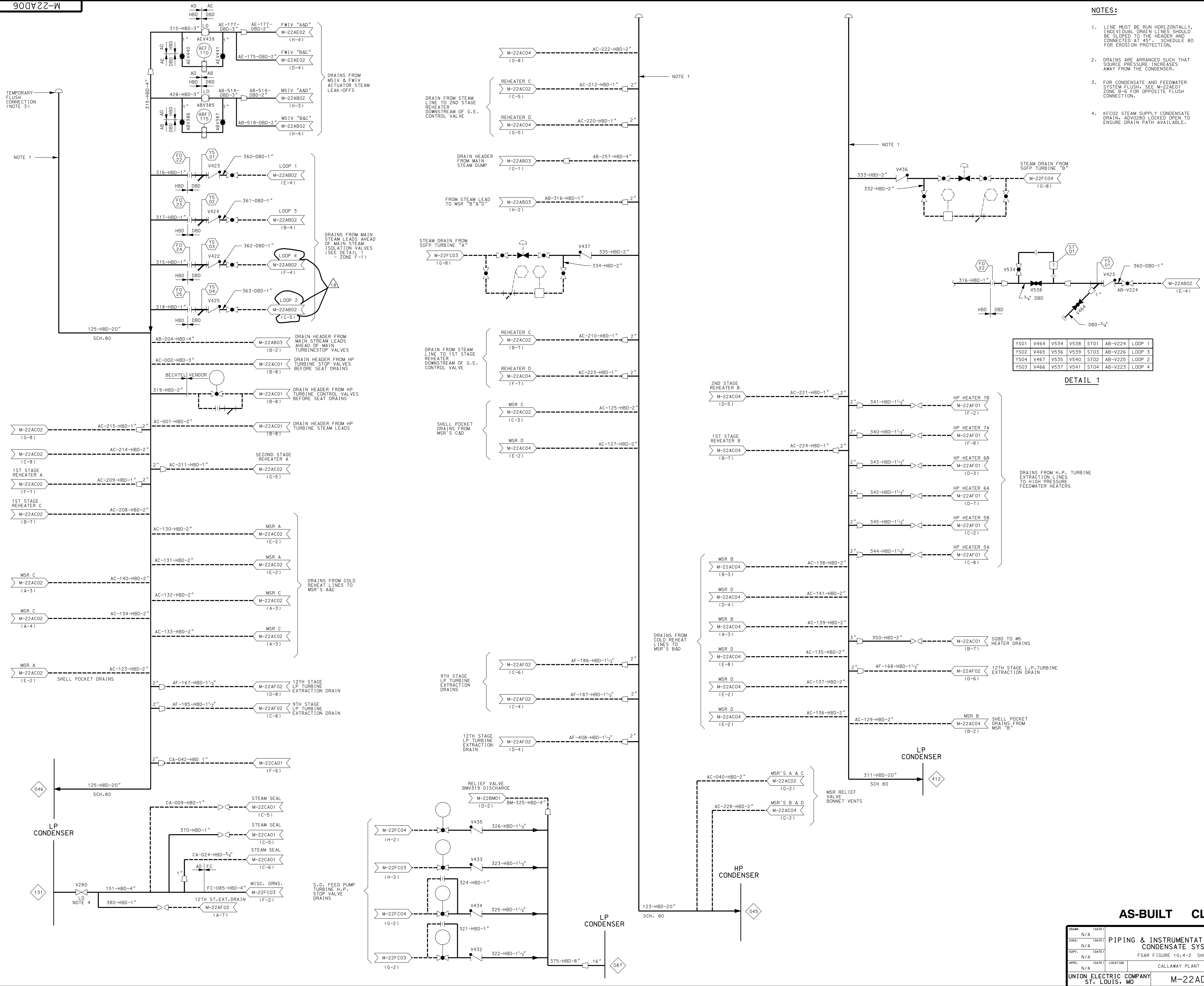
AS-BUILT CLASS 1

DRAWN	N/A	(DATE)	
CHKD.	N/A	(DATE)	
SRV.	N/A	(DATE)	
APPV.	N/A	(DATE)	
LOCATION		CALLAWAY PLANT	CLASS
UNION ELECTRIC COMPANY		ST. LOUIS, MO	
M-22AD04		REV. 4	

PIPING & INSTRUMENTATION DIAGRAM
 CONDENSATE SYSTEM
 FSAR FIGURE 10.4-2 SHEET 4

1. LINE MUST BE RUN HORIZONTALLY. INDIVIDUAL DRAIN LINES SHOULD BE SLOPED TO THE HEADER AND CONNECTED AT 45° - SCHEDULE 80 FOR EROSION PROTECTION.
2. DRAINS ARE ARRANGED SUCH THAT SOURCE PRESSURE INCREASES AWAY FROM THE CONDENSER.
3. FOR CONDENSATE AND FEEDWATER SYSTEM FLUSH, SEE M-22AE01 ZONE B-6 FOR OPPOSITE FLUSH CONNECTION.
4. KFC02 STEAM SUPPLY CONDENSATE DRAIN, ADV0280 LOCKED OPEN TO ENSURE DRAIN PATH AVAILABLE.

REV.	DATE	DRAWN
1	08/20/01	JHK
2	04/02/01	DLB
3	04/19/01	HLP
4	04/19/01	JHK
5	04/19/01	RBF
6	04/19/01	RBF
7	04/19/01	RBF
8	08/20/01	JHK
9	08/20/01	JHK
10	05/17/04	JHK
11	05/22/04	JHK
12	11/09/04	JHK
13	10/08/05	JHK
14	02/08/06	JHK
15	03/20/06	JHK
16	04/20/07	JHK
17	02/29/08	JHK
18	03/27/08	JHK
19	03/27/08	JHK
20	03/27/08	JHK
21	03/27/08	JHK
22	03/27/08	JHK
23	03/27/08	JHK
24	03/27/08	JHK
25	03/27/08	JHK
26	03/27/08	JHK
27	03/27/08	JHK
28	03/27/08	JHK
29	03/27/08	JHK
30	03/27/08	JHK



DETAIL 1

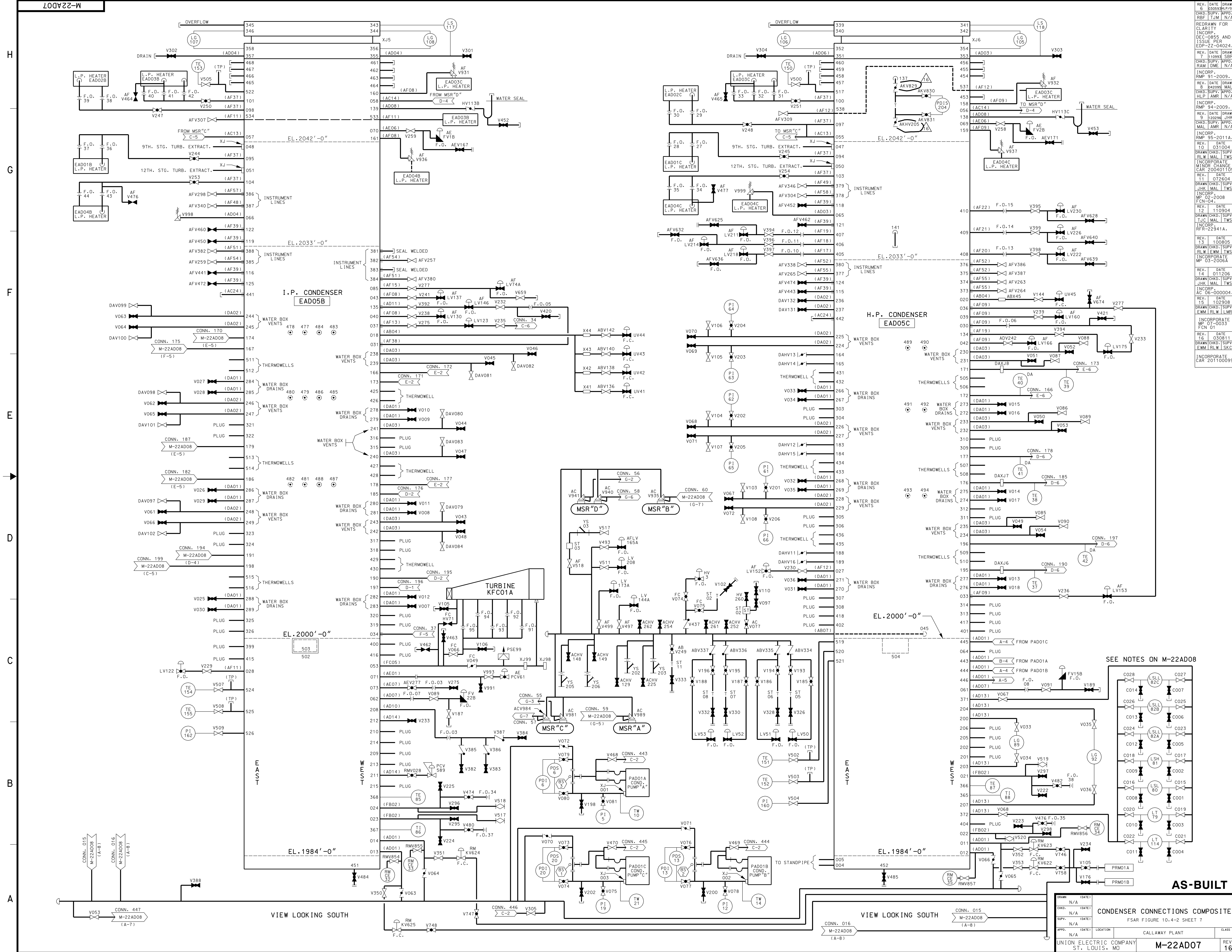
YS01	V464	V534	V538	ST01	AB-V224	LOOP 1
YS02	V465	V536	V539	ST03	AB-V226	LOOP 3
YS04	V467	V535	V540	ST02	AB-V225	LOOP 2
YS03	V466	V537	V541	ST04	AB-V223	LOOP 4

AS-BUILT CLASS 1

DRAWN	N/A	(DATE)	
CHKD.	N/A	(DATE)	
SUPV.	N/A	(DATE)	
APPD.	N/A	(DATE)	
LOCATION	CALLAWAY PLANT		CLASS
UNION ELECTRIC COMPANY			REV. 18
ST. LOUIS, MO			M-22AD06

PIPING & INSTRUMENTATION DIAGRAM CONDENSATE SYSTEM

FSAR FIGURE 10.4-2 SHEET 6



REV. DATE DRAWN
 03/09/98 JPK/PCB
 CHD: SUPV: APPR: RBF | TUM | N/A

REDRAWN FOR
 CLARITY
 INCORP:
 DEC-0855 AND
 ISSUE PER
 EDP-22-04024.

REV. DATE DRAWN
 7/10/98 SBR
 CHD: SUPV: APPR: HLP | AMR | N/A

INCORP:
 RMP 91-2009.

REV. DATE DRAWN
 8/04/98 MAL
 CHD: SUPV: APPR: HLP | AMR | N/A

INCORP:
 RMP 94-2009.

REV. DATE DRAWN
 9/12/98 JHK
 CHD: SUPV: APPR: MAL | AMR | N/A

INCORP:
 RMP 95-2011A.

REV. DATE
 TO 03/10/04

DRAWN CHD: SUPV:
 RLW | MAL | TWS

INCORPORATE
 MIND CHANGE
 CAR 200401109

REV. DATE
 11/07/2004

DRAWN CHD: SUPV:
 JHK | MAL | TWS

INCORP:
 MP 02-2008
 FCN-04.

REV. DATE
 12/10/04

DRAWN CHD: SUPV:
 TJC | MAL | TWS

INCORP:
 MP 02-2008
 FCN-04.

REV. DATE
 13/10/05

DRAWN CHD: SUPV:
 JHK | MAL | TWS

INCORPORATE
 MP 03-2006A

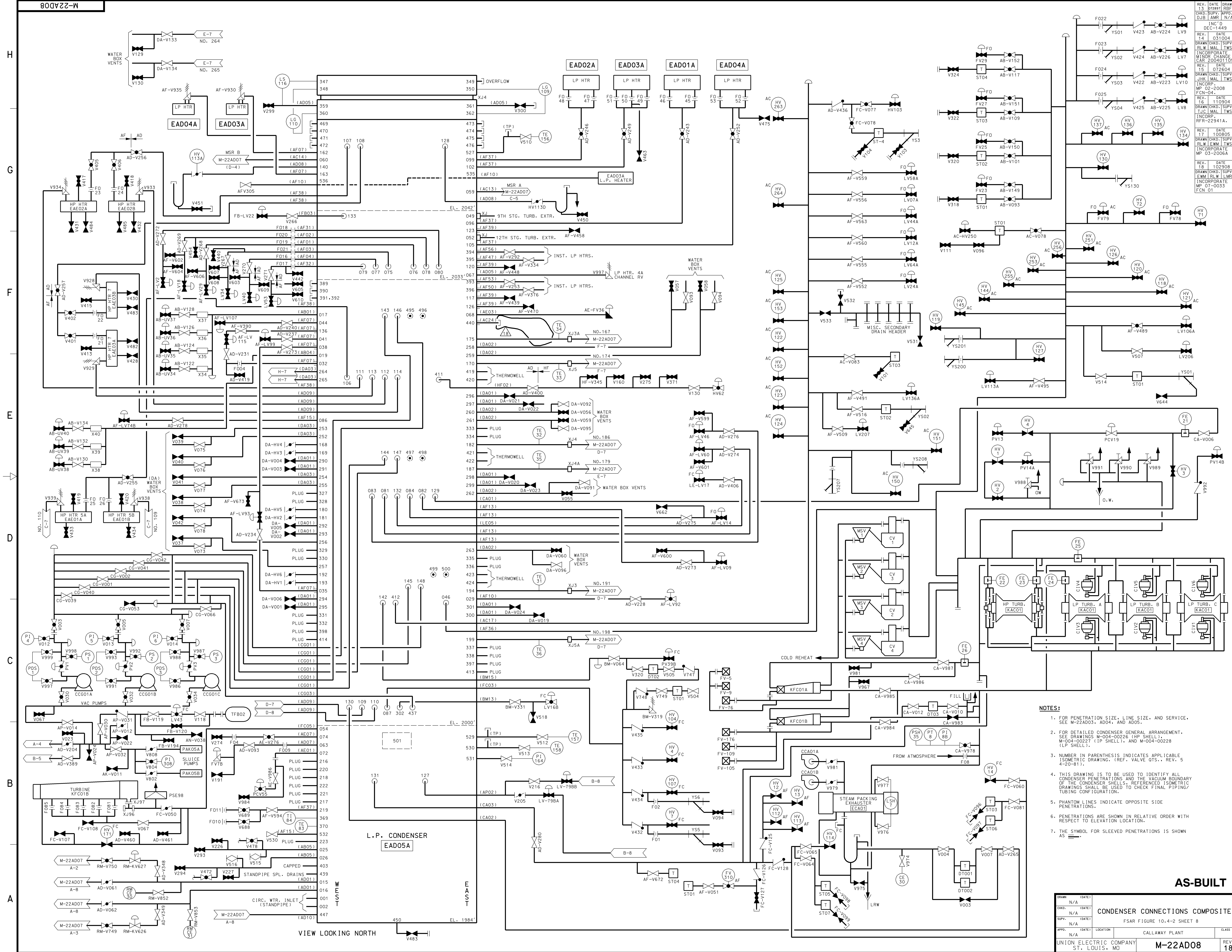
REV. DATE
 14/01/2006

DRAWN CHD: SUPV:
 EWM | RLW | SKC

INCORPORATE
 CAR 201100039

AS-BUILT

DRAWN	N/A	DATE	
CHKD:	N/A	DATE	
SUPV:	N/A	DATE	
APP.:	N/A	DATE	
LOCATION	CALLAWAY PLANT		
CONDENSER CONNECTIONS COMPOSITE			
FSAR FIGURE 10.4-2 SHEET 7			
UNION ELECTRIC COMPANY			CLASS
ST. LOUIS, MO			M-22AD07
			REV. 16



- NOTES:**
- FOR PENETRATION SIZE, LINE SIZE, AND SERVICE, SEE M-22AD03, AD04, AND AD05.
 - FOR DETAILED CONDENSER GENERAL ARRANGEMENT, SEE DRAWINGS M-004-00226 (HP SHELL), M-004-00227 (LP SHELL), AND M-004-00228 (LP SHELL).
 - NUMBER IN PARENTHESIS INDICATES APPLICABLE ISOMETRIC DRAWING. (REF. VALVE O.T.S., REV. 5 4-20-81).
 - THIS DRAWING IS TO BE USED TO IDENTIFY ALL CONDENSER PENETRATIONS AND THE VACUUM BOUNDARY OF THE CONDENSER SHELLS. REFERENCED ISOMETRIC DRAWINGS SHALL BE USED TO CHECK FINAL PIPING/TUBING CONFIGURATION.
 - PHANTOM LINES INDICATE OPPOSITE SIDE.
 - PENETRATIONS ARE SHOWN IN RELATIVE ORDER WITH RESPECT TO ELEVATION LOCATION.
 - THE SYMBOL FOR SLEEVED PENETRATIONS IS SHOWN AS

AS-BUILT	
CONDENSER CONNECTIONS COMPOSITE	
FSAR FIGURE 10.4-2 SHEET 8	
DRAWN: N/A	DATE: N/A
CHECKED: N/A	DATE: N/A
SUPV: N/A	DATE: N/A
APPV: N/A	LOCATION: CALLAWAY PLANT
CLASS: M-22AD08	
REV. 18	

REV. DATE	INC'D	REV.
14	031004	031004
15	072604	072604
16	110904	110904
17	100805	100805
18	100908	100908
19	030003	030003

8

7

6

5

4

3

2

1

H

G

F

E

M

D

B

A

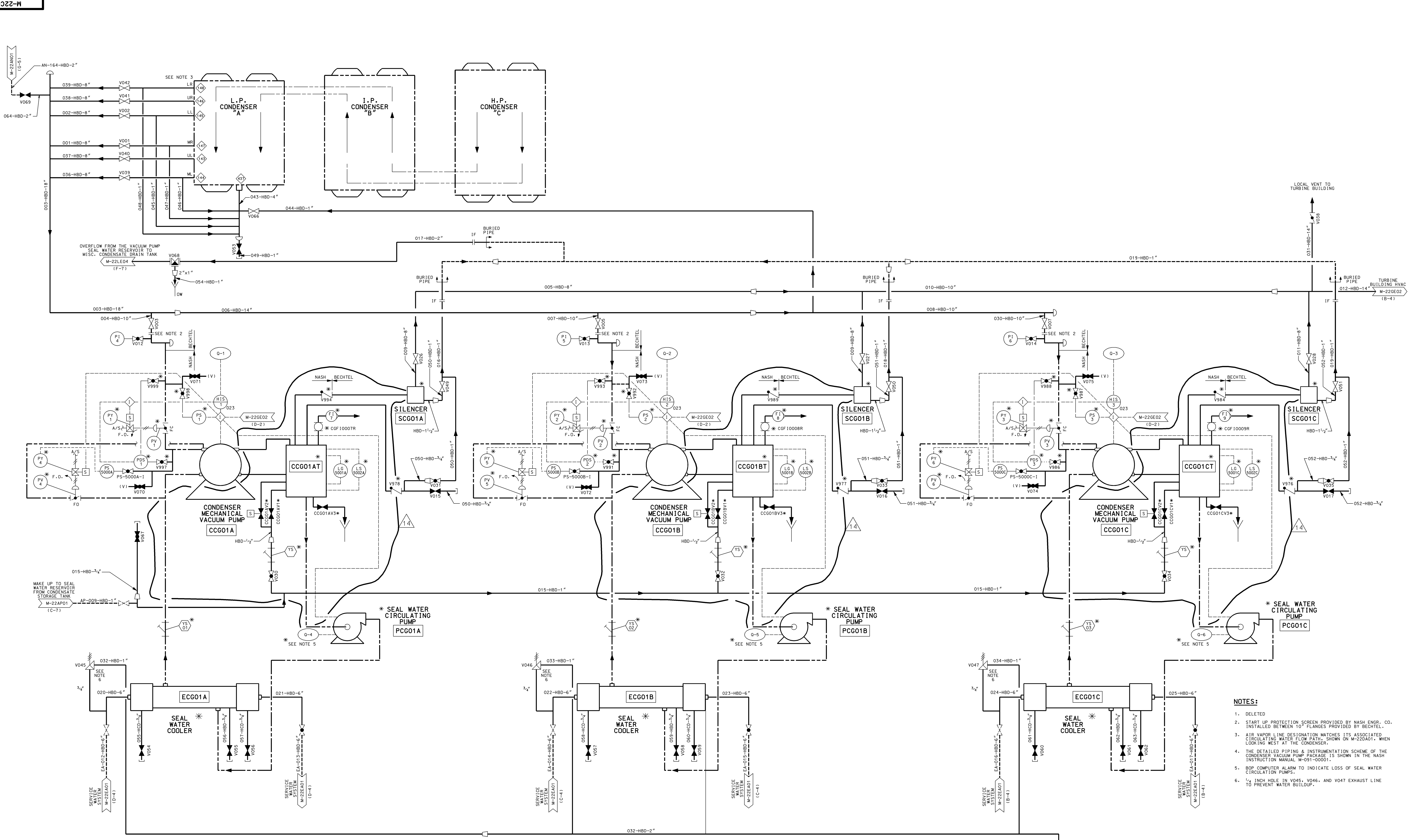
REV. DATE
 12 041905
 DRAWN(S) (S) WPC
 MAL RLW TWS
 INCORP. 22341A

REV. DATE
 13 101106
 DRAWN(S) (S) WPC
 MAL RLW TWS
 INCORP. 22341A

REV. DATE
 14 042416
 DRAWN(S) (S) WPC
 MAL RLW TWS
 INCORP. 220605862.

REV. DATE
 14 042416
 DRAWN(S) (S) WPC
 MAL RLW TWS
 INCORP. 22341A

REV. DATE
 14 042416
 DRAWN(S) (S) WPC
 MAL RLW TWS
 INCORP. 221507476.

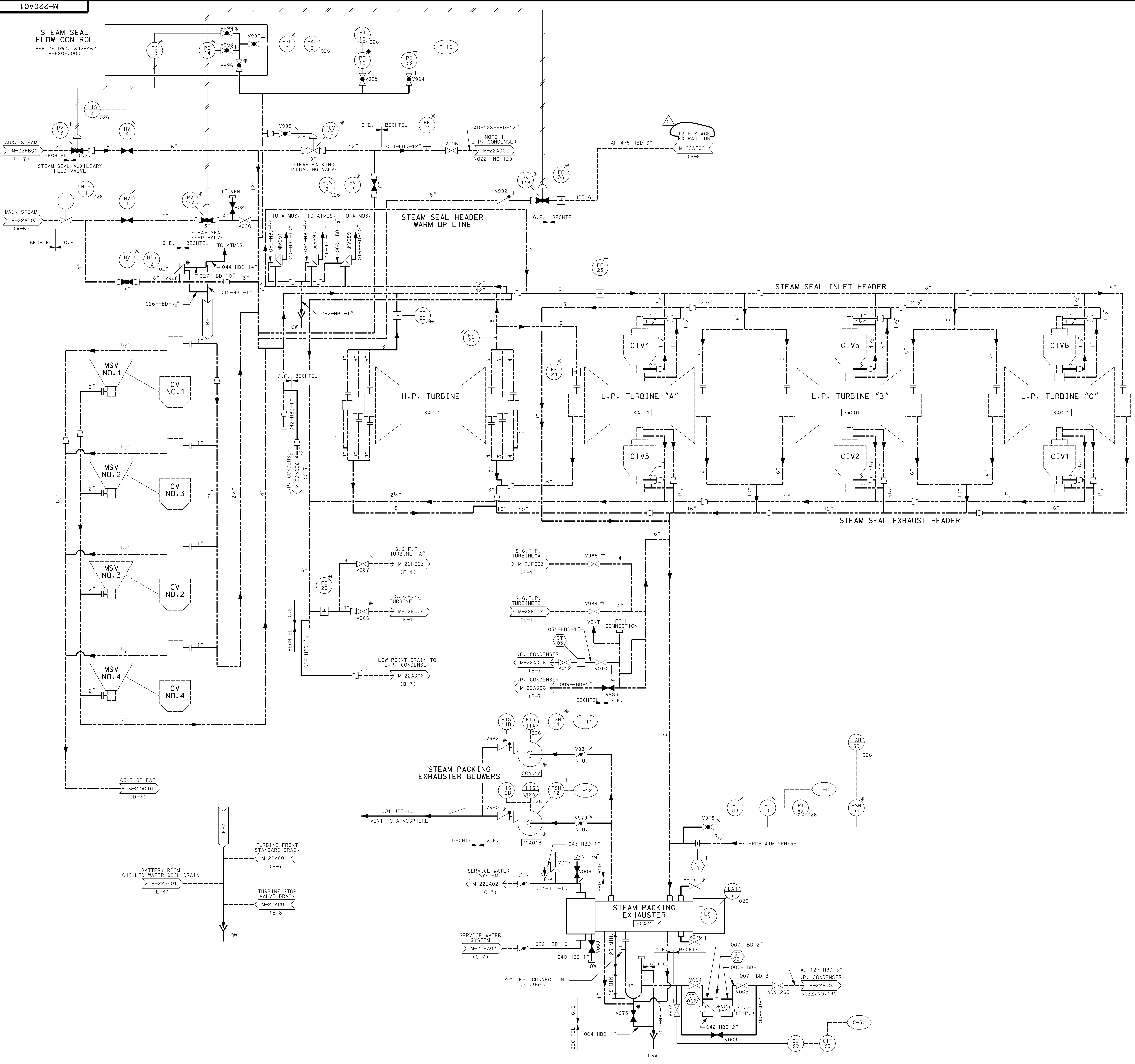


- NOTES:**
1. DELETED
 2. START UP PROTECTION SCREEN PROVIDED BY MASH ENGR. CO. INSTALLED BETWEEN 10" FLANGES PROVIDED BY BECHTEL.
 3. AIR VAPOR LINE DESIGNATION MATCHES ITS ASSOCIATED CIRCULATING WATER FLOW PATH, SHOWN ON M-22E01. WHEN LOOKING WEST AT THE CONDENSER.
 4. THE DETAILED PIPING & INSTRUMENTATION SCHEME OF THE CONDENSER VACUUM PUMP PACKAGE IS SHOWN IN THE MASH INSTRUCTION MANUAL M-091-00001.
 5. BOP COMPUTER ALARM TO INDICATE LOSS OF SEAL WATER CIRCULATION PUMPS.
 6. 1/4" INCH HOLE IN V045, V046, AND V047 EXHAUST LINE TO PREVENT WATER BULLDOPE.

AS-BUILT CLASS 1

APP. DATE	LOC. DATE	CLASS
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

UNION ELECTRIC COMPANY
 ST. LOUIS, MO
 M-22CG01
 14



NOTES:

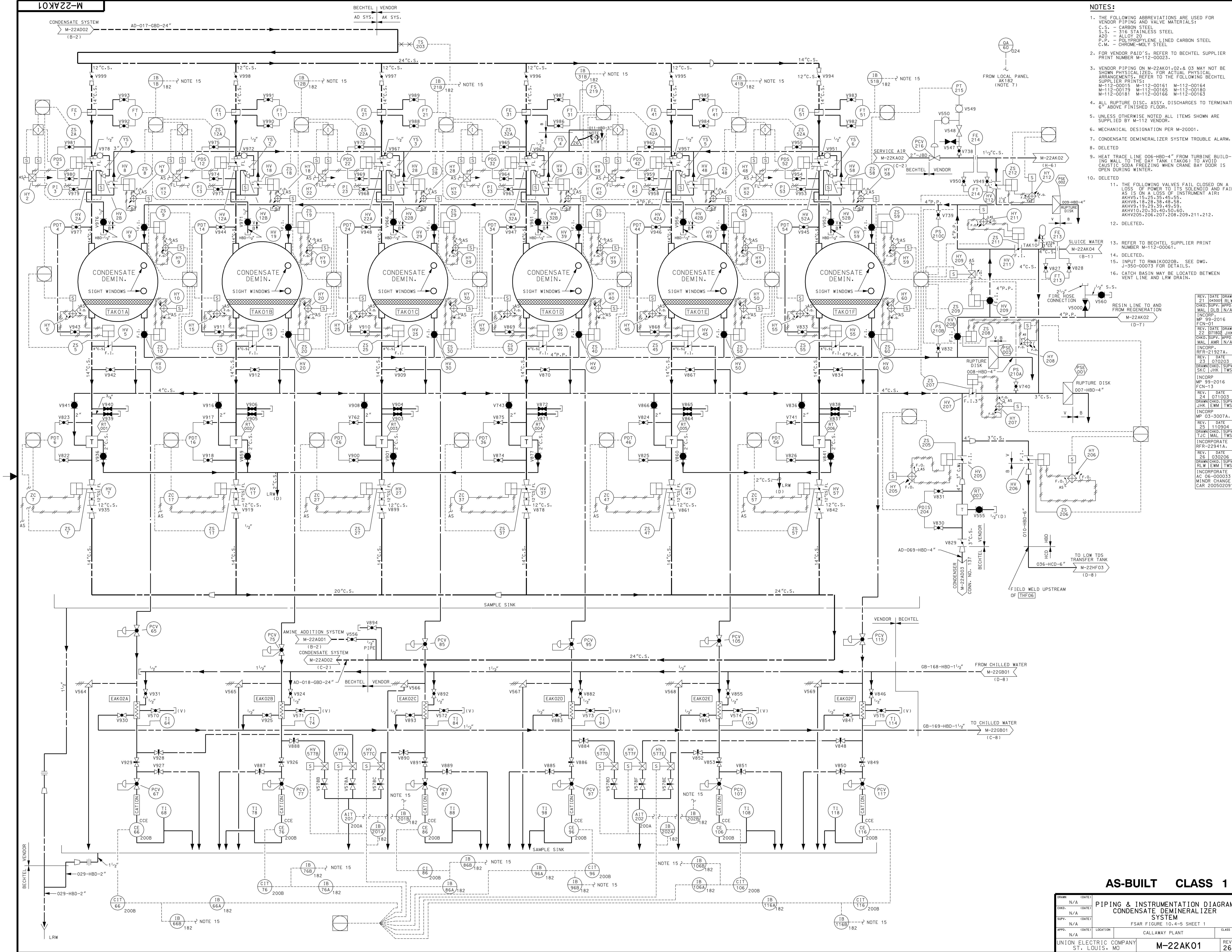
1. SLOPE CONTINUOUSLY TO CONDENSER.
2. SEE ALSO G.E. DWG. 842E467 (M-820-00002), AND 881E868 (M-820-00056).

REV.	DATE	DRAWN	CHECKED	APP'D.	REVISION
1	08/25/91	JHK	JHK	JHK	REDRAWN FOR CLARITY.
2	09/28/92	JHK	JHK	JHK	INCORPORATE RMP 89-2002 FCN-04.
3	11/16/02	JHK	JHK	JHK	INCORPORATE MP 00-2009 FCN-01.
4	04/19/05	JHK	JHK	JHK	INCORPORATE RFR 22941A.
5	10/08/05	JHK	JHK	JHK	INCORPORATE MP 03-2006A.

AS-BUILT CLASS 1

DRAWN	DATE	CHECKED	DATE	APP'D.	DATE	LOCATION	CLASS
N/A		N/A		N/A			

PIPING & INSTRUMENTATION DIAGRAM
STEAM SEAL SYSTEM
 FSAR FIGURE 10.4-4
 CALLAWAY PLANT
 UNION ELECTRIC COMPANY
 ST. LOUIS, MO
 M-22CA01
 REV. 5

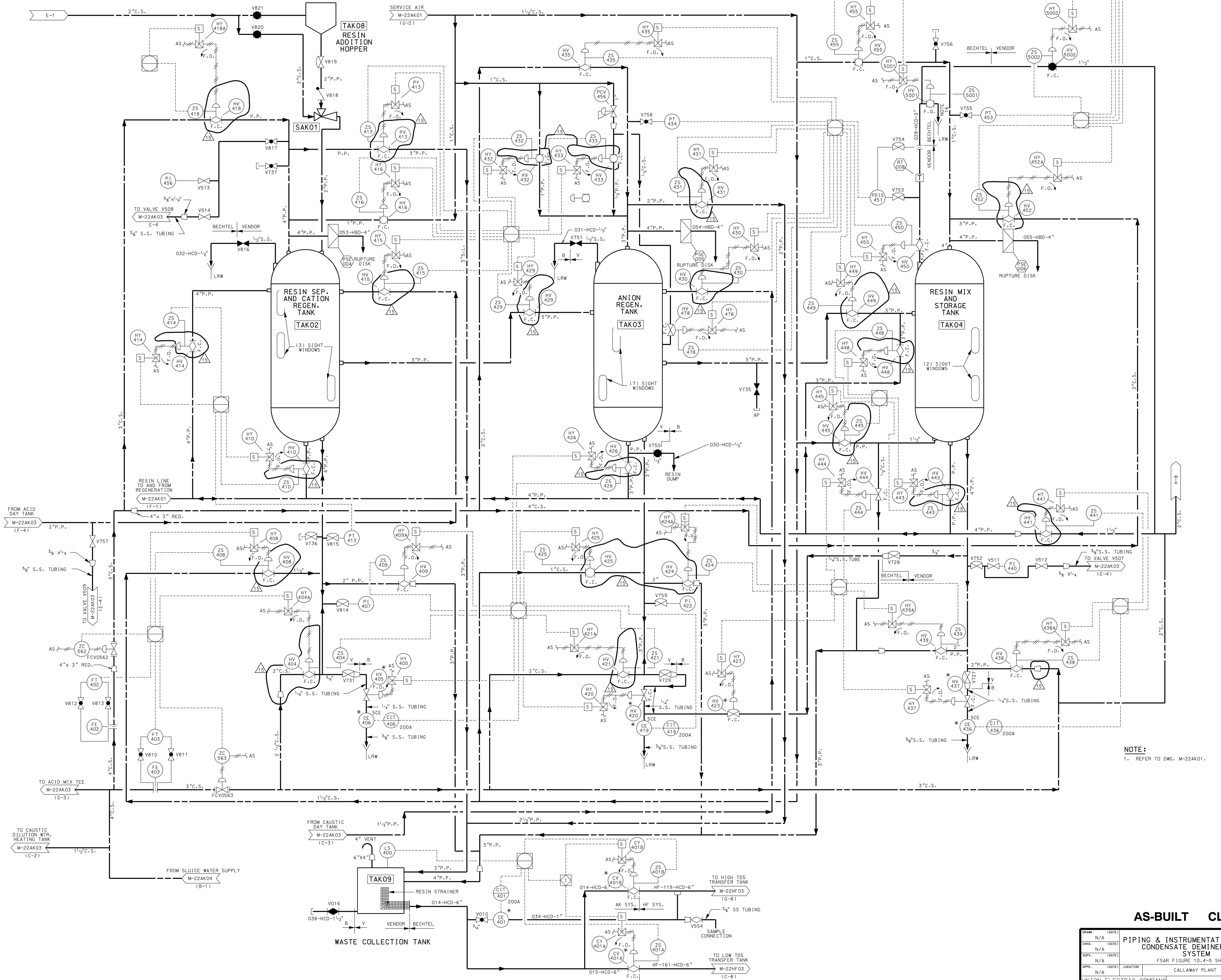


- NOTES:**
- THE FOLLOWING ABBREVIATIONS ARE USED FOR VENDOR PIPING AND VALVE MATERIALS:
 C.S. - CARBON STEEL
 S.S. - 316 STAINLESS STEEL
 A.S. - ALLOY 20
 P.P. - POLYPROPYLENE LINED CARBON STEEL
 C.M. - CHROME-MOLY STEEL
 - FOR VENDOR PAID'S, REFER TO BECHTEL SUPPLIER PRINT NUMBER M-112-00023.
 - VENDOR PIPING ON M-22AK01.02 & 03 MAY NOT BE SHOWN PHYSICALLY. FOR ACTUAL PHYSICAL ARRANGEMENTS, REFER TO THE FOLLOWING BECHTEL SUPPLIER PRINTS:
 M-112-00015 M-112-00161 M-112-00164
 M-112-00179 M-112-00165 M-112-00180
 M-112-00181 M-112-00166 M-112-00163
 - ALL RUPTURE DISC. ASSY. DISCHARGES TO TERMINATE 6' ABOVE FINISHED FLOOR.
 - UNLESS OTHERWISE NOTED ALL ITEMS SHOWN ARE SUPPLIED BY M-112 VENDOR.
 - MECHANICAL DESIGNATION PER M-20001.
 - CONDENSATE DEMINERALIZER SYSTEM TROUBLE ALARM. 8. DELETED
 - HEAT TRACE LINE 006-HBD-4" FROM TURBINE BUILDING WALL TO THE DAY TANK (TAK06) TO AVOID CAUSTIC SODA FREEZING WHEN CRANE BAY DOOR IS OPEN DURING WINTER.
 - DELETED
 - THE FOLLOWING VALVES FAIL CLOSED ON A LOSS OF POWER TO ITS SOLENOID AND FAIL AS IS ON A LOSS OF INSTRUMENT AIR:
 AKHV5: 15, 25, 35, 45, 55.
 AKHV8: 18, 28, 38, 48, 58.
 AKHV9: 19, 29, 39, 49, 59.
 AKHV10: 20, 30, 40, 50, 60.
 AKHV200: 206, 207, 208, 209, 211, 212.
 - DELETED.
 - REFER TO BECHTEL SUPPLIER PRINT NUMBER M-112-00061.
 - DELETED.
 - INPUT TO RMAJK0020B. SEE DWG. J-350-00073 FOR DETAILS.
 - CATCH BASIN MAY BE LOCATED BETWEEN VENT LINE AND LRW DRAIN.

REV.	DATE	DRWN	CHKD	APPD.
21	04/30/01	JHK	RLW	N/A
INCORPORATE RFR-22941A.				
22	07/10/03	JHK	RLW	N/A
INCORPORATE RFR-22941A.				
23	07/10/03	JHK	RLW	N/A
INCORPORATE RFR-22941A.				
24	07/10/03	JHK	RLW	N/A
INCORPORATE RFR-22941A.				
25	11/09/04	JHK	RLW	N/A
INCORPORATE RFR-22941A.				
26	03/02/06	JHK	RLW	N/A
INCORPORATE RFR-22941A.				
MINOR CHANGE CAR 200502091				

AS-BUILT CLASS 1

DRWN	N/A	DATE	
CHKD	N/A	DATE	
SUPV	N/A	DATE	
APPD.	N/A	DATE	
PIPING & INSTRUMENTATION DIAGRAM CONDENSATE DEMINERALIZER SYSTEM FSAR FIGURE 10.4-5 SHEET 1 CALLAWAY PLANT UNION ELECTRIC COMPANY ST. LOUIS, MO M-22AK01 REV. 26			



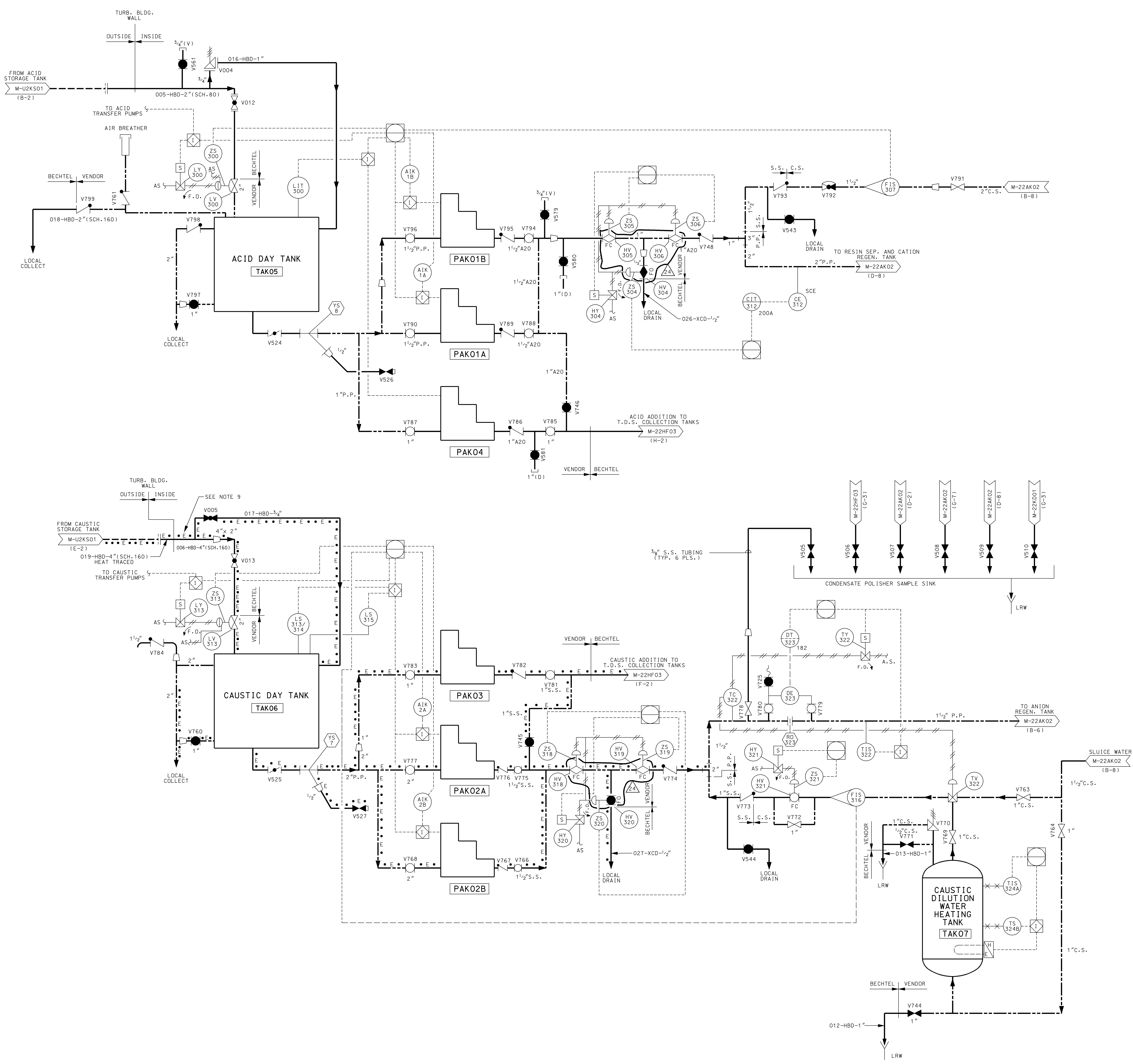
REV. DATE DRAWN 01/20/01 JHK
 CHKD. SUPV. APPR. RBF TUM N/A
 REDRAWN FOR CLARITY
 INCORP.
 REV. DATE DRAWN 08/07/98 RBF
 CHKD. SUPV. APPR. DJB AMR N/A
 INCORP. RMP 93-20117 FCN-01
 INCORP.
 REV. DATE DRAWN 8/10/98 JHK
 CHKD. SUPV. APPR. MAL AMR N/A
 INCORP. RMP 93-2016A
 REV. DATE DRAWN 9/04/00 RLW
 CHKD. SUPV. APPR. MAL AMR N/A
 INCORP. MP 99-2016A
 REV. DATE DRAWN 10/09/01 JHK
 CHKD. SUPV. APPR. MAL AMR N/A
 INCORP. MP 99-2016B
 REV. DATE 12/07/03
 DRAWN CHKD. SUPV. JHK EMM TWS
 INCORPORATE RFR-22941A.
 REV. DATE 13/02/03
 DRAWN CHKD. SUPV. JHK MAL TWS
 INCORPORATE MP 99-2016 FCN-14.
 REV. DATE 14/11/04
 DRAWN CHKD. SUPV. TJC MAL TWS
 INCORPORATE RFR-22941A.
 REV. DATE 15/07/08
 DRAWN CHKD. SUPV. RLW EMM JHK
 INCORPORATE MP 99-2016 FCN-15

NOTE:
 1. REFER TO DWG. M-22AK01.

AS-BUILT CLASS 1

DRAWN (DATE)	N/A ()
CHKD. (DATE)	N/A ()
SUPV. (DATE)	N/A ()
APP. (DATE)	N/A ()
LOCATION	CALLAWAY PLANT
CLASS	CLASS
UNION ELECTRIC COMPANY	M-22AK02
ST. LOUIS, MO	REV. 15

PIPING & INSTRUMENTATION DIAGRAM
 CONDENSATE DEMINERALIZER SYSTEM
 F5AR FIGURE 10.4-5 SHEET 2



NOTE:
 1. REFER TO DWG. M-22AK01.

AS-BUILT CLASS 1

DRAWN	N/A	(DATE)	
CHKD.	N/A	(DATE)	
SUPV.	N/A	(DATE)	
APPD.	N/A	(DATE)	
LOCATION	CALLAWAY PLANT		CLASS
UNION ELECTRIC COMPANY ST. LOUIS, MO			REV. 24

**PIPING & INSTRUMENTATION DIAGRAM
 CONDENSATE DEMINERALIZER
 SYSTEM**

FSAR FIGURE 10.4-5 SHEET 3

REV. DATE DRAWN
 01/29/91 HJC
 CHKD: SUPV: APPD:
 RBF TJM N/A

REDRAWN FOR
 CLARITY

REV. DATE DRAWN
 10/11/91 SBR
 CHKD: SUPV: APPD:
 EMM TJM N/A

INCORP.
 RFR-09277A

REV. DATE DRAWN
 11/06/91 JHK
 CHKD: SUPV: APPD:
 MAL AMR N/A

INCORP.
 RFR-19024A.

REV. DATE DRAWN
 12/11/91 SKC
 CHKD: SUPV: APPD:
 DJB JAMR N/A

INCORP.
 RFR-20052A.

REV. DATE DRAWN
 04/20/01 EWM
 CHKD: SUPV: APPD:
 DJB DMS N/A

INCORP.
 MP 99-2016A.

REV. DATE DRAWN
 09/30/01 EWM
 CHKD: SUPV: APPD:
 DJB DMS N/A

INCORP.
 MP 99-2016
 FCN 01.

REV. DATE DRAWN
 09/06/01 JHK
 CHKD: SUPV: APPD:
 MAL AMR N/A

INCORP.
 RFR-21178A.

REV. DATE DRAWN
 05/15/02 JHK
 CHKD: SUPV: APPD:
 MAL AMR N/A

INCORP.
 MP 97-2006
 FCN-02
 (PARTIAL).

REV. DATE DRAWN
 09/23/02 JHK
 CHKD: SUPV: APPD:
 MAL AMR N/A

INCORP.
 MP 97-2006
 FCN-02
 (PARTIAL).

REV. DATE DRAWN
 09/23/02 JHK
 CHKD: SUPV: APPD:
 MAL AMR N/A

INCORP.
 MP 97-2006
 FCN-03.

REV. DATE
 20/07/03
 DRAWN:CHKD: SUPV:
 JHK SKC TWS

INCORP.
 MP 99-2016B.

REV. DATE
 08/20/03
 DRAWN:CHKD: SUPV:
 JHK MAL TWS

INCORP.
 MP 99-2016
 FCN-14.

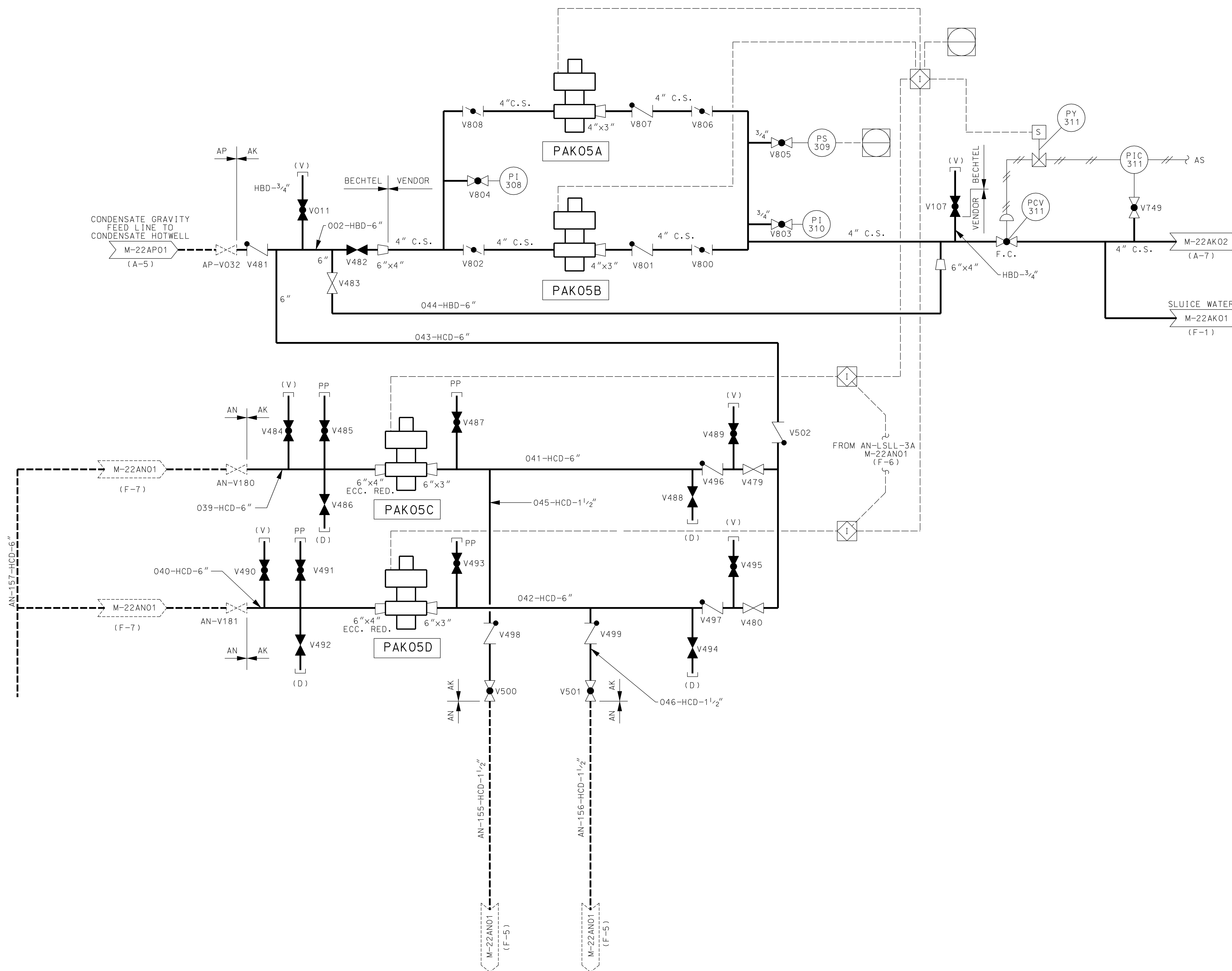
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 TJC MAL TWS

INCORP.
 RFR-22941A.

REV. DATE
 07/16/08
 DRAWN:CHKD: SUPV:
 EWM JHK

INCORP.
 MP 99-2016
 FCN-15

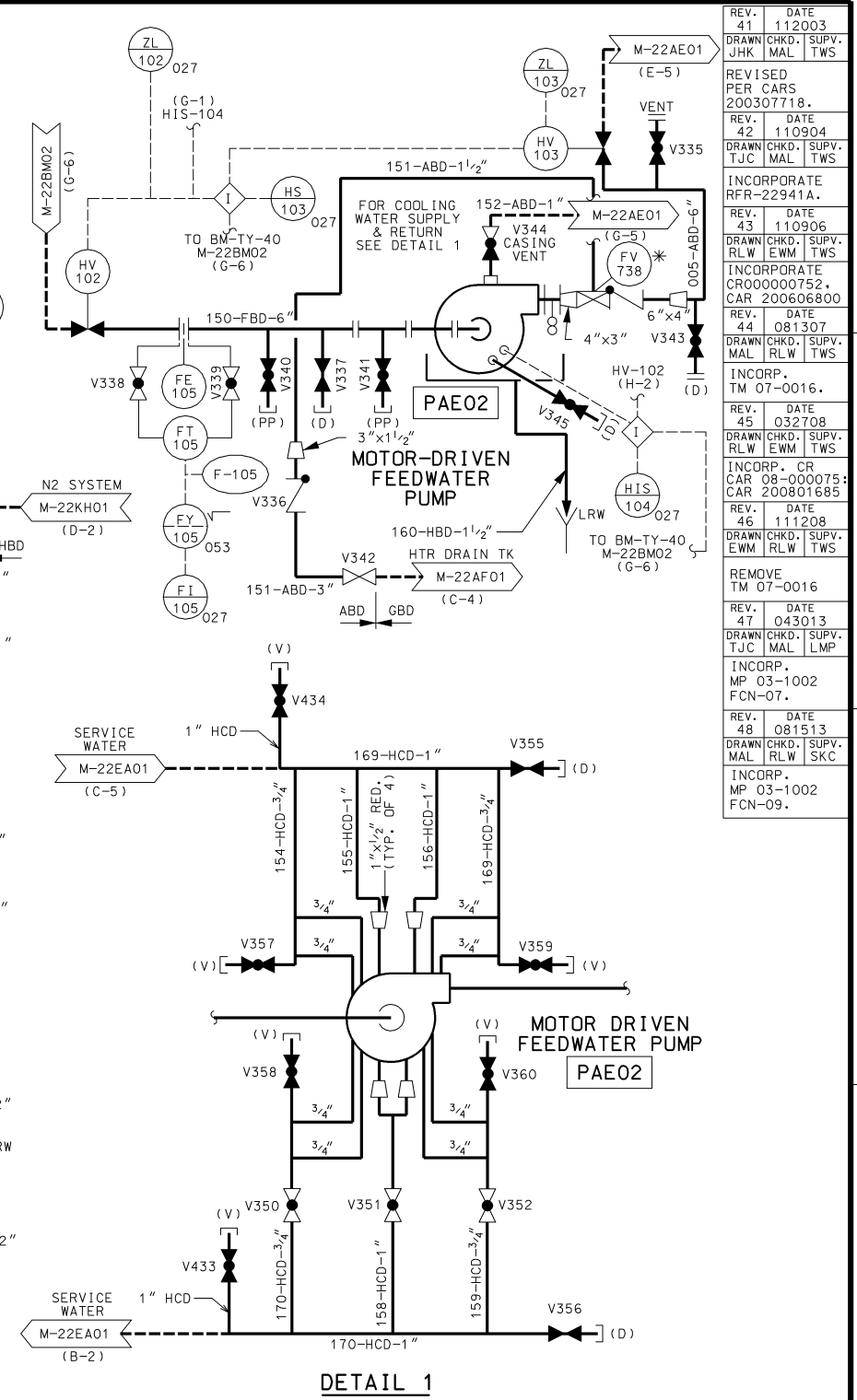
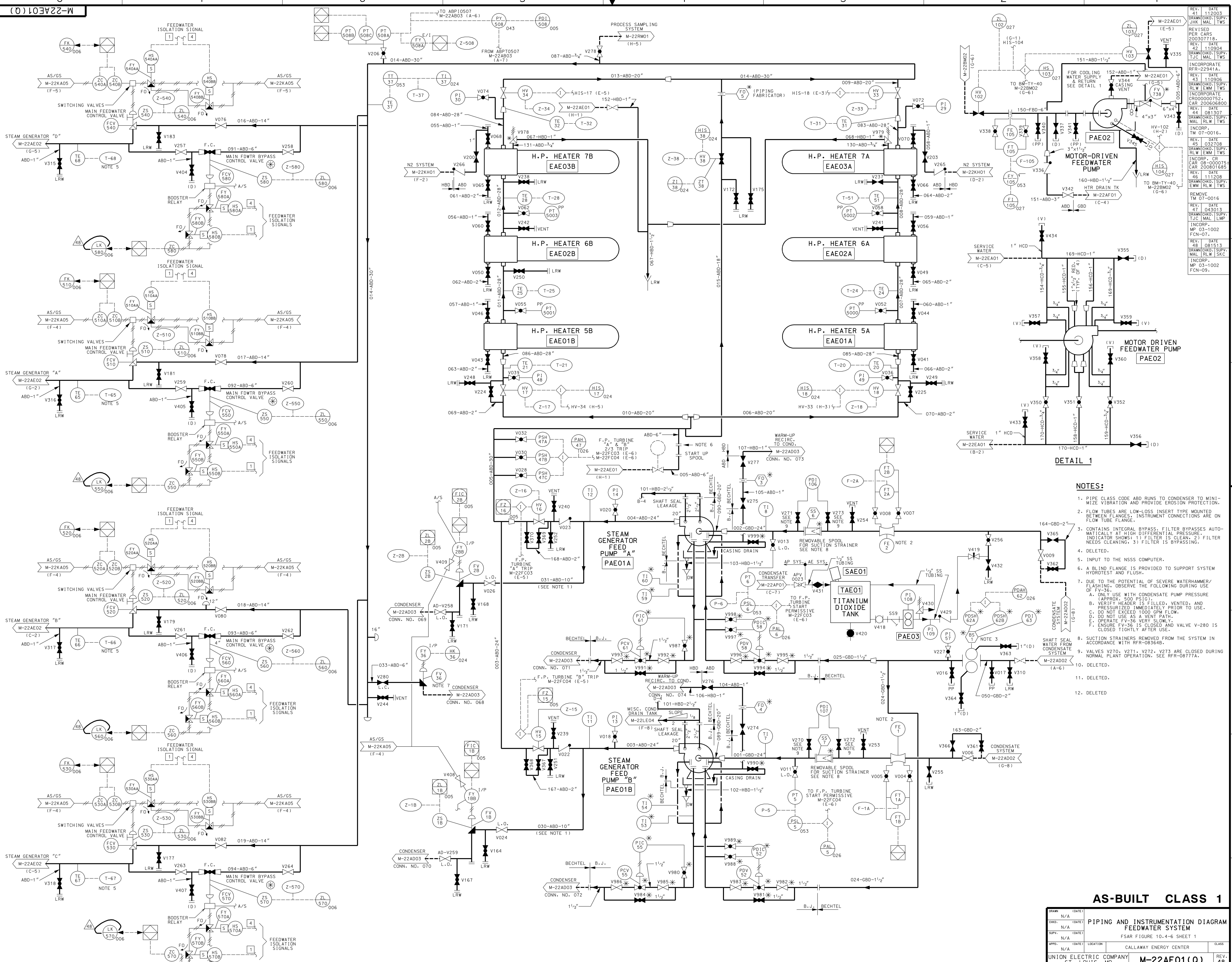
REV. 5	DATE 8/5/91	DRAWN DJB
CHKD. RBF	SUPV. TJM	APPD. N/A
REDRAWN FOR CLARITY		
REV. 6	DATE 01196	DRAWN RBF
CHKD. DJB	SUPV. IAMR	APPD. N/A
INC'D RFR-16416A		
REV. 7	DATE 061103	DRAWN JHK
CHKD. SKC	SUPV. TWS	APPD. N/A
ISSUE PER CAR 200303755.		
REV. 8	DATE 070203	DRAWN SKC
CHKD. JHK	SUPV. TWS	APPD. N/A
INCORP MP 99-2016B		
REV. 9	DATE 110904	DRAWN TJC
CHKD. MAL	SUPV. TWS	APPD. N/A
INCORPORATE RFR-22941A.		



REFERENCE DWGS. :
M-220102
M-220103
M-220104

AS-BUILT CLASS 1

DRAWN N/A	(DATE)	PIPING & INSTRUMENTATION DIAGRAM CONDENSATE DEMINERALIZER SYSTEM
CHKD. N/A	(DATE)	
SUPV. N/A	(DATE)	
APPD. N/A	(DATE)	
LOCATION	CLASS	
UNION ELECTRIC COMPANY ST. LOUIS, MO		M-22AK04 REV. 9



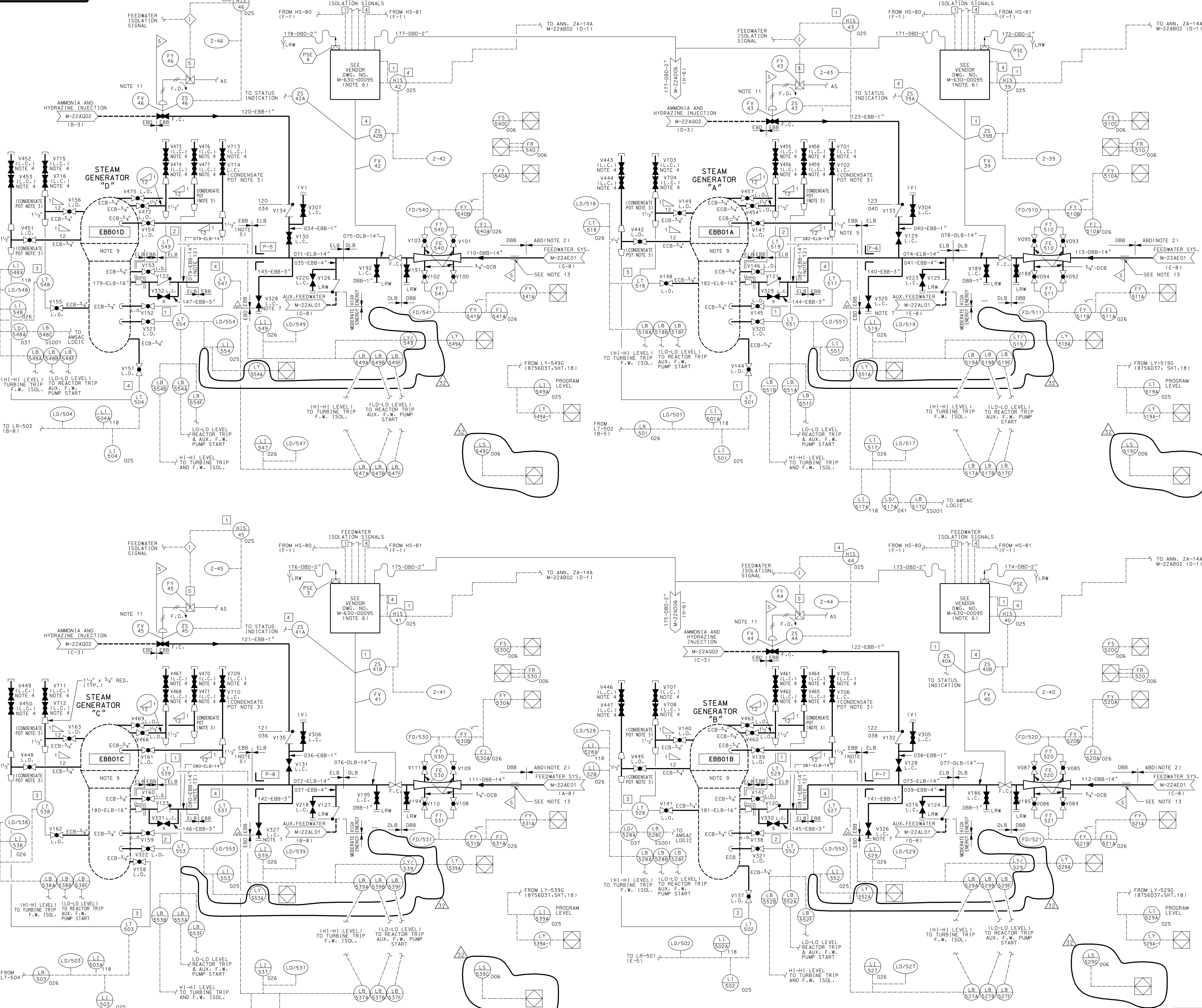
- NOTES:**
- PIPE CLASS CODE ABD RUNS TO CONDENSER TO MINIMIZE VIBRATION AND PROVIDE EROSION PROTECTION.
 - FLOW TUBES ARE LOW-LOSS INSERT TYPE MOUNTED BETWEEN FLANGES. INSTRUMENT CONNECTIONS ARE ON FLOW TUBE FLANGE.
 - CONTAINS INTEGRAL BYPASS. FILTER BYPASSES AUTOMATICALLY AT HIGH DIFFERENTIAL PRESSURE. INDICATOR SHOWS: 1) FILTER IS CLEAN, 2) FILTER NEEDS CLEANING, 3) FILTER IS BYPASSING.
 - DELETED.
 - INPUT TO THE NSSS COMPUTER.
 - A BLIND FLANGE IS PROVIDED TO SUPPORT SYSTEM HYDROTEST AND FLUSH.
 - DUE TO THE POTENTIAL OF SEVERE WATERHAMMER/FLASHING, OBSERVE THE FOLLOWING DURING USE OF FV-36.
 - ONLY USE WITH CONDENSATE PUMP PRESSURE (APPROX. 500 PSIG).
 - VERIFY HEADER IS FILLED, VENTED, AND PRESSURIZED IMMEDIATELY PRIOR TO USE.
 - DO NOT EXCEED 1000 GPM FLOW.
 - DO NOT USE AS A VENT PATH.
 - OPERATE FV-36 VERY SLOWLY.
 - ENSURE FV-36 IS CLOSED AND VALVE V-280 IS CLOSED TIGHTLY AFTER USE.
 - SUCTION STRAINERS REMOVED FROM THE SYSTEM IN ACCORDANCE WITH RFR-083648.
 - VALVES V270, V271, V272, V273 ARE CLOSED DURING NORMAL PLANT OPERATION. SEE RFR-08777A.
 - DELETED.
 - DELETED.
 - DELETED.

AS-BUILT CLASS 1

DRWN	N/A	(DATE)	
CHKD	N/A	(DATE)	
SUPV	N/A	(DATE)	
APPV	N/A	(DATE)	
LOCATION	CALLAWAY ENERGY CENTER		CLASS
UNION ELECTRIC COMPANY ST. LOUIS, MO			REV. 48

PIPING AND INSTRUMENTATION DIAGRAM
FEEDWATER SYSTEM
FSAR FIGURE 10.4-6 SHEET 1

(Q) M-22AE01



TO ALL FEEDWATER ISOLATION VALVES

1 HS FEEDWATER ISOLATION VALVES - MASTER TRIP 006

4 HS FEEDWATER ISOLATION VALVES - MASTER TRIP 006

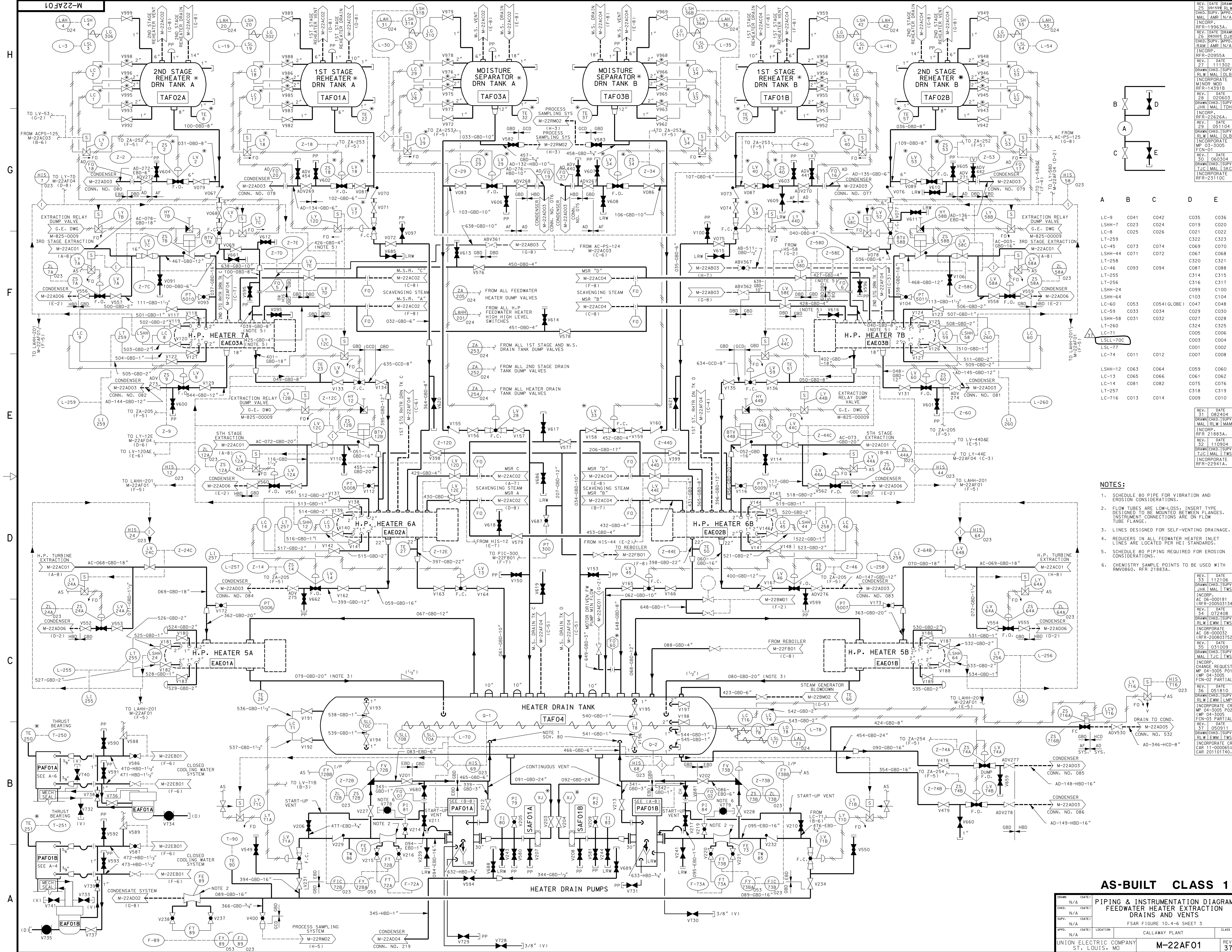
- NOTES:**
- ALL INSTRUMENTS NUMBERED 400 AND ABOVE ON M-22AE02 ARE FURNISHED WITH ASSS EQUIPMENT (OTHERWISE DESIGNATED AS Ⓢ).
 - CLASS CHANGE (0BB TO 0AB) IS AT FIRST WELD PLANT NORTH OF A-0 WALL (INSIDE TURBINE BLDG.).
 - DO NOT APPLY INSULATION TO CONDENSATE POT. SEE WESTINGHOUSE DWG. 1682C84, SHT. 1 & 24 FOR REFERENCE. SEE WESTINGHOUSE PIP VOLUME 12-1, SECTION 3.0, PAGES 23 AND 24 FOR DESIGN DETAILS.
 - SERIES 700 VALVES ARE TO BE INSTRUMENT TYPE VALVES BOUGHT IN ACCORDANCE WITH DRAWING J-27610.
 - PIPING INSIDE CONTAINMENT TO BE INSTRUMENTED AFTER FABRICATION OR IMPACT TESTED.
 - THE FEEDWATER ISOLATION VALVE ACTUATORS ARE PROCESS FLUID OPERATED.
 - S.G. WET LAYOUT CONNECTION.
 - THE FOLLOWING CODE/NON-CODE BOUNDARIES APPLY TO ALL CARBON STEEL VENTS & DRAINS:
 - 1. Deleted.
 - 2. Deleted.
 - 3. Deleted.
 - 4. Deleted.
 - 5. Deleted.
 - 6. Deleted.
 - 7. Deleted.
 - 8. Deleted.
 - 9. Deleted.
 - 10. Deleted.
 - 11. Deleted.
 - 12. Deleted.
 - 13. Deleted.

REV.	DATE	DRAWN	CHKD.	DATE	DRAWN	CHKD.	DATE	DRAWN	CHKD.	DATE	DRAWN	CHKD.	DATE
19	03/29/98	MAL	JHK	03/29/98	MAL	JHK	03/29/98	MAL	JHK	03/29/98	MAL	JHK	03/29/98
20	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04
21	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04
22	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04
23	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04	MAL	JHK	05/17/04
24	11/09/04	MAL	JHK	11/09/04	MAL	JHK	11/09/04	MAL	JHK	11/09/04	MAL	JHK	11/09/04
25	10/12/05	MAL	JHK	10/12/05	MAL	JHK	10/12/05	MAL	JHK	10/12/05	MAL	JHK	10/12/05
26	10/28/05	MAL	JHK	10/28/05	MAL	JHK	10/28/05	MAL	JHK	10/28/05	MAL	JHK	10/28/05
27	11/02/05	MAL	JHK	11/02/05	MAL	JHK	11/02/05	MAL	JHK	11/02/05	MAL	JHK	11/02/05
28	07/18/06	MAL	JHK	07/18/06	MAL	JHK	07/18/06	MAL	JHK	07/18/06	MAL	JHK	07/18/06
29	07/17/10	MAL	JHK	07/17/10	MAL	JHK	07/17/10	MAL	JHK	07/17/10	MAL	JHK	07/17/10
30	04/30/13	MAL	JHK	04/30/13	MAL	JHK	04/30/13	MAL	JHK	04/30/13	MAL	JHK	04/30/13
31	07/09/13	MAL	JHK	07/09/13	MAL	JHK	07/09/13	MAL	JHK	07/09/13	MAL	JHK	07/09/13
32	03/25/15	MAL	JHK	03/25/15	MAL	JHK	03/25/15	MAL	JHK	03/25/15	MAL	JHK	03/25/15
33	03/10/22	MAL	JHK	03/10/22	MAL	JHK	03/10/22	MAL	JHK	03/10/22	MAL	JHK	03/10/22

AS-BUILT CLASS 1

ANY REVISION TO THIS DWG. MAY REQUIRE A REVISION TO M-22AB04, M-22AB05, M-22AB06 AND/OR M-22AB07

N/A	DATE	PIPING AND INSTRUMENTATION DIAGRAM FEEDWATER SYSTEM	DATE
N/A	DATE	FSAR FIGURE 10.4-6 SHEET 2	DATE
N/A	DATE	CALLAWAY ENERGY CENTER	DATE
UNION ELECTRIC COMPANY	DATE	M-22AE02 (Q)	DATE
ST. LOUIS, MO	DATE		DATE



- NOTES:**
- SCHEDULE 80 PIPE FOR VIBRATION AND EROSION CONSIDERATIONS.
 - FLOW TUBES ARE LOW-LOSS, INSERT TYPE. DESIGNED TO BE MOUNTED BETWEEN INSTRUMENT CONNECTIONS ON FLOW TUBE FLANGE.
 - LINES DESIGNED FOR SELF-VENTING DRAINAGE.
 - REDUCERS IN ALL FEEDWATER HEATER INLET LINES ARE LOCATED PER HEI STANDARDS.
 - SCHEDULE 80 PIPING REQUIRED FOR EROSION CONSIDERATIONS.
 - CHEMISTRY SAMPLE POINTS TO BE USED WITH RMV060. RFR 21893A.

REV.	DATE	DESCRIPTION
31	082404	DATE
30	060304	DATE
29	051104	DATE
28	020603	DATE
27	022626A	DATE
26	060404	DATE
25	051004	DATE
24	051104	DATE
23	051104	DATE
22	111202	DATE
21	111202	DATE
20	111202	DATE
19	111202	DATE
18	111202	DATE
17	111202	DATE
16	111202	DATE
15	111202	DATE
14	111202	DATE
13	111202	DATE
12	111202	DATE
11	111202	DATE
10	111202	DATE
9	111202	DATE
8	111202	DATE
7	111202	DATE
6	111202	DATE
5	111202	DATE
4	111202	DATE
3	111202	DATE
2	111202	DATE
1	111202	DATE

AS-BUILT CLASS 1

PIPING & INSTRUMENTATION DIAGRAM
FEEDWATER HEATER EXTRACTON DRAINS AND VENTS

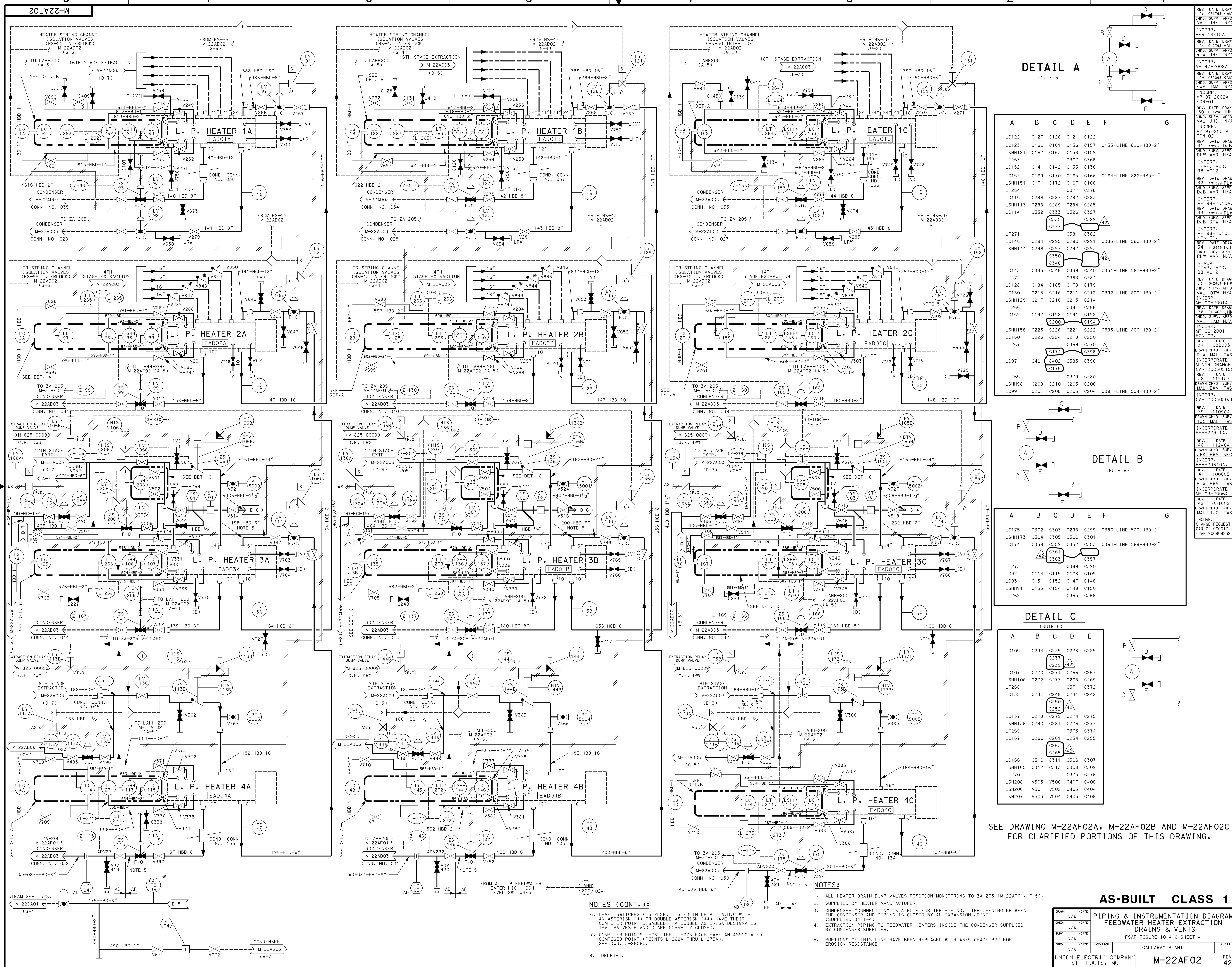
FSAR FIGURE 10.4-6 SHEET 3

CALLAWAY PLANT

UNION ELECTRIC COMPANY
 ST. LOUIS, MO

M-22AF01

REV. 37



DETAIL A
(NOTE 6)

A	B	C	D	E	F	G
LC122	C127	C128	C121	C122		
LC123	C160	C161	C156	C157	C155-LINE	620-HBD-2"
LSHH121	C162	C163	C158	C159		
LT263						
LC152	C141	C142	C135	C136		
LC153	C169	C170	C165	C166	C164-LINE	626-HBD-2"
LSHH151	C171	C172	C167	C168		
LT264						
LC115	C286	C287	C282	C283		
LSHH113	C288	C289	C284	C285		
LC114	C332	C333	C326	C327		
LT271	C294	C295	C290	C291	C385-LINE	560-HBD-2"
LC146	C296	C297	C292	C293		
LSHH144						
LC143	C345	C346	C339	C340	C351-LINE	562-HBD-2"
LT272						
LC128	C184	C185	C178	C179		
LC130	C215	C216	C211	C212	C392-LINE	600-HBD-2"
LSHH129	C217	C218	C213	C214		
LT266						
LC159	C197	C198	C191	C192		
LSHH158	C225	C226	C221	C222	C393-LINE	606-HBD-2"
LC160	C223	C224	C219	C220		
LT267						
LC97	C401	C402	C395	C396		
LT265						
LSHH98	C209	C210	C205	C206		
LC99	C207	C208	C203	C204	C391-LINE	594-HBD-2"

DETAIL B
(NOTE 6)

A	B	C	D	E	F	G
LC175	C302	C303	C298	C299	C386-LINE	566-HBD-2"
LSHH173	C304	C305	C300	C301		
LC174	C358	C359	C352	C353	C364-LINE	568-HBD-2"
LT273						
LC92	C114	C115	C108	C109		
LC93	C151	C152	C147	C148		
LSHH91	C153	C154	C149	C150		
LT262						
LC105	C234	C235	C228	C229		
LC107	C270	C271	C266	C267		
LSHH106	C272	C273	C268	C269		
LT268						
LC135	C247	C248	C241	C242		
LC137	C278	C279	C274	C275		
LSHH136	C280	C281	C276	C277		
LT269						
LC167	C260	C261	C254	C255		
LC166	C310	C311	C306	C307		
LSHH165	C312	C313	C308	C309		
LT270						
LSH208	V505	V506	C407	C408		
LSH206	V501	V502	C403	C404		
LSH207	V503	V504	C405	C406		

DETAIL C
(NOTE 6)

A	B	C	D	E
LC105	C234	C235	C228	C229
LC107	C270	C271	C266	C267
LSHH106	C272	C273	C268	C269
LT268				
LC135	C247	C248	C241	C242
LC137	C278	C279	C274	C275
LSHH136	C280	C281	C276	C277
LT269				
LC167	C260	C261	C254	C255
LC166	C310	C311	C306	C307
LSHH165	C312	C313	C308	C309
LT270				
LSH208	V505	V506	C407	C408
LSH206	V501	V502	C403	C404
LSH207	V503	V504	C405	C406

SEE DRAWING M-22AF02A, M-22AF02B AND M-22AF02C FOR CLARIFIED PORTIONS OF THIS DRAWING.

AS-BUILT CLASS 1

DRWN	N/A	(DATE)
SUPV	N/A	(DATE)
APPV	N/A	(DATE)
LOCATION		
CALLAWAY PLANT		
CLASS		
UNION ELECTRIC COMPANY		
ST. LOUIS, MO		
M-22AF02		
REV.	42	

NOTES (CONT.):

- LEVEL SWITCHES (LSL/LSH) LISTED IN DETAIL A,B,C WITH AN ASTERISK (*) OR DOUBLE ASTERISK (**) HAVE THEIR COMPUTER POINT DISABLED. A DOUBLE ASTERISK (**) DESIGNATES THAT VALVES B AND C ARE NORMALLY CLOSED.
- COMPUTER POINTS L-262 THRU L-273 EACH HAVE AN ASSOCIATED COMPOSED POINT (POINTS L-262A THRU L-273A). SEE DWG. J-26060.
- DELETED.

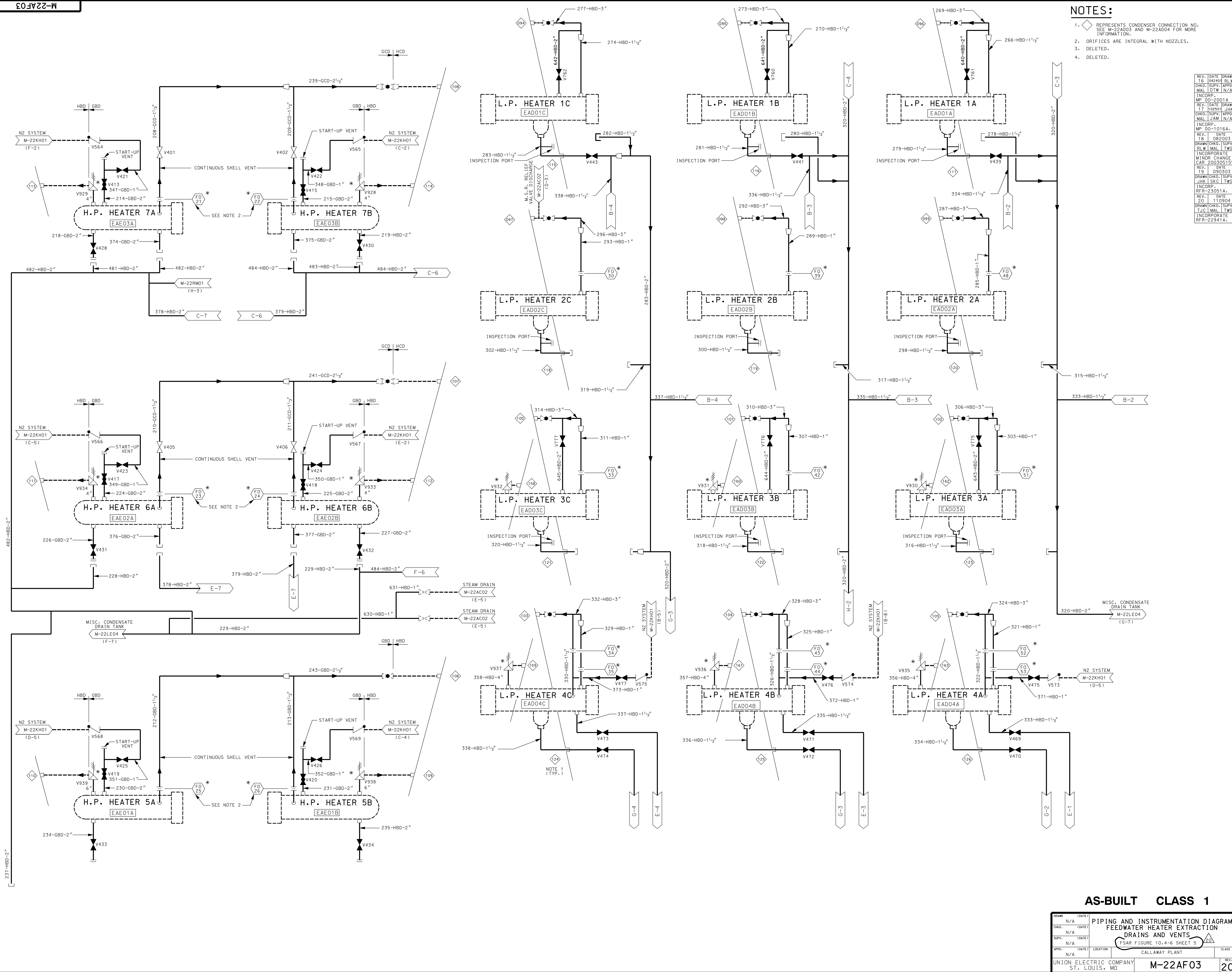
NOTES:

- ALL HEATER DRAIN DUMP VALVES POSITION MONITORING TO ZA-205 (M-22AF01, F-5).
- SUPPLIED BY HEATER MANUFACTURER.
- CONDENSER "CONNECTION" IS A HOLE FOR THE PIPING. THE OPENING BETWEEN THE CONDENSER AND PIPING IS CLOSED BY AN EXPANSION JOINT (SUPPLIED BY I-4).
- EXTRACTION PIPING TO FEEDWATER HEATERS INSIDE THE CONDENSER SUPPLIED BY CONDENSER SUPPLIER.
- PORTIONS OF THIS LINE HAVE BEEN REPLACED WITH A335 GRADE P22 FOR EROSION RESISTANCE.

NOTES:

1. REPRESENTS CONDENSER CONNECTION NO. SEE M-22AD03 AND M-22AD04 FOR MORE INFORMATION.
2. ORIFICES ARE INTEGRAL WITH NOZZLES.
3. DELETED.
4. DELETED.

REV.	DATE	DRAWN	CHKD.	DATE	APPD.
16	04/04	RLW			
17	05/08	JHK			
18	08/20/03				
19	09/03/03				
20	11/09/04				

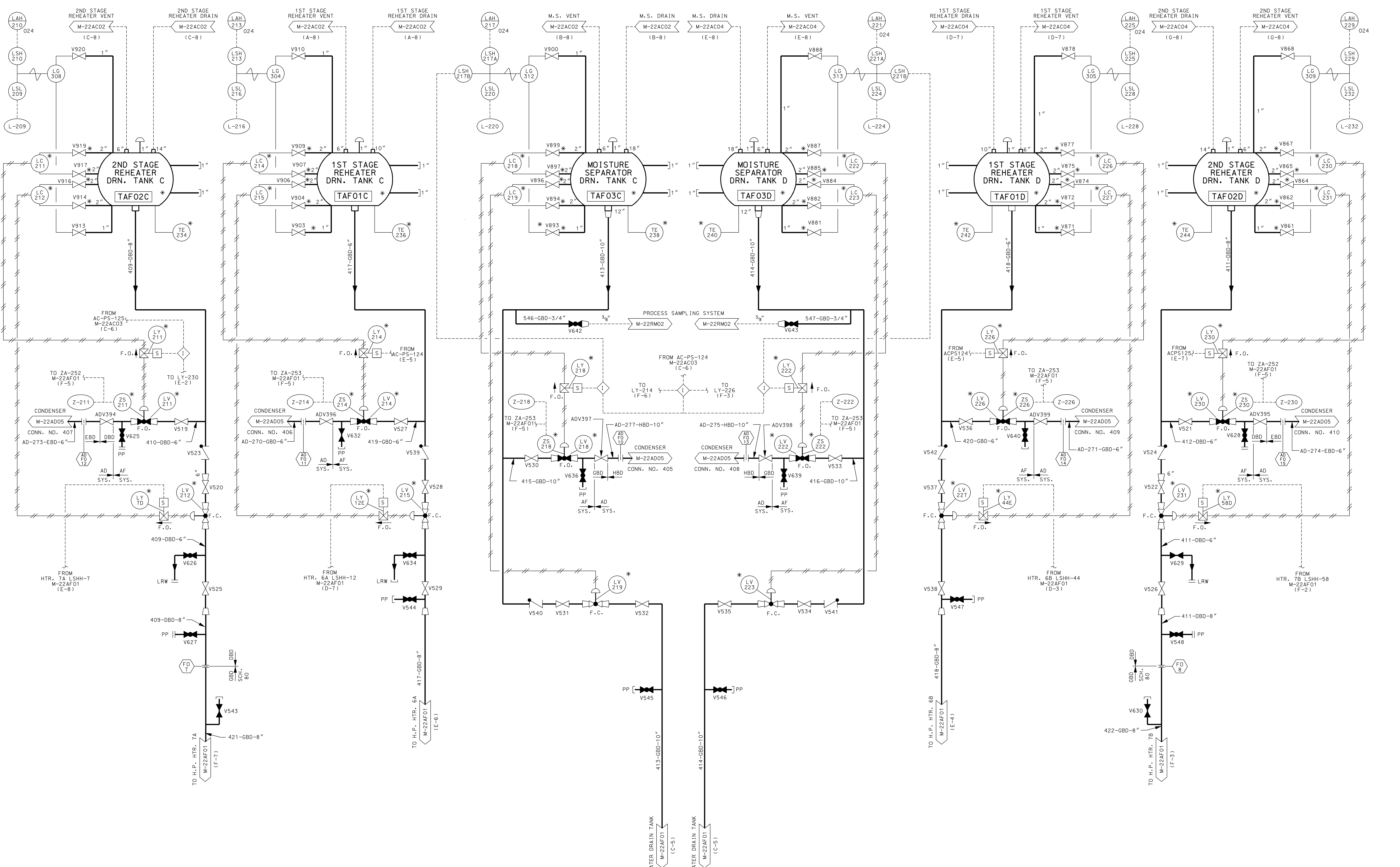


AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY ST. LOUIS, MO			CLASS

**PIPING AND INSTRUMENTATION DIAGRAM
FEEDWATER HEATER EXTRACTION
DRAINS AND VENTS**

FSAR FIGURE 10.4-6 SHEET 5
M-22AF03
REV. 20



REV.	DATE	DRAWN	BY	CHKD.	BY	APPD.	BY
1	02/06/03	JHK	ML	TWS			
2	05/11/04	JHK	ML	TWS			
3	08/26/04	JHK	ML	TWS			
4	11/09/04	JHK	ML	TWS			
5	02/03/05	JHK	ML	TWS			
6	02/03/05	JHK	ML	TWS			
7	02/03/05	JHK	ML	TWS			
8	02/03/05	JHK	ML	TWS			

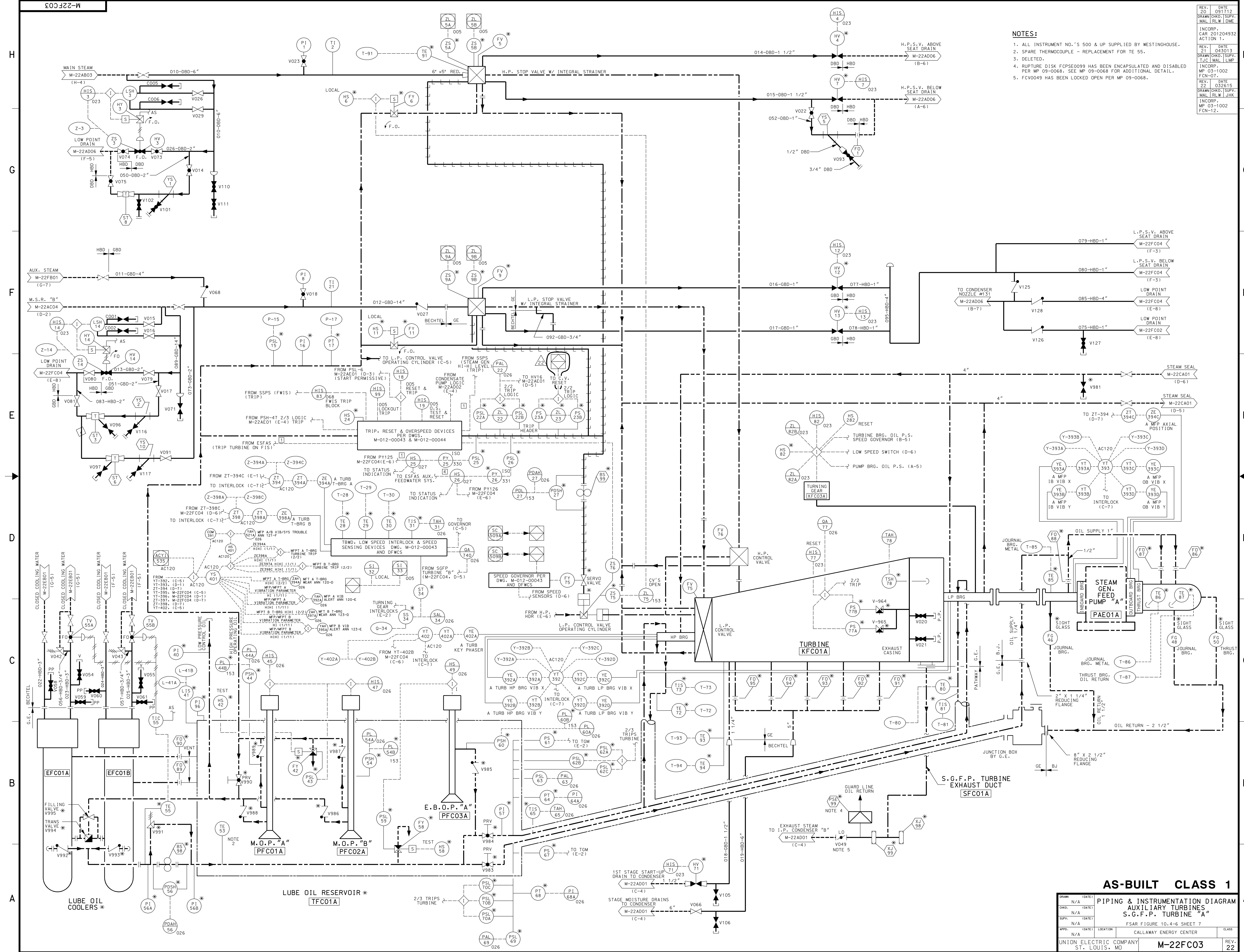
AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY			REV. 10
ST. LOUIS, MO			M-22AF04

PIPING & INSTRUMENTATION DIAGRAM
FEEDWATER HEATER EXTRACTION
DRAINS AND VENTS
ESAR FIGURE 10.4-6 SHEET 6

REV.	DATE	BY	CHKD.
20	091712		
DRAWING: SUPV. MAL, RLW, DME			
INCORP.	DATE	BY	CHKD.
CAR	201204932		
ACTION 1:			
REV.	DATE	BY	CHKD.
21	043013		
INCORP. MP 03-1002 FCN-07.			
REV.	DATE	BY	CHKD.
22	032615		
DRAWING: SUPV. MAL, RLW, JHK			
INCORP.	DATE	BY	CHKD.
MP 03-1002			
FCN-12.			

- NOTES:**
1. ALL INSTRUMENT NO.'S 500 & UP SUPPLIED BY WESTINGHOUSE.
 2. SPARE THERMOCOUPLE - REPLACEMENT FOR TE 55.
 3. DELETED.
 4. RUPTURE DISK FCPS0099 HAS BEEN ENCAPSULATED AND DISABLED PER MP 09-0068. SEE MP 09-0068 FOR ADDITIONAL DETAIL.
 5. FCV0049 HAS BEEN LOCKED OPEN PER MP 09-0068.



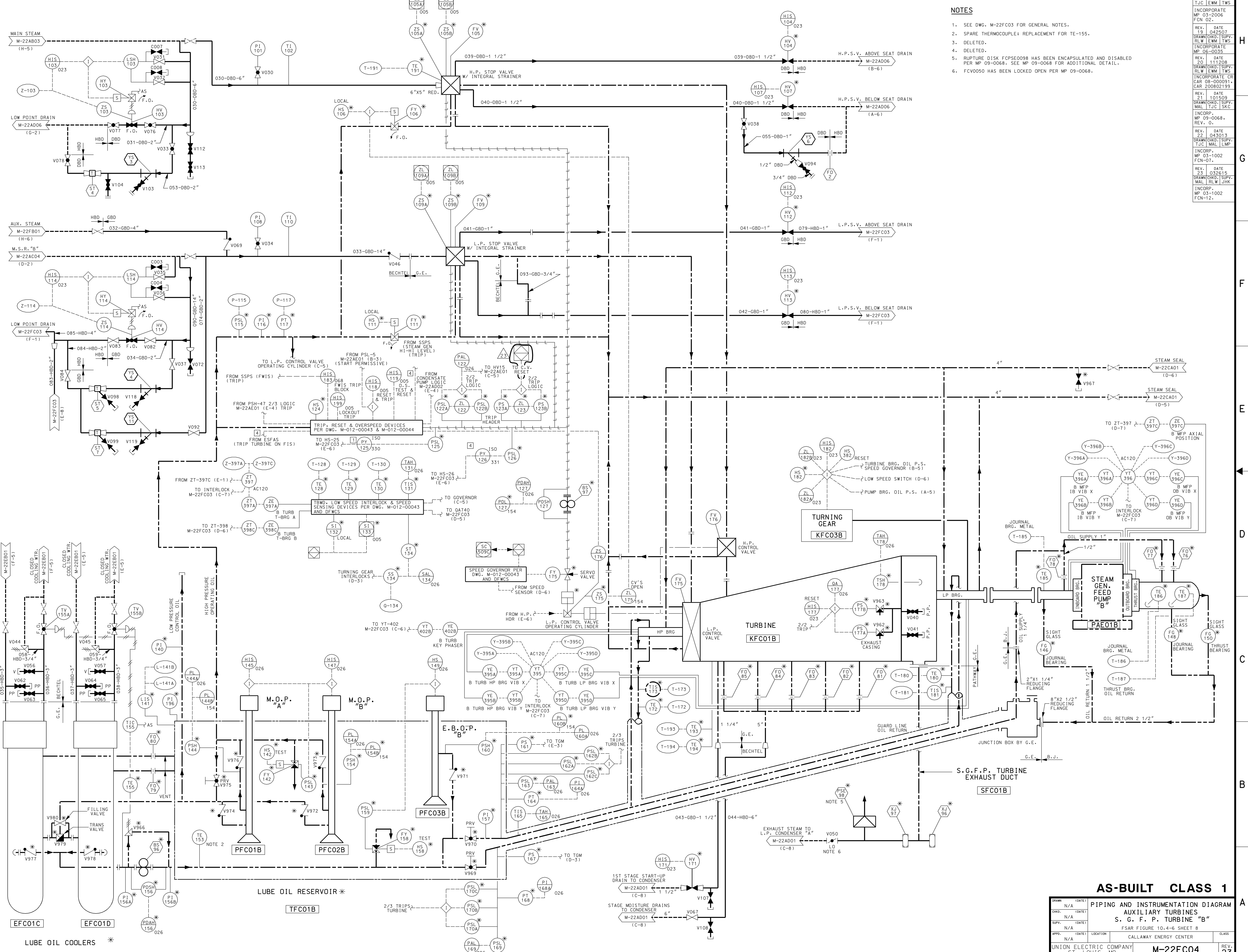
AS-BUILT CLASS 1

DRAWN	DATE	BY	CHKD.
N/A			
CHKD.	DATE	BY	CHKD.
N/A			
SUPV.	DATE	BY	CHKD.
N/A			
APPD.	DATE	LOCATION	CLASS
N/A		FSAR FIGURE 10.4-6 SHEET 7	
UNION ELECTRIC COMPANY			REV. 22
ST. LOUIS, MO			

PIPING & INSTRUMENTATION DIAGRAM
AUXILIARY TURBINES
S.G.F.P. TURBINE "A"

FSAR FIGURE 10.4-6 SHEET 7
CALLAWAY ENERGY CENTER

M-22FC03



- NOTES**
1. SEE DWG. M-22FC03 FOR GENERAL NOTES.
 2. SPARE THERMOCOUPLE; REPLACEMENT FOR TE-155.
 3. DELETED.
 4. DELETED.
 5. RUPTURE DISK FCPSE0098 HAS BEEN ENCAPSULATED AND DISABLED PER MP 09-0068. SEE MP 09-0068 FOR ADDITIONAL DETAIL.
 6. FCV0050 HAS BEEN LOCKED OPEN PER MP 09-0068.

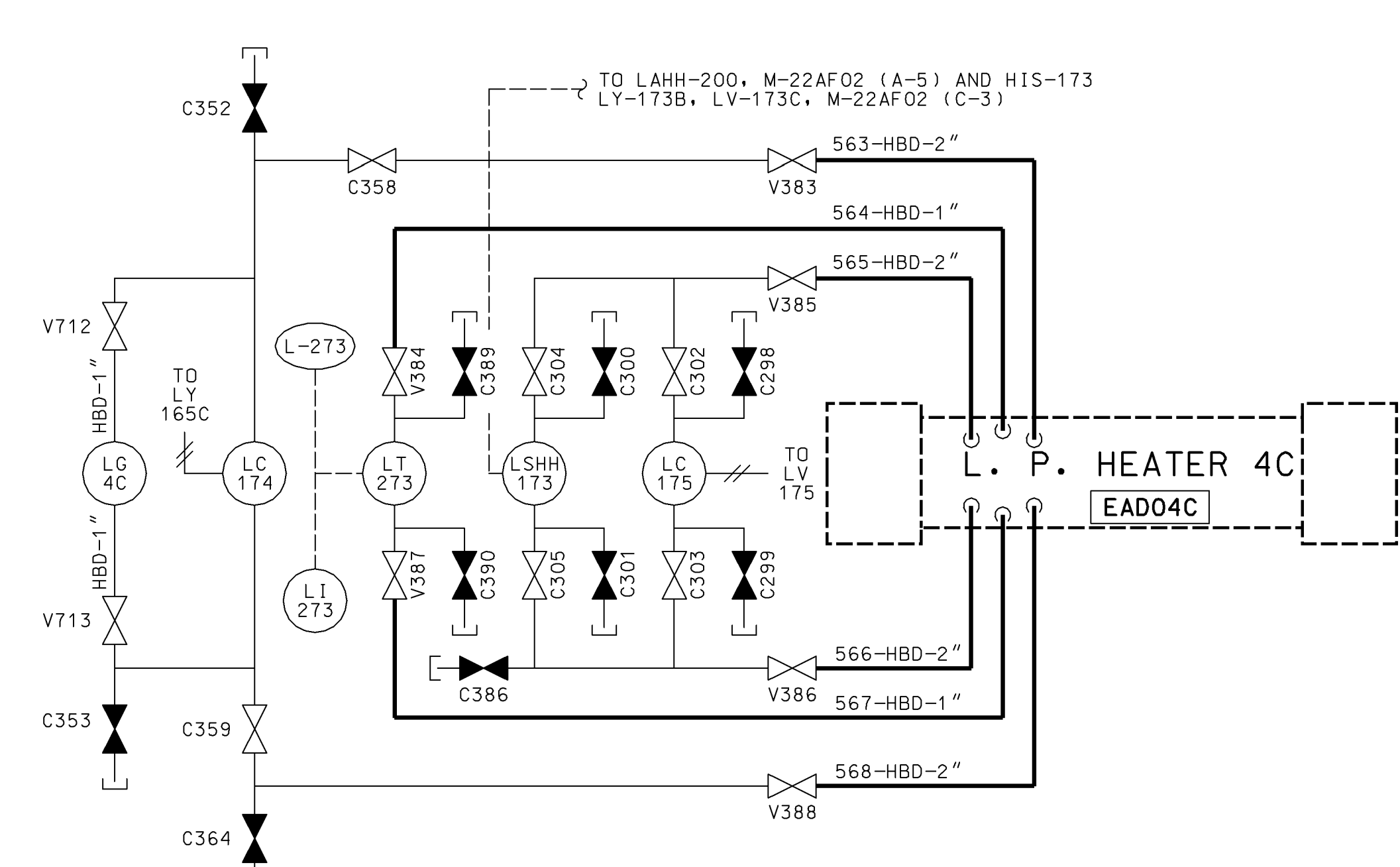
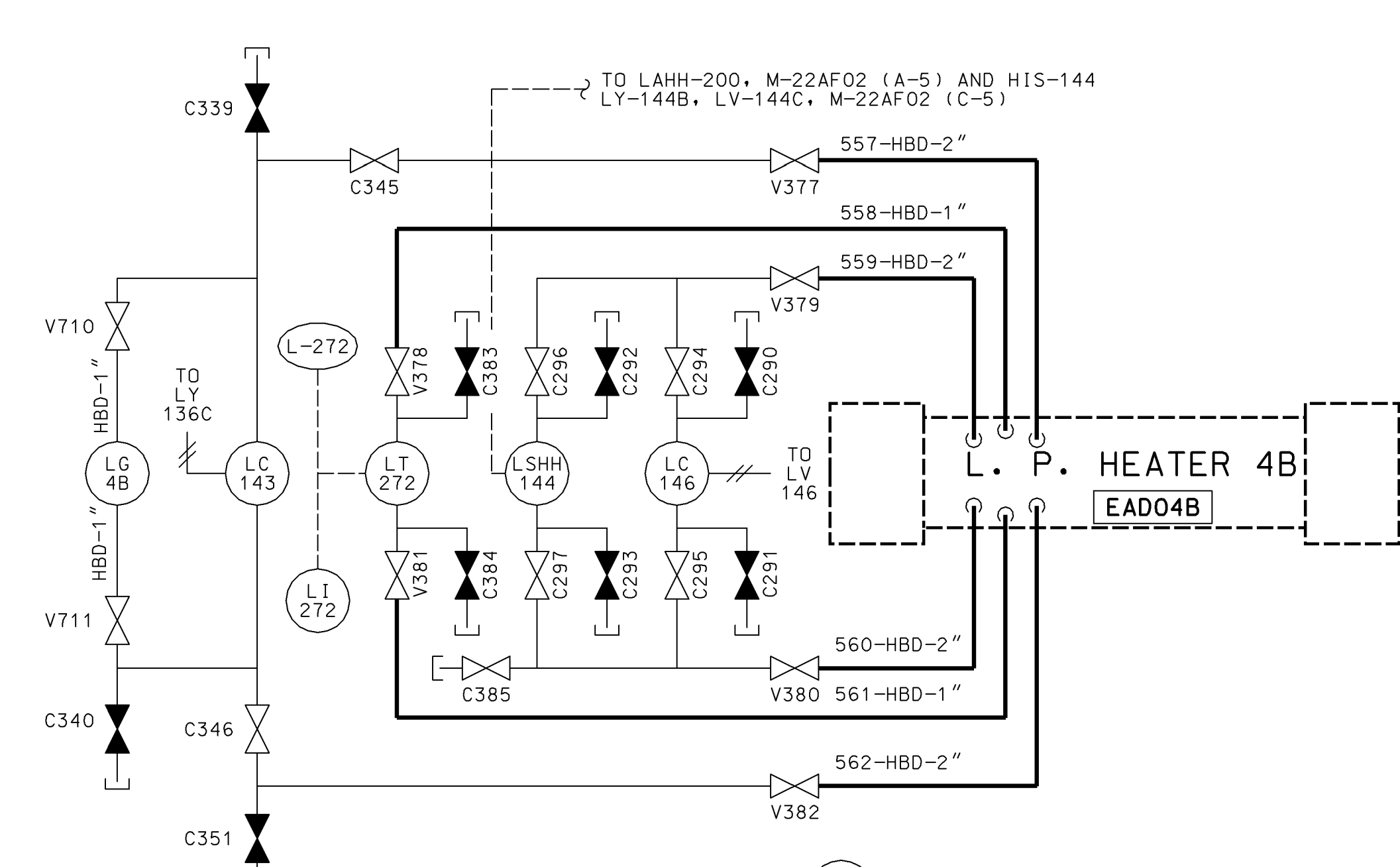
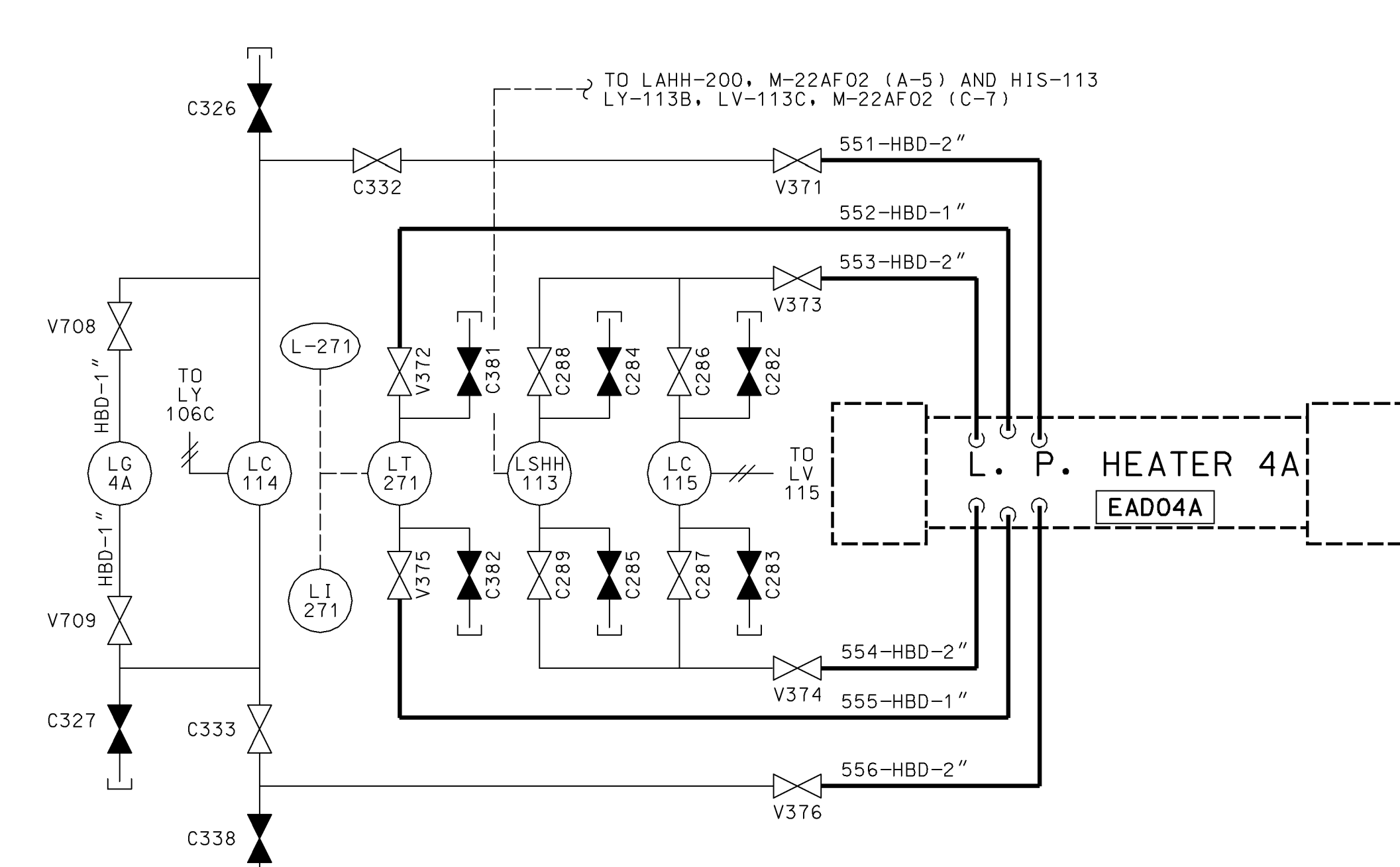
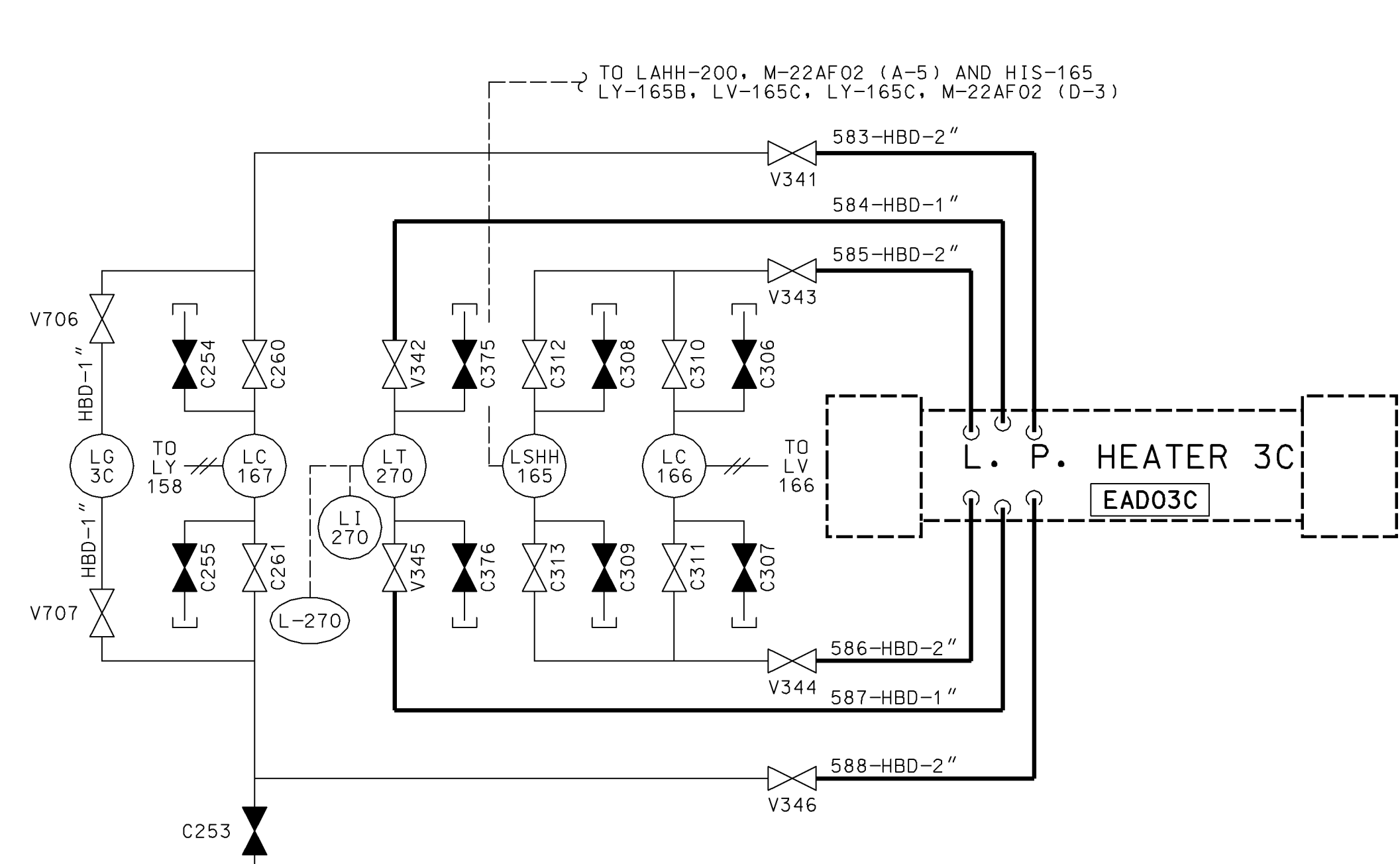
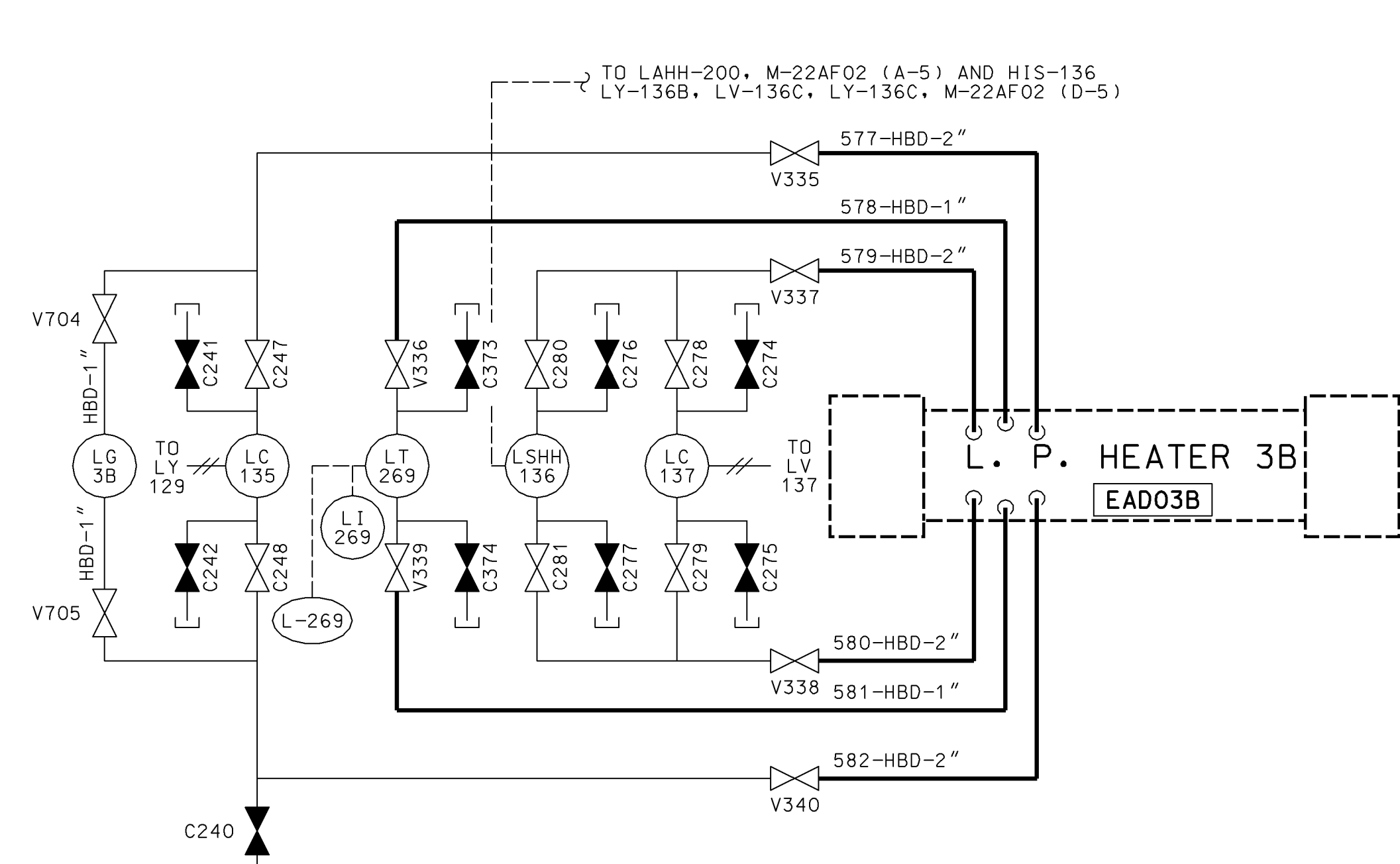
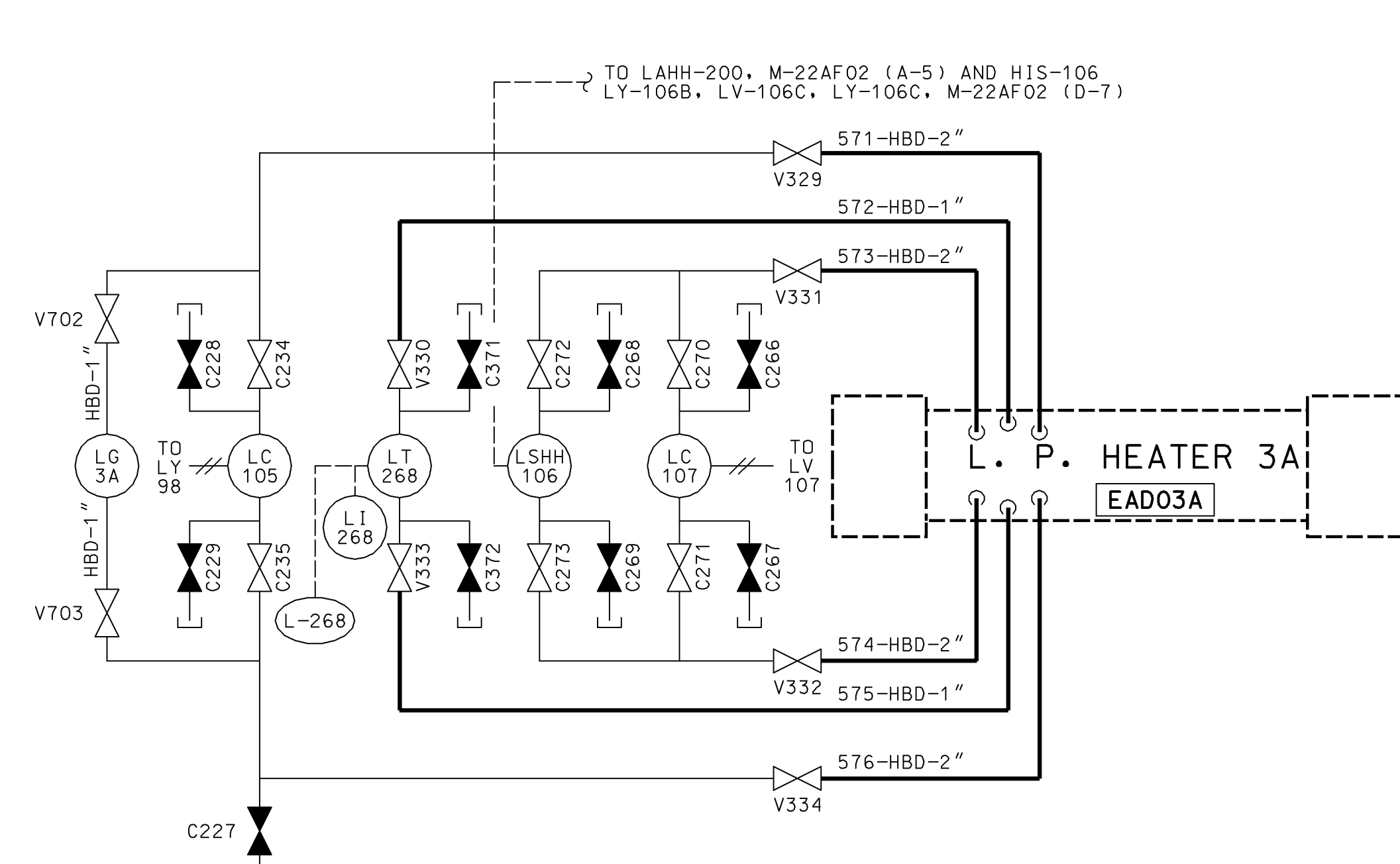
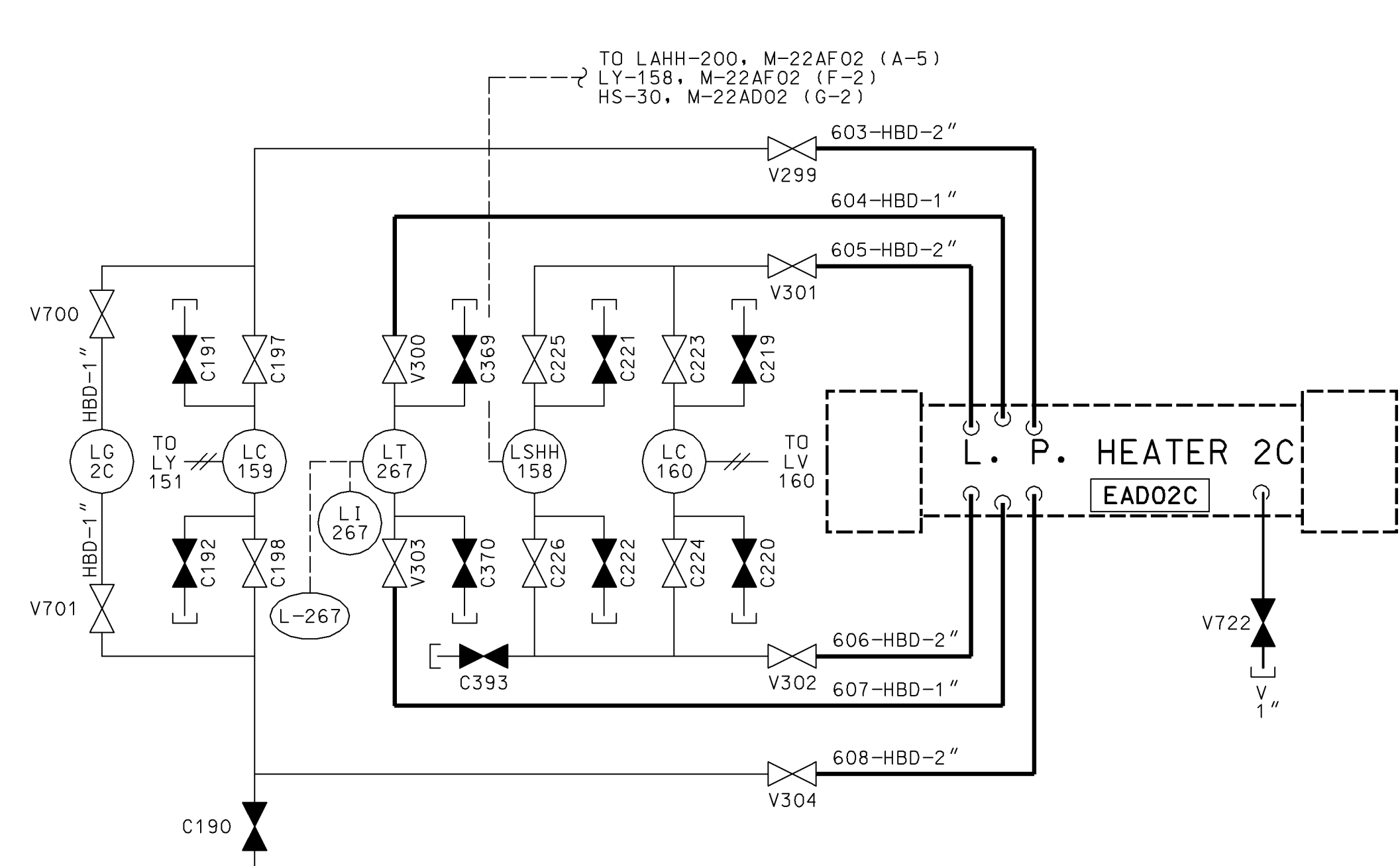
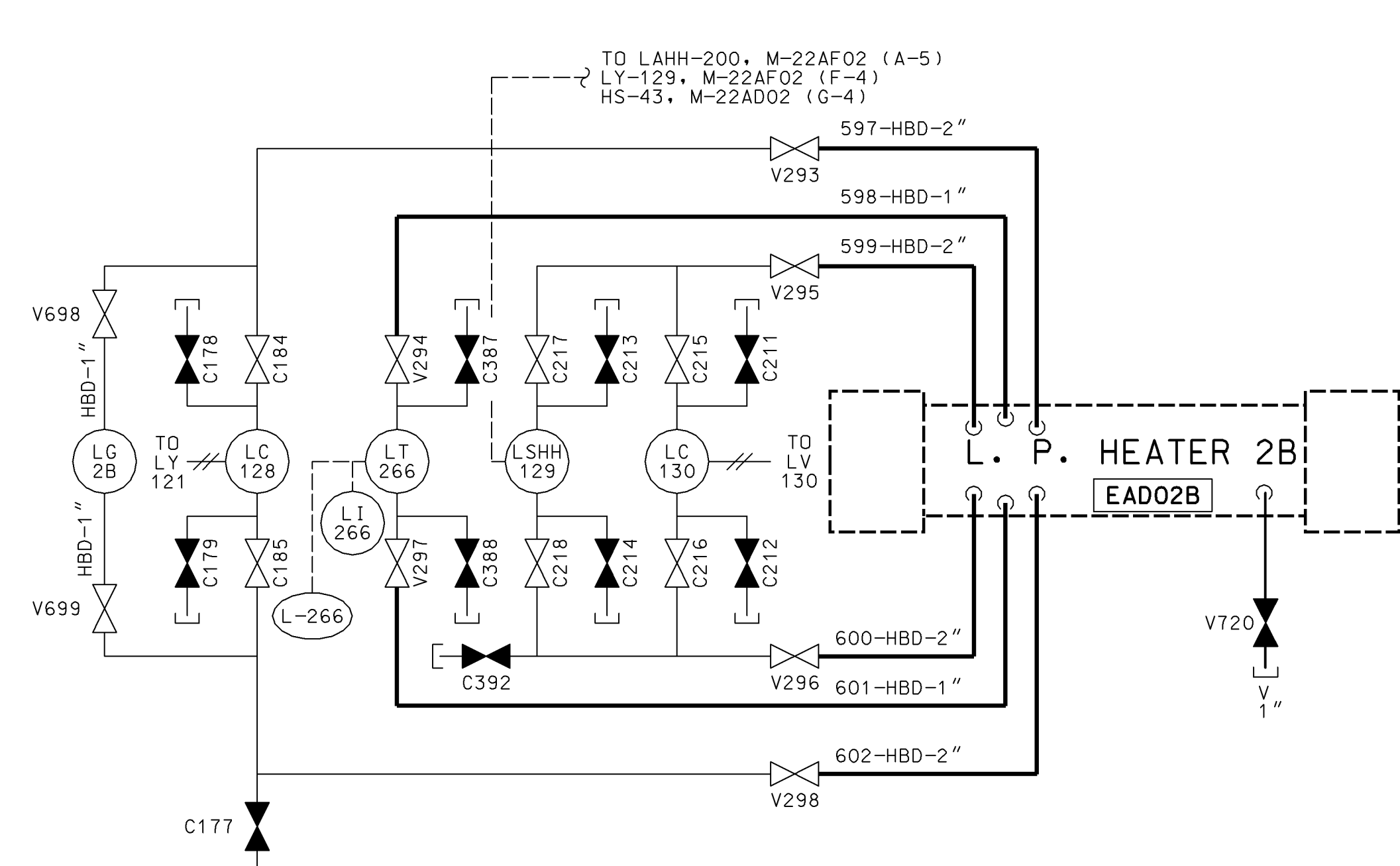
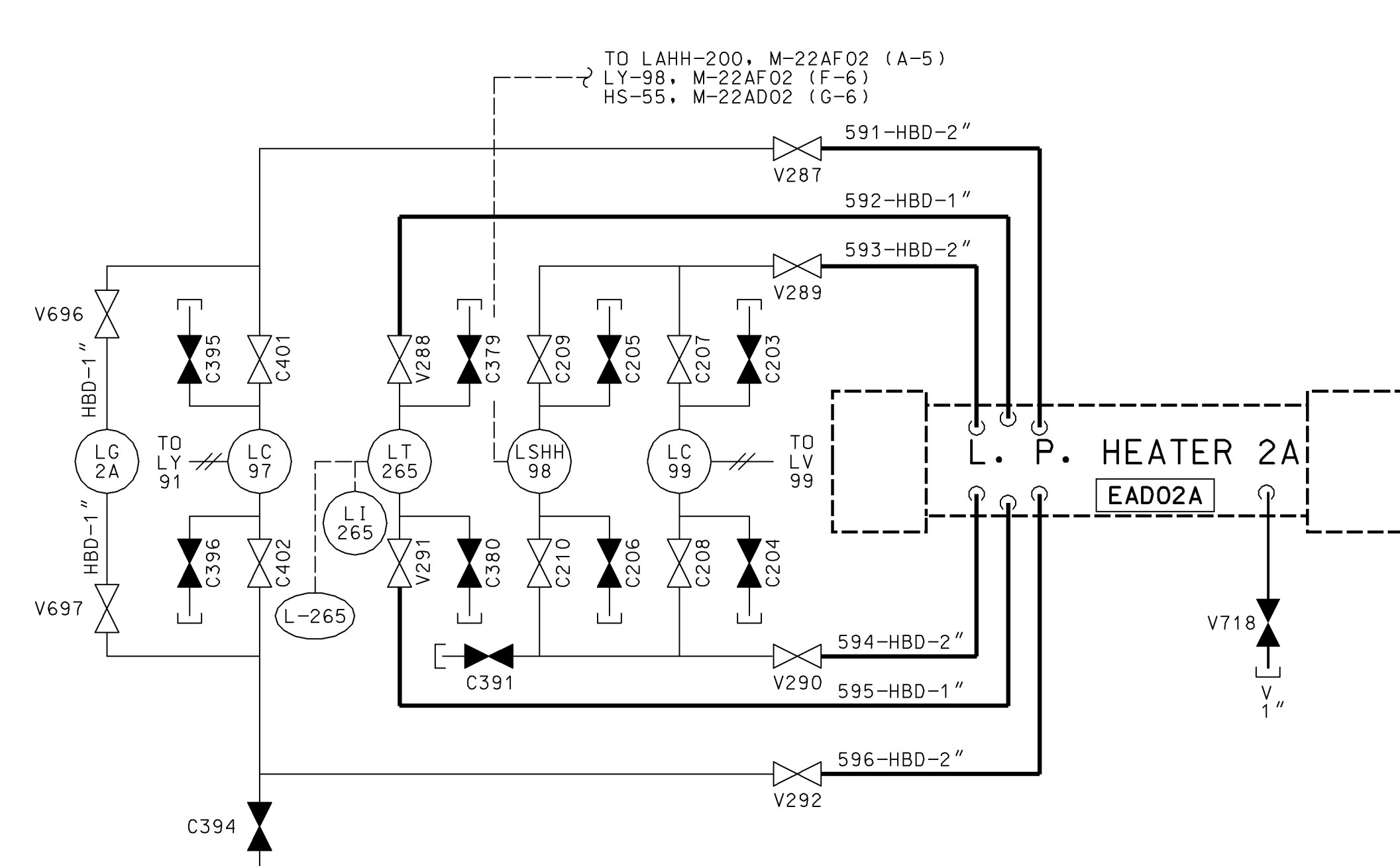
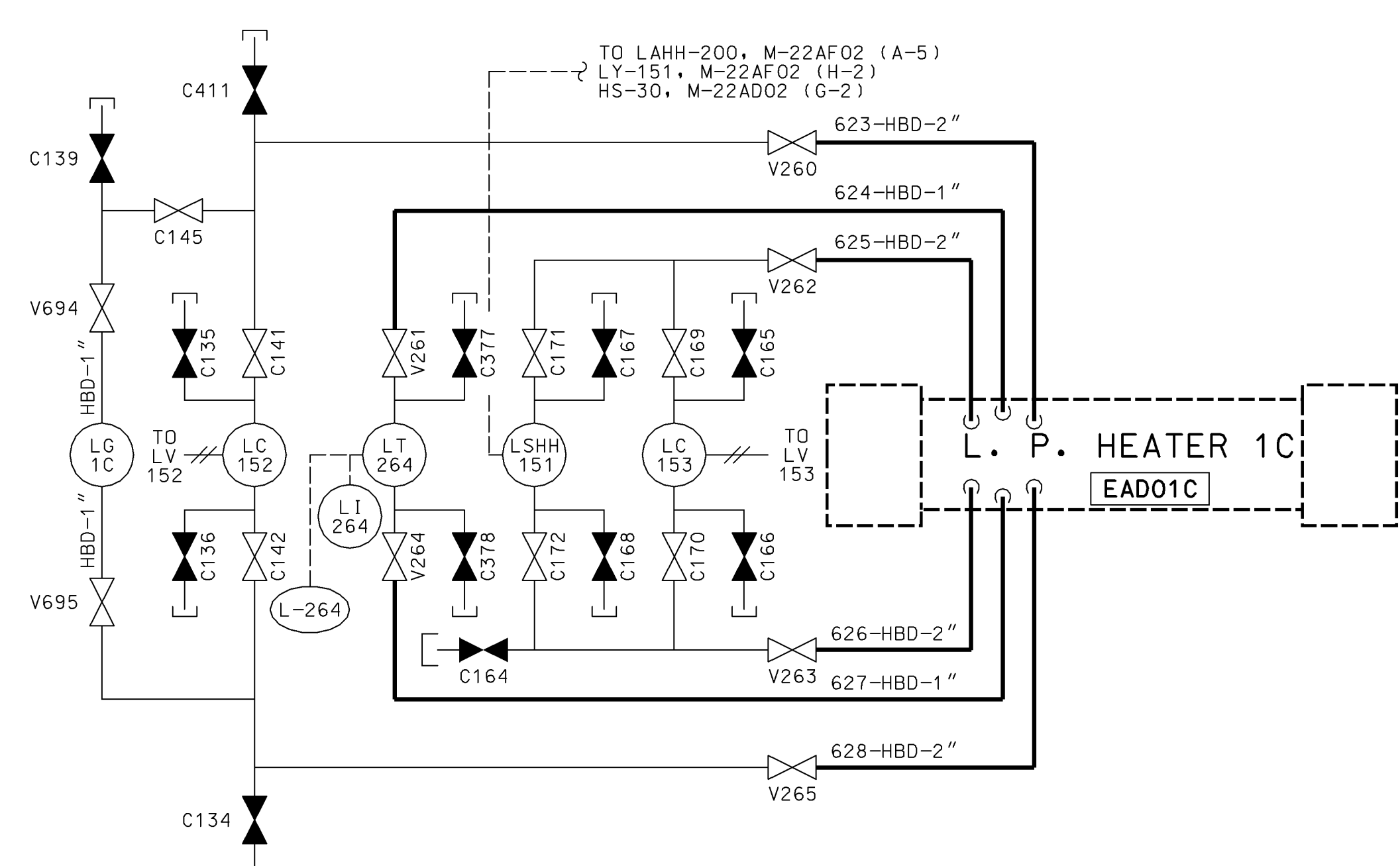
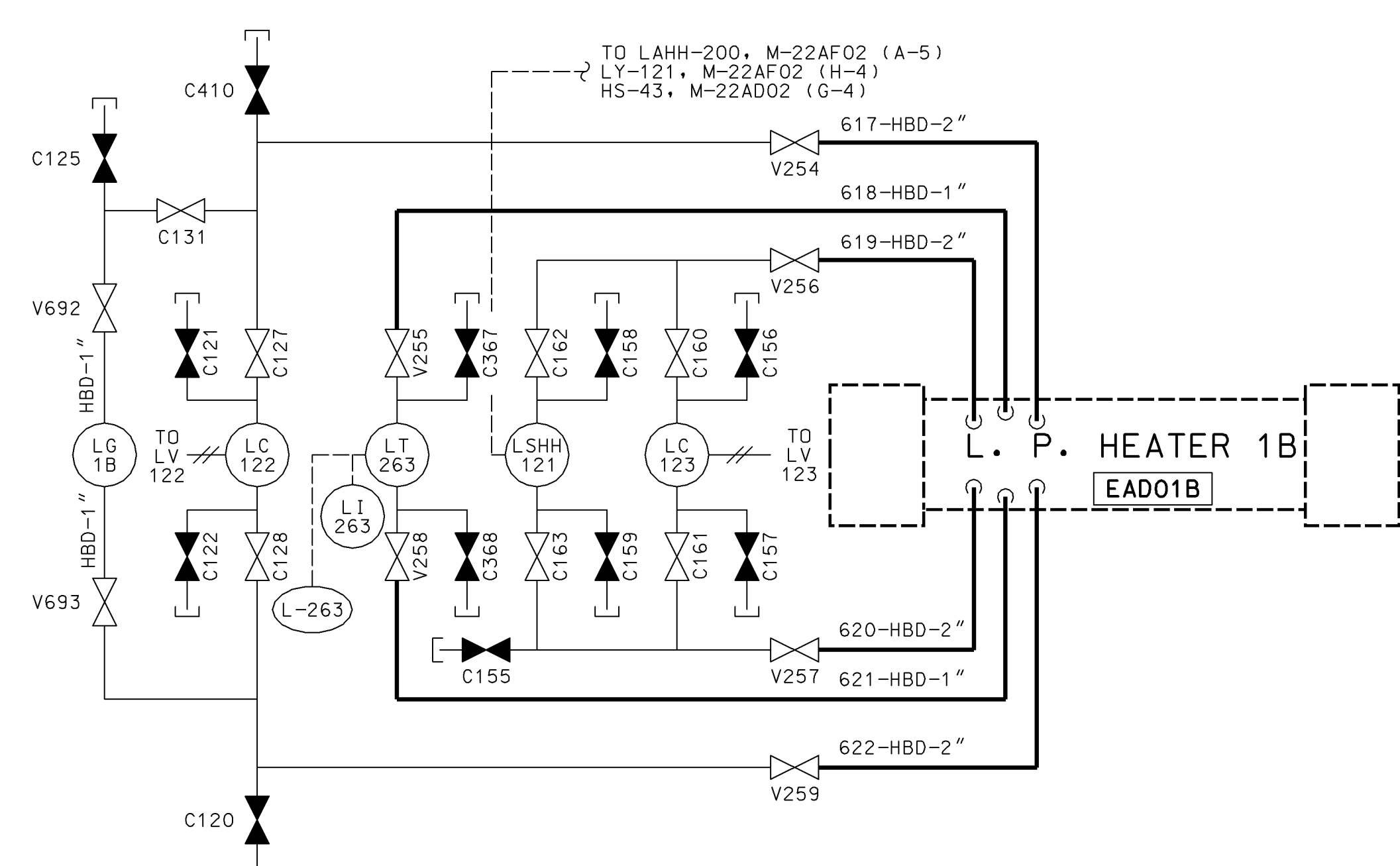
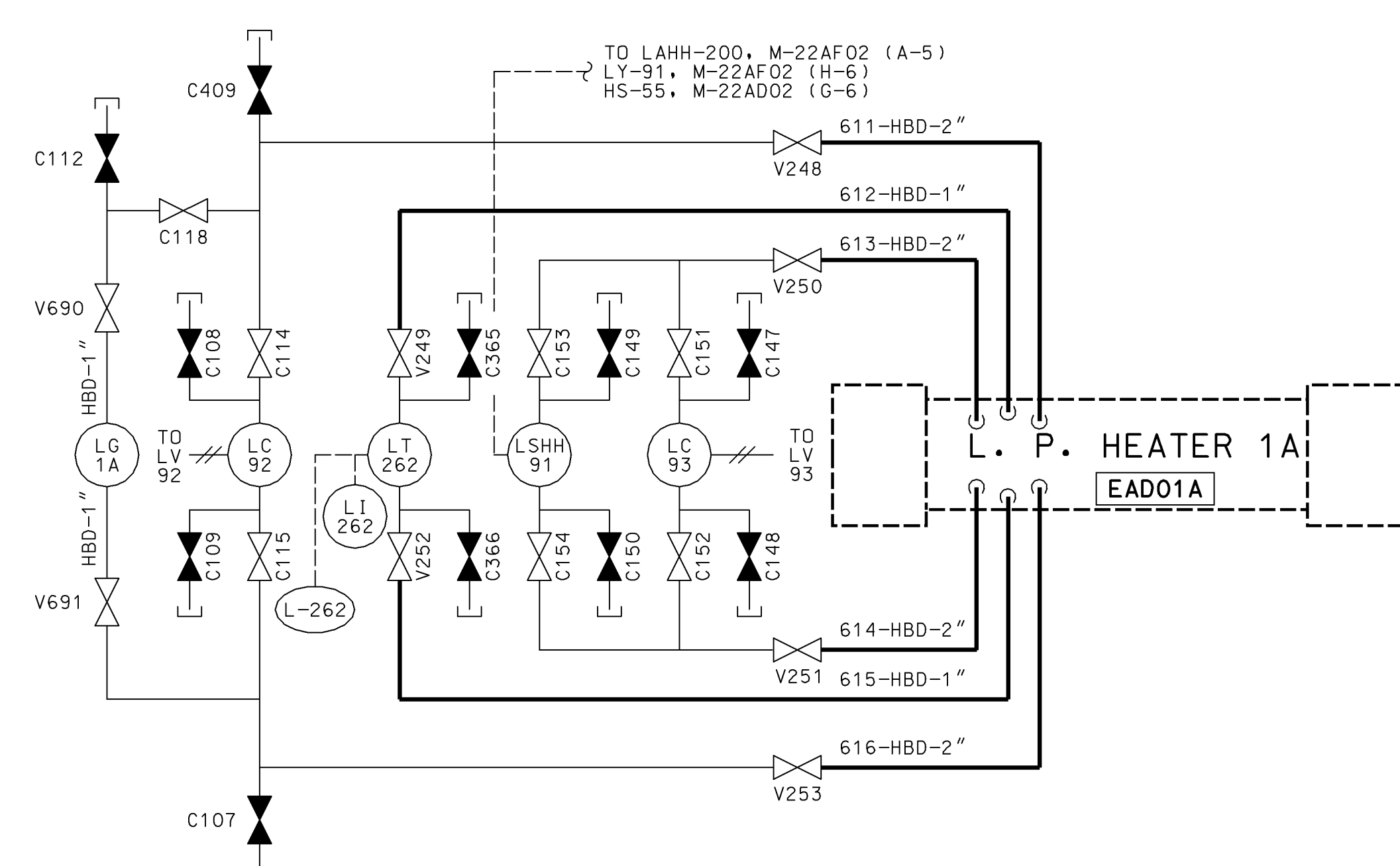
REV.	DATE	BY	CHKD.	APPD.
18	01/20/05	JJC	EWM	TWS
19	02/25/07	JJC	EWM	TWS
20	11/11/08	JJC	EWM	TWS
21	01/15/09	JJC	EWM	TWS
22	04/30/13	JJC	EWM	TWS
23	03/26/15	JJC	EWM	TWS

AS-BUILT CLASS 1

DRWN	N/A	DATE	
CHKD	N/A	DATE	
SUPV	N/A	DATE	
APPD	N/A	DATE	
LOC	FSAR FIGURE 10.4-6	SHEET	8
CLAS	CALLAWAY ENERGY CENTER		
COMP	UNION ELECTRIC COMPANY		
LOC	ST. LOUIS, MO		
REV.	23		

REV.	DATE	DRAWN	BY
INITIAL	ISSUE	PER	REF
REFR-14529A.			
REV.	DATE	DRAWN	BY
CHD.	SUPV.	APPR.	DJB
CHKD.	SUPV.	APPR.	JHK
INCORP.	TEMP.	MOD.	98-M012
REV.	DATE	DRAWN	BY
CHD.	SUPV.	APPR.	DJB
CHKD.	SUPV.	APPR.	JHK
INCORP.	TEMP.	MOD.	98-M012
REV.	DATE	DRAWN	BY
CHD.	SUPV.	APPR.	DJB
CHKD.	SUPV.	APPR.	JHK
INCORP.	TEMP.	MOD.	98-M012
REV.	DATE	DRAWN	BY
CHD.	SUPV.	APPR.	DJB
CHKD.	SUPV.	APPR.	JHK
INCORP.	TEMP.	MOD.	98-M012
REV.	DATE	DRAWN	BY
CHD.	SUPV.	APPR.	DJB
CHKD.	SUPV.	APPR.	JHK
INCORP.	TEMP.	MOD.	98-M012

M-22AF02C



FROM ALL LP FEEDWATER HEATER HIGH HIGH LEVEL SWITCHES (LAHH) 200 024

NOTES:

- 1. DELETED.

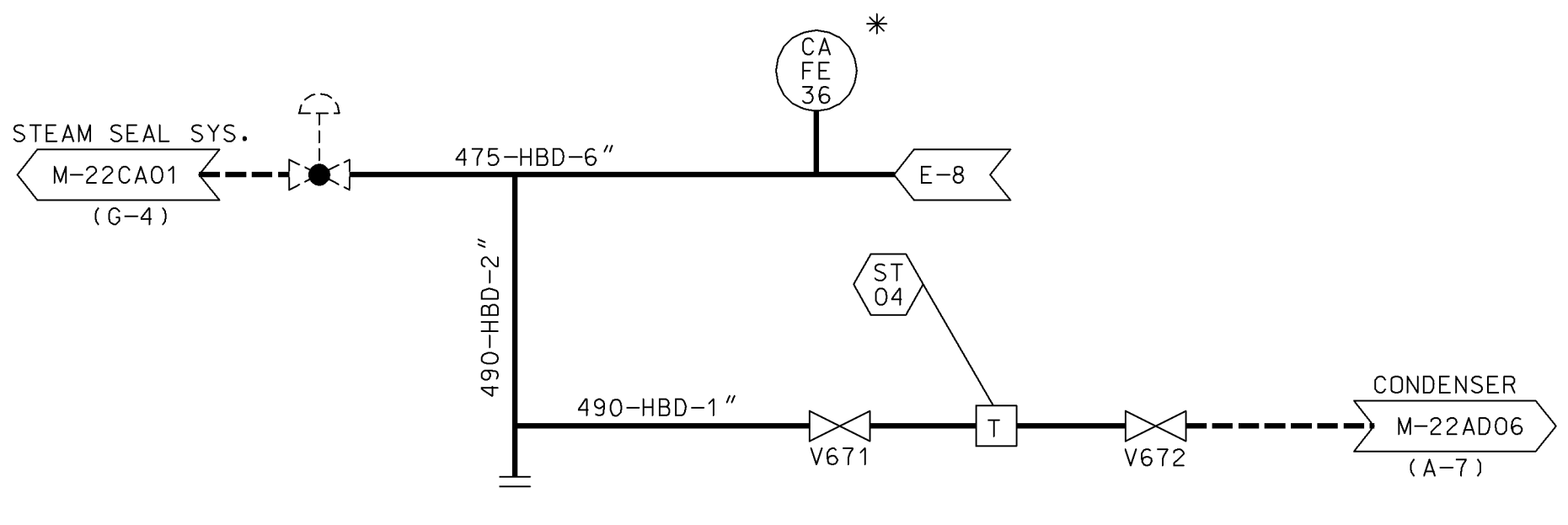
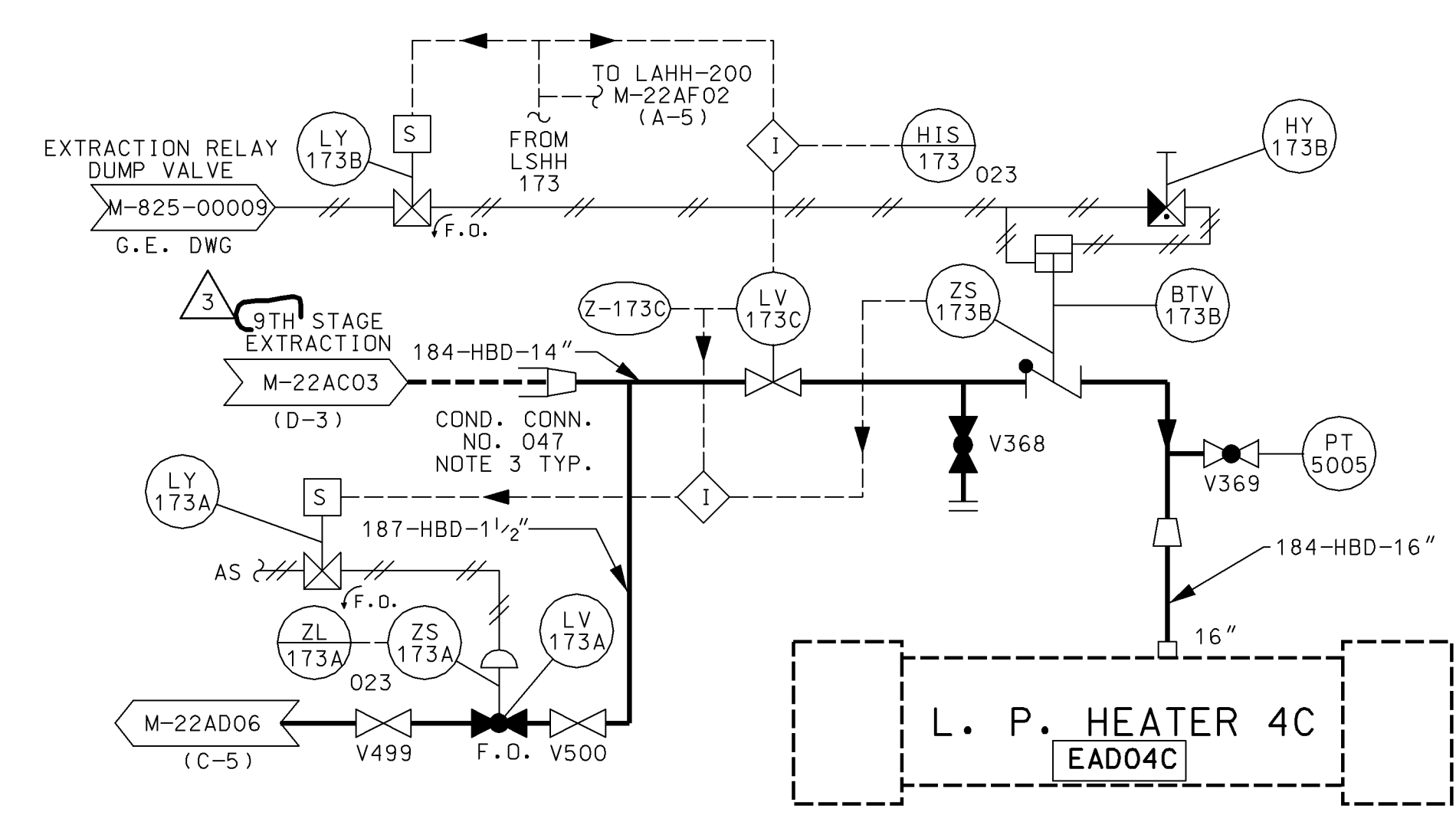
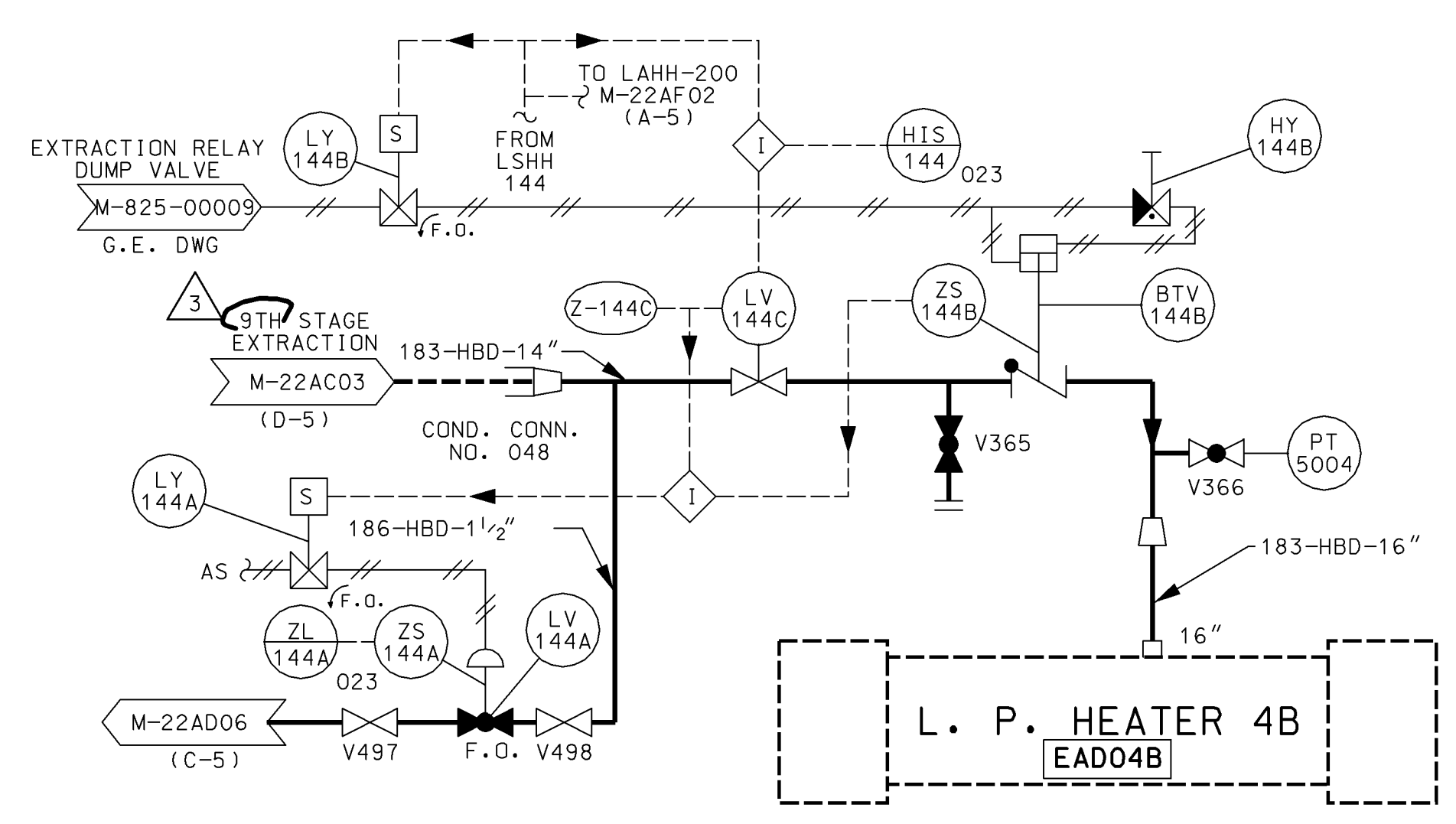
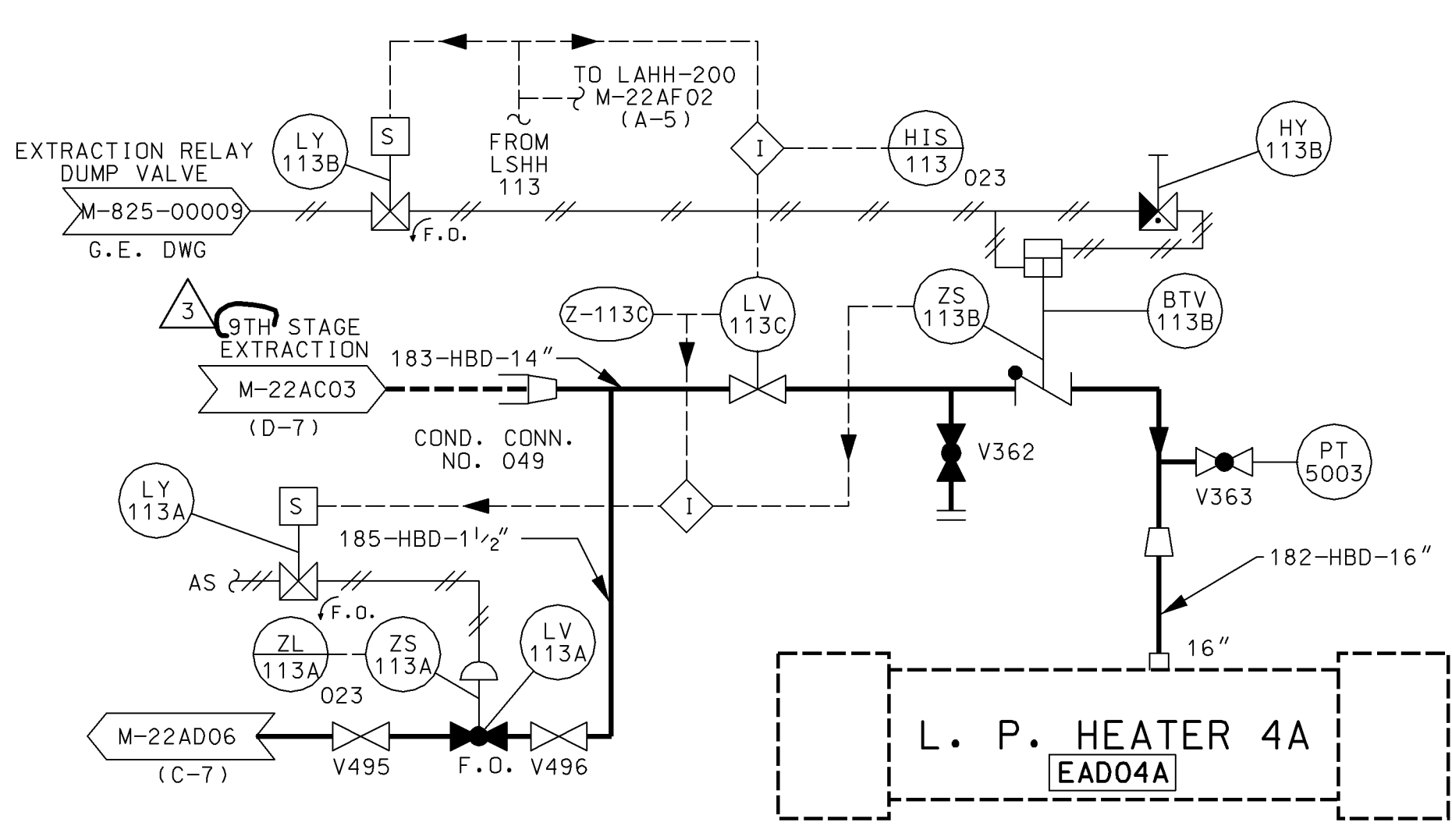
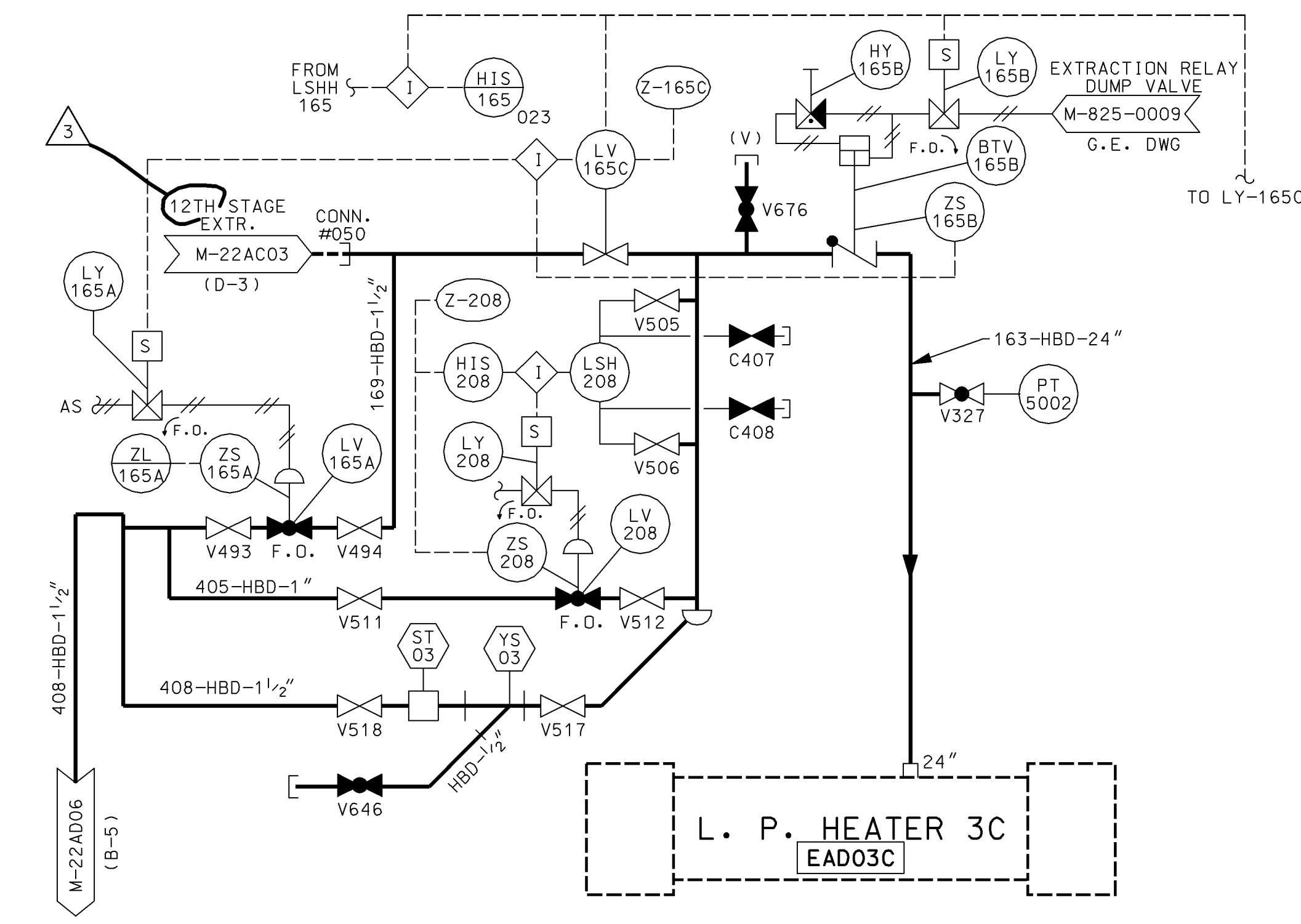
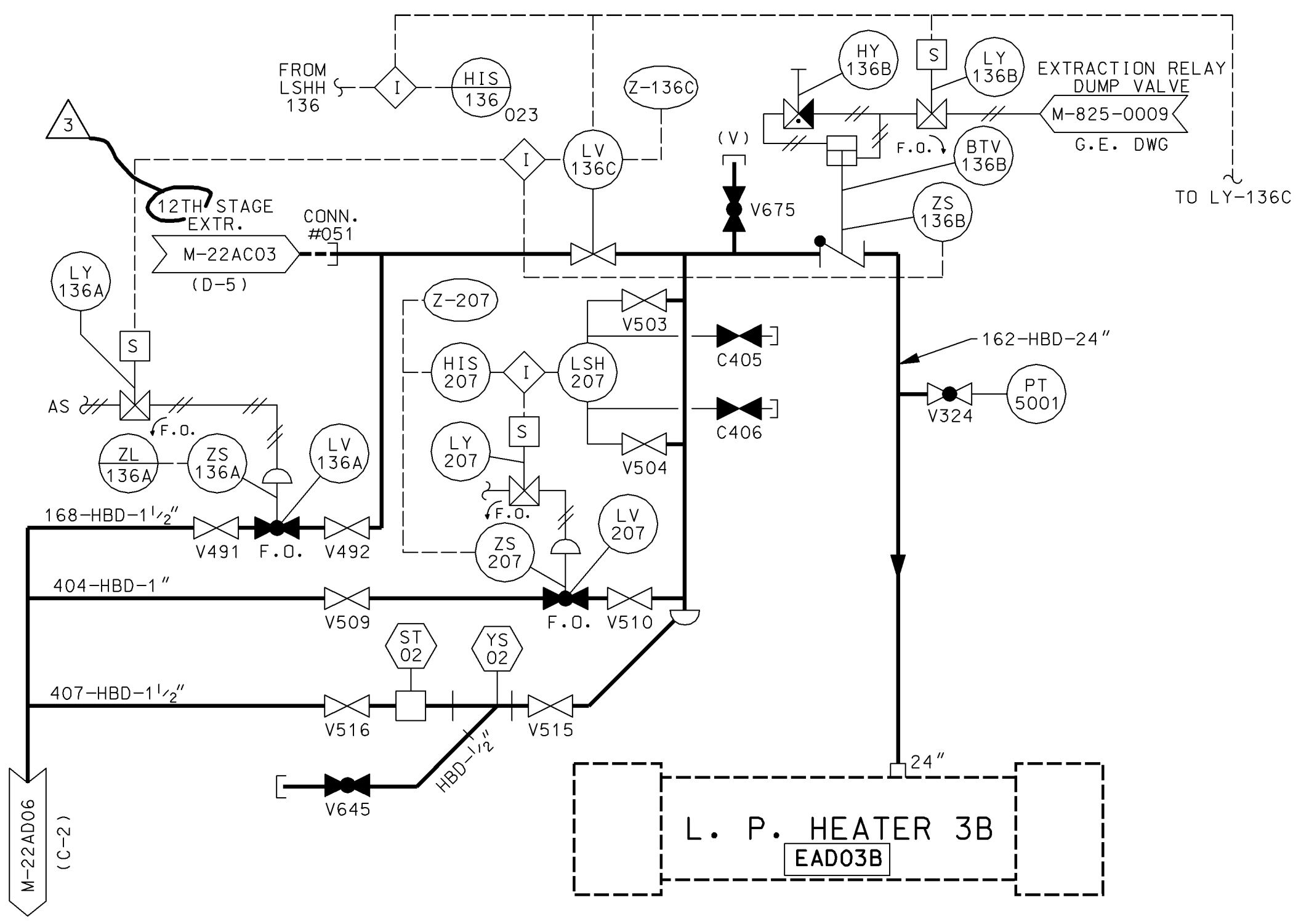
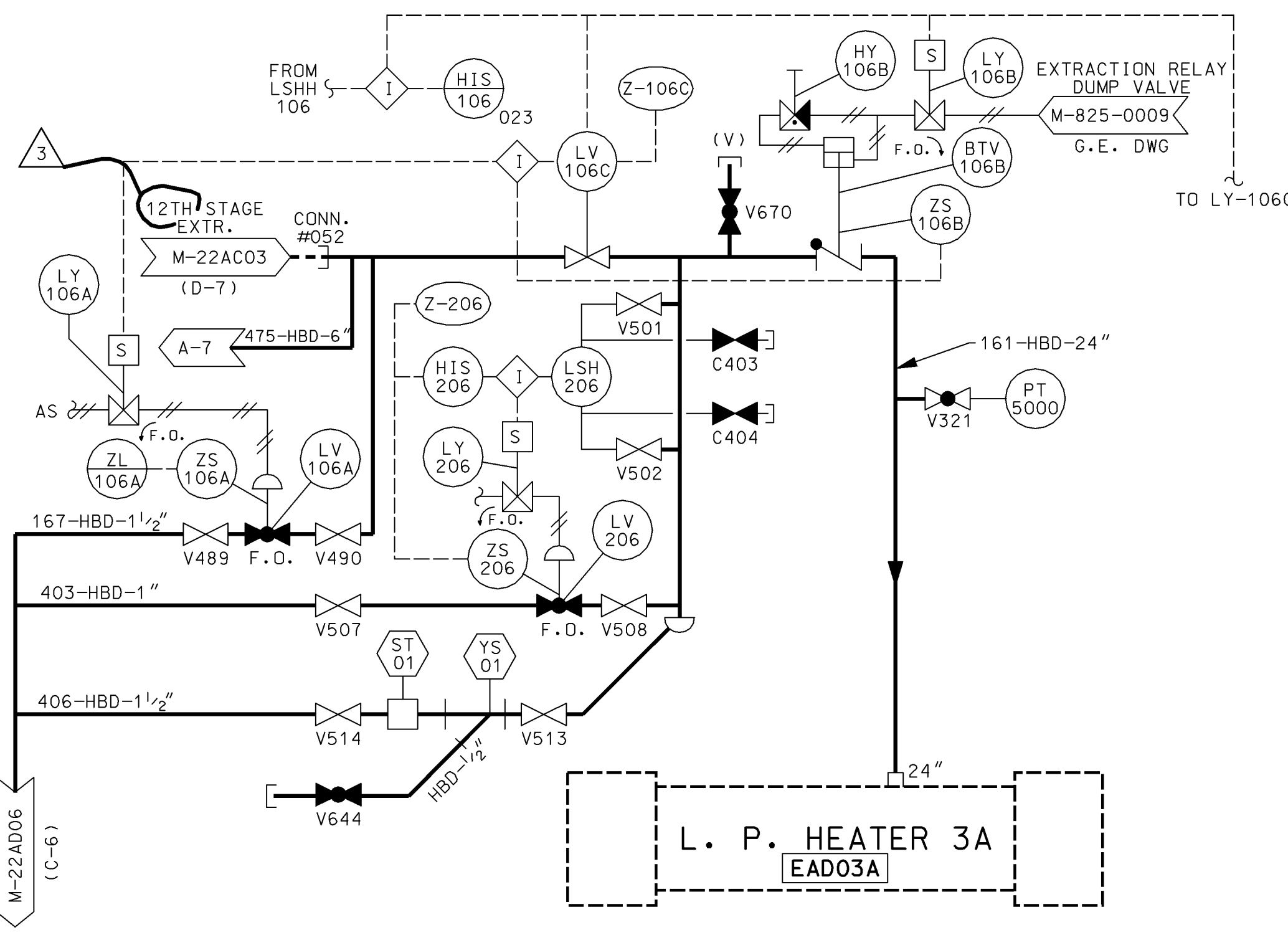
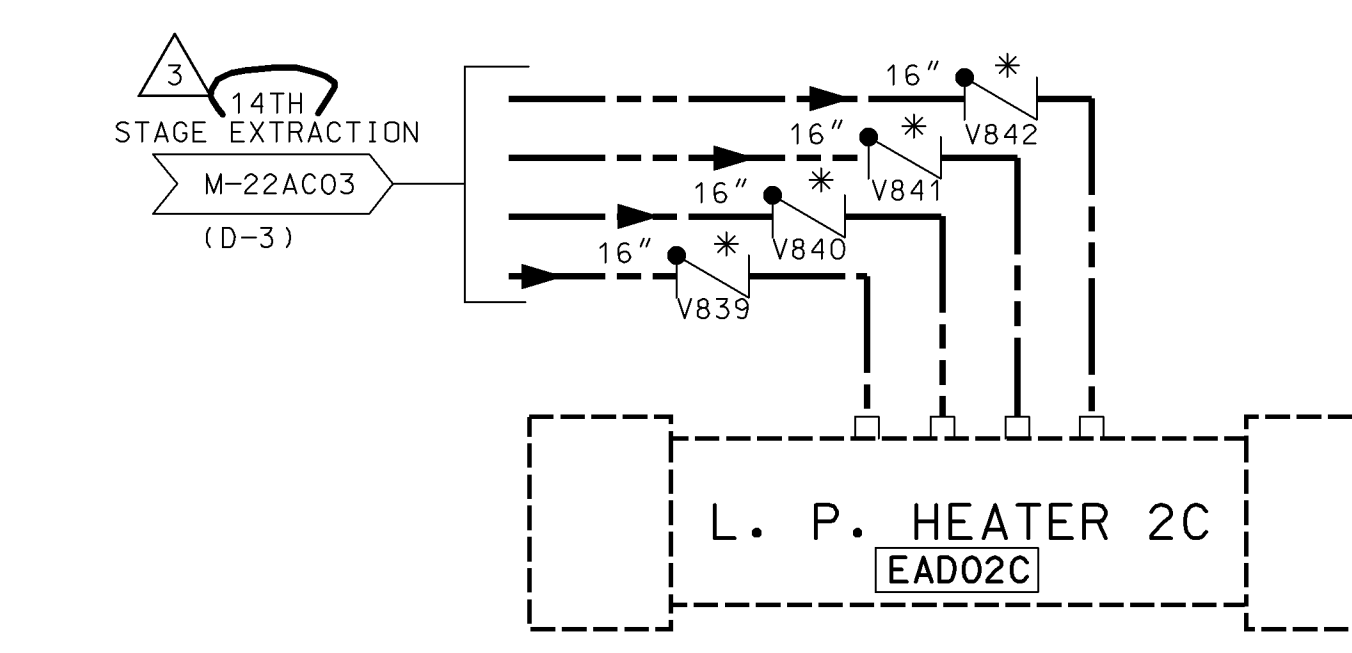
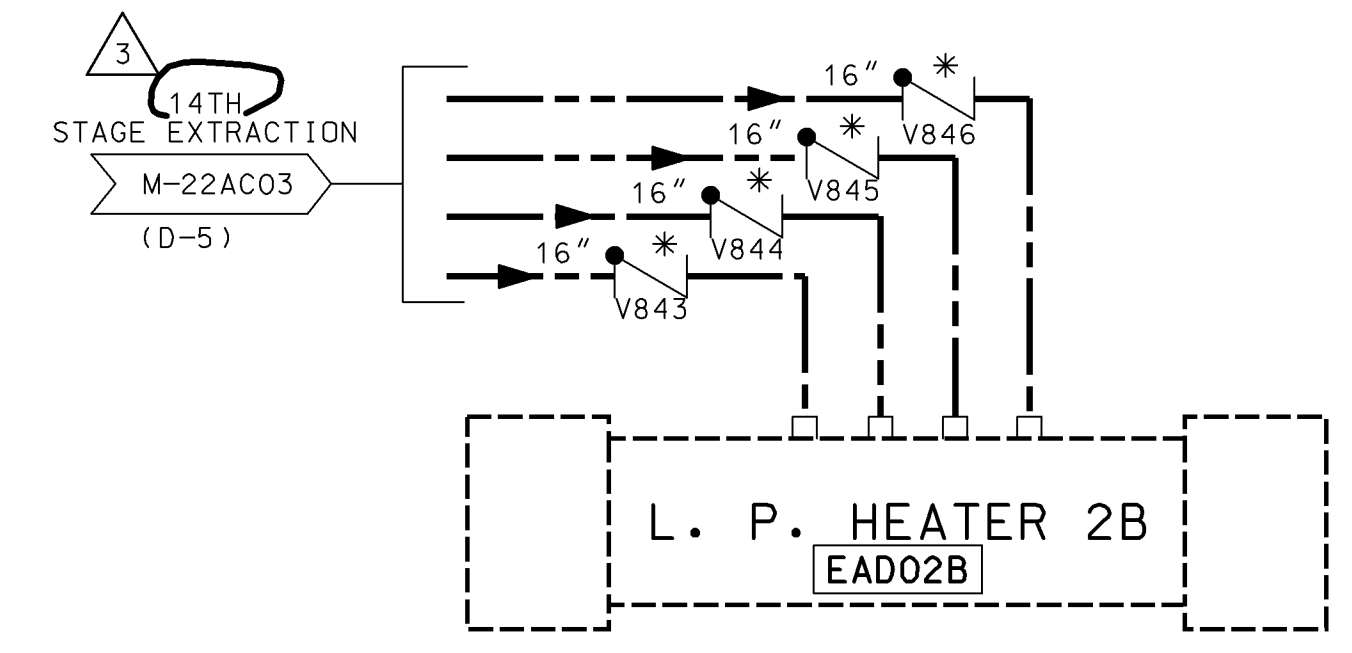
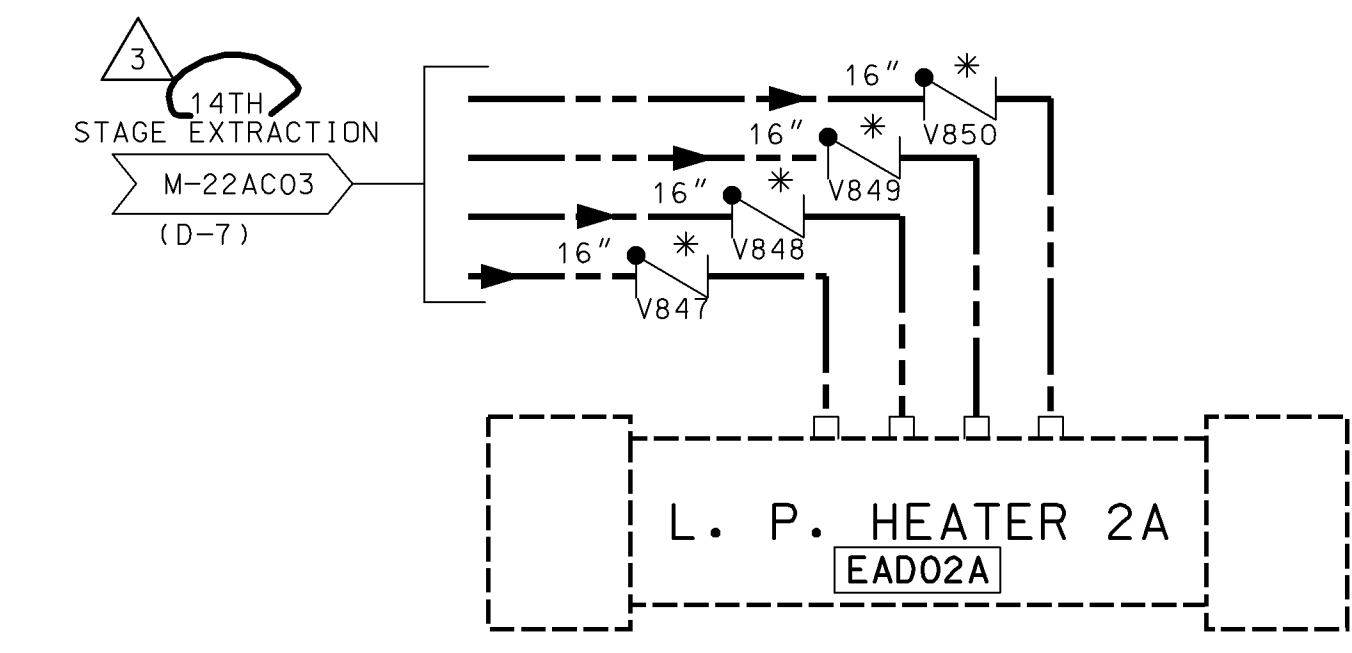
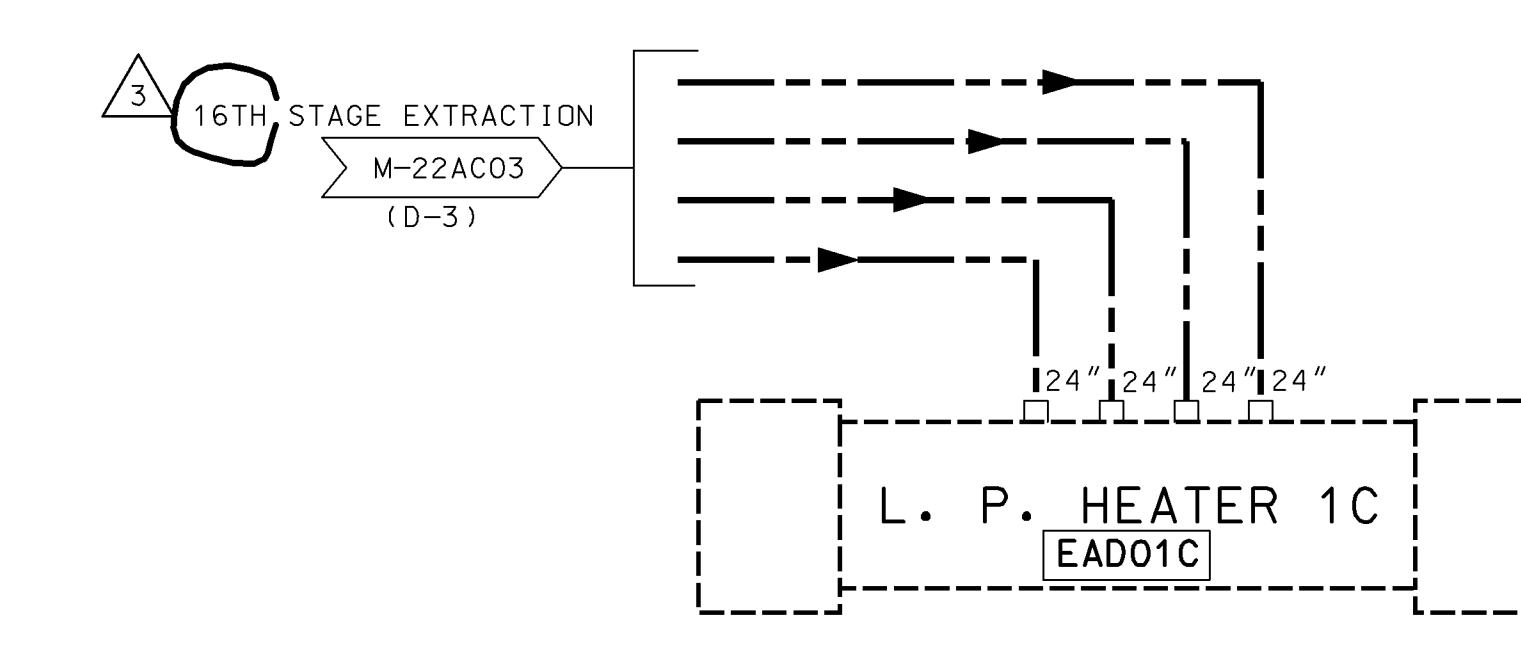
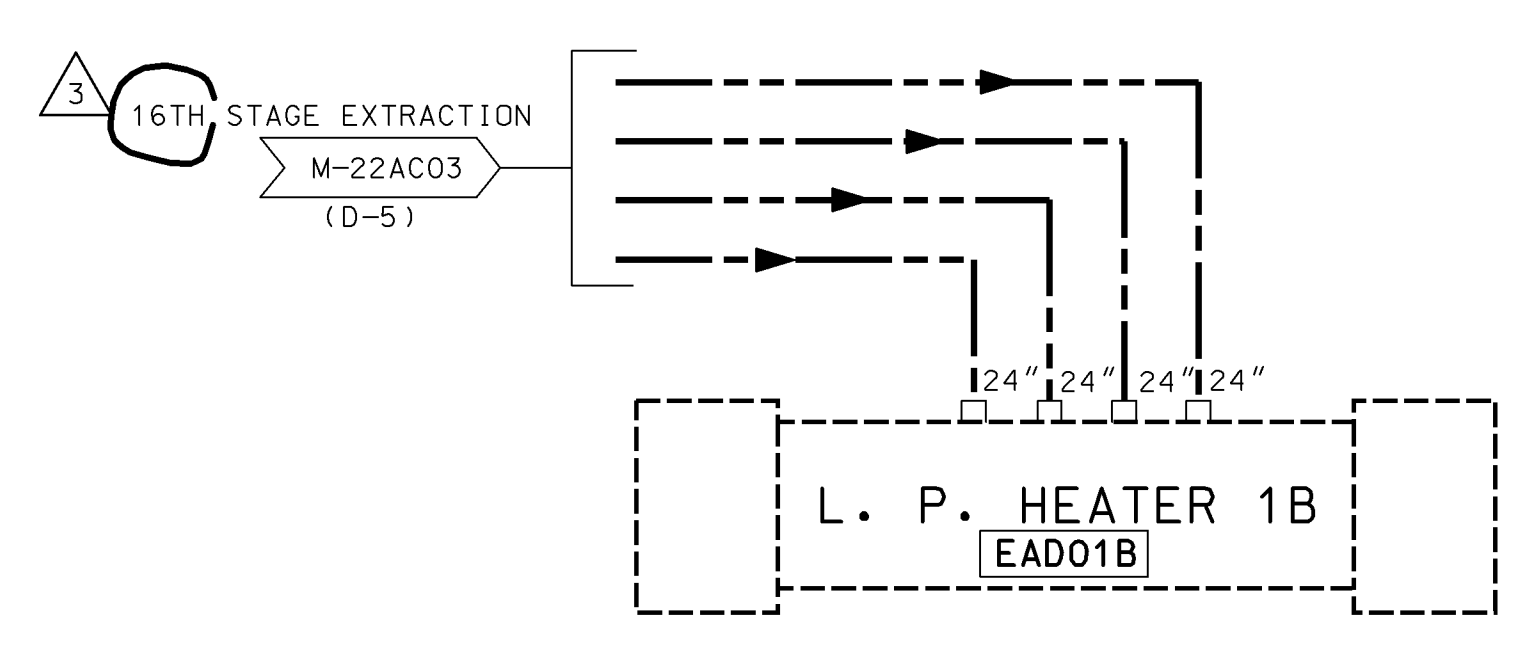
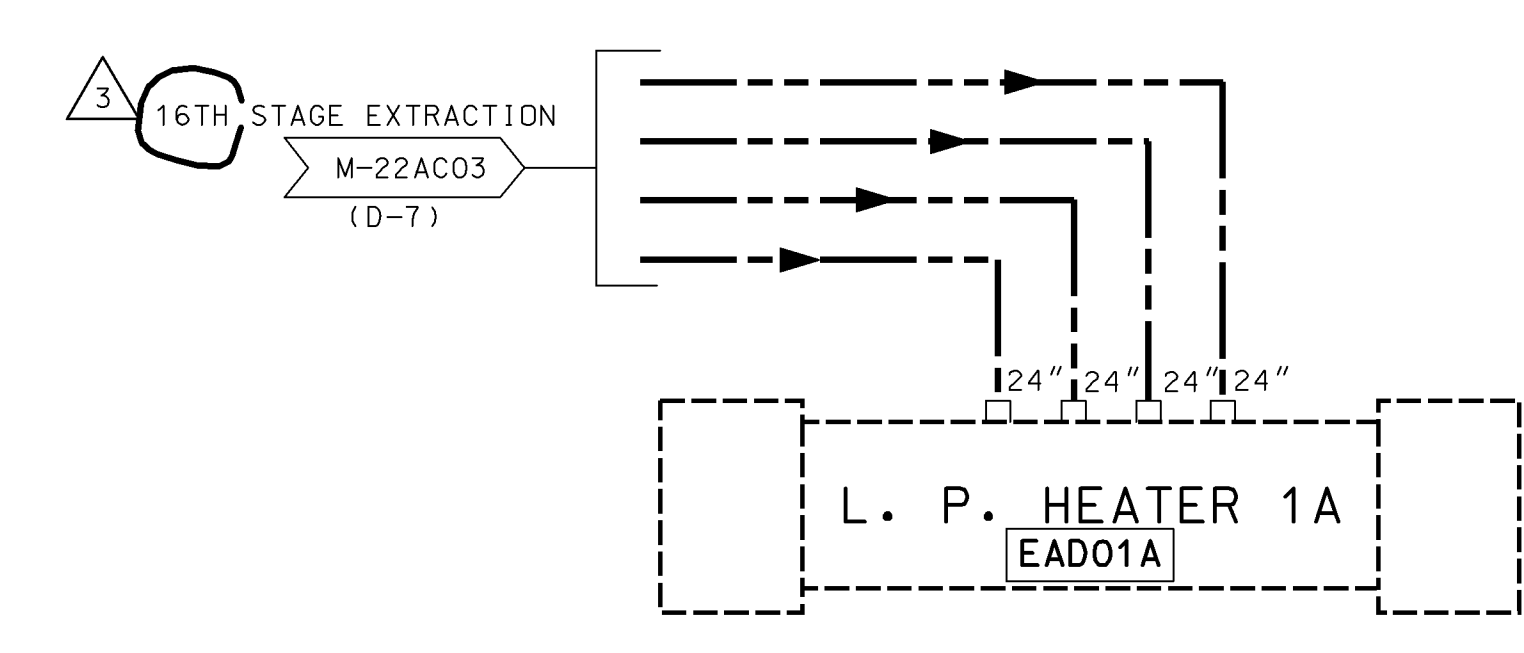
AS-BUILT CLASS 1

DRAWN	N/A	(DATE)	
CHKD.	N/A	(DATE)	
SUPV.	N/A	(DATE)	
APPR.	N/A	(DATE)	
LOCATION	CALLAWAY PLANT		CLASS
UNION ELECTRIC COMPANY			REV. 4
ST. LOUIS, MO			M-22AF02C

PIPING & INSTRUMENTATION DIAGRAM
FEEDWATER HEATER EXTRACTION
DRAINS & VENTS
FSAR FIGURE 10.4-6 SHEET 9

REV.	DATE	DRAWN	BY
0	02/03/94	GDC	TJM
INCORP.	DEC. 1813		
REV.	DATE	DRAWN	BY
1	06/20/02	DJS	
INCORP.	DEC. 1813		
REV.	DATE	DRAWN	BY
2	04/19/05		
INCORP.	DEC. 1813		
REV.	DATE	DRAWN	BY
3	10/08/05		
INCORP.	DEC. 1813		
REV.	DATE	DRAWN	BY
03-2006A			

M-22AF02A

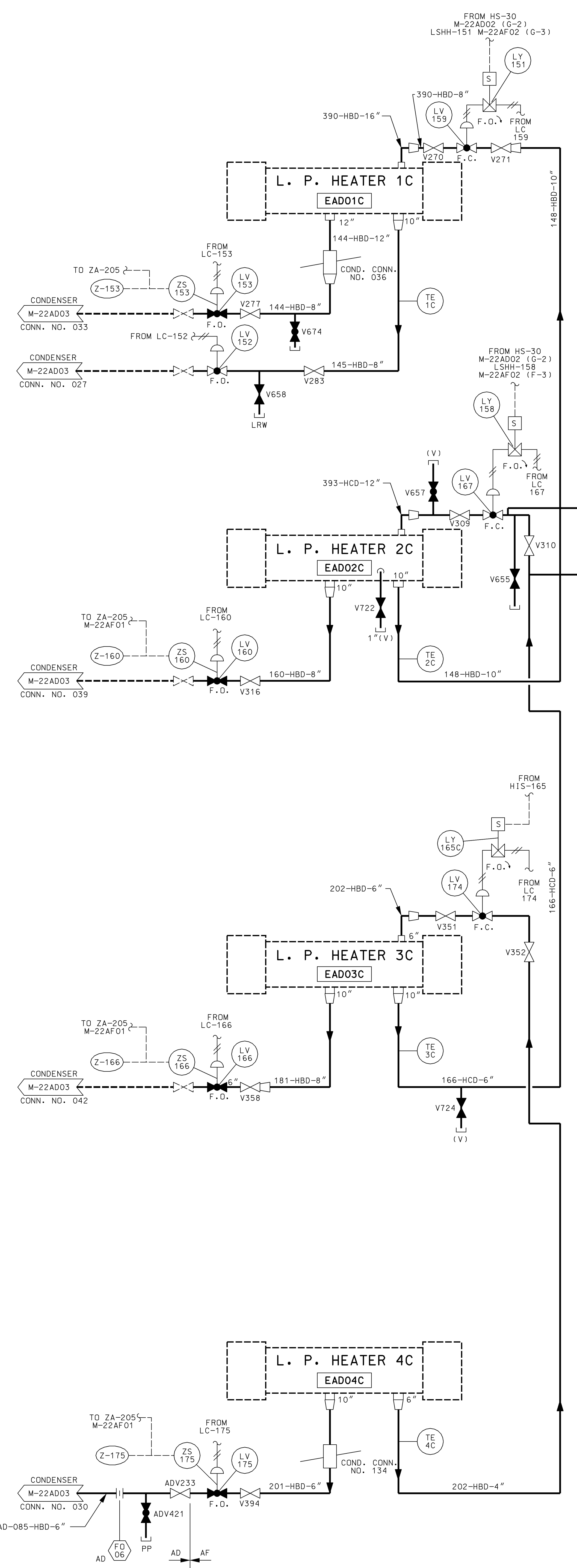
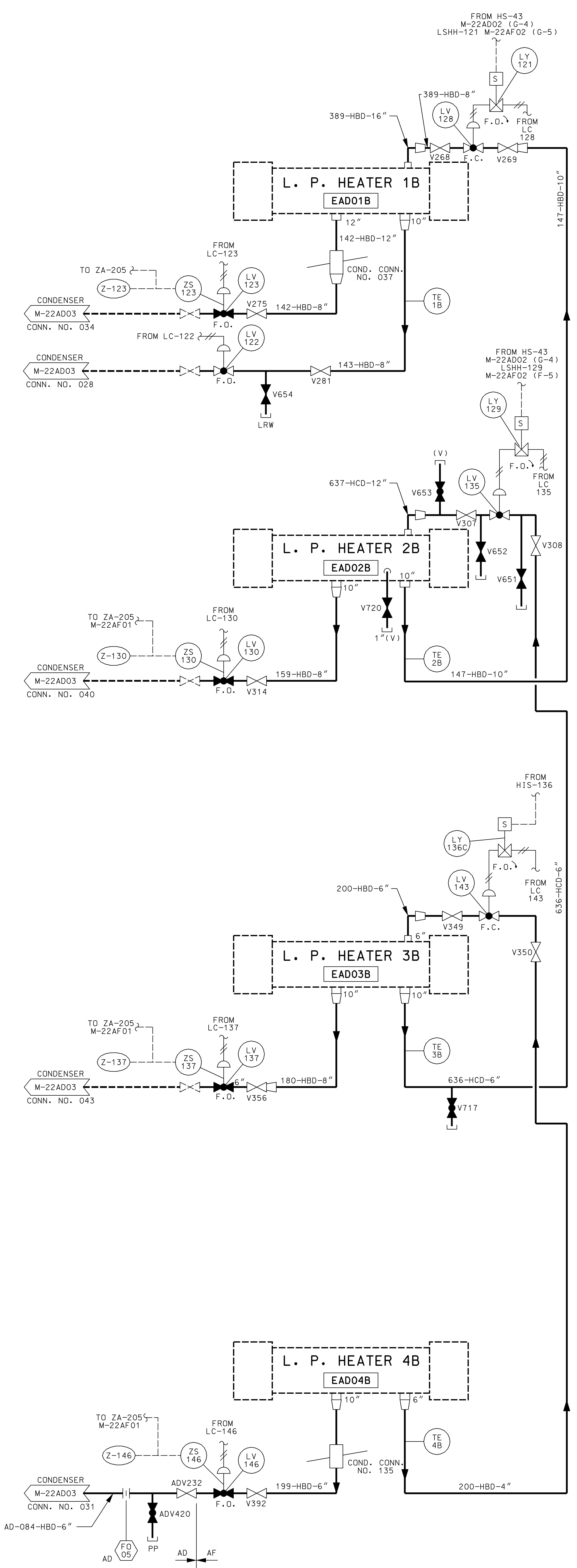
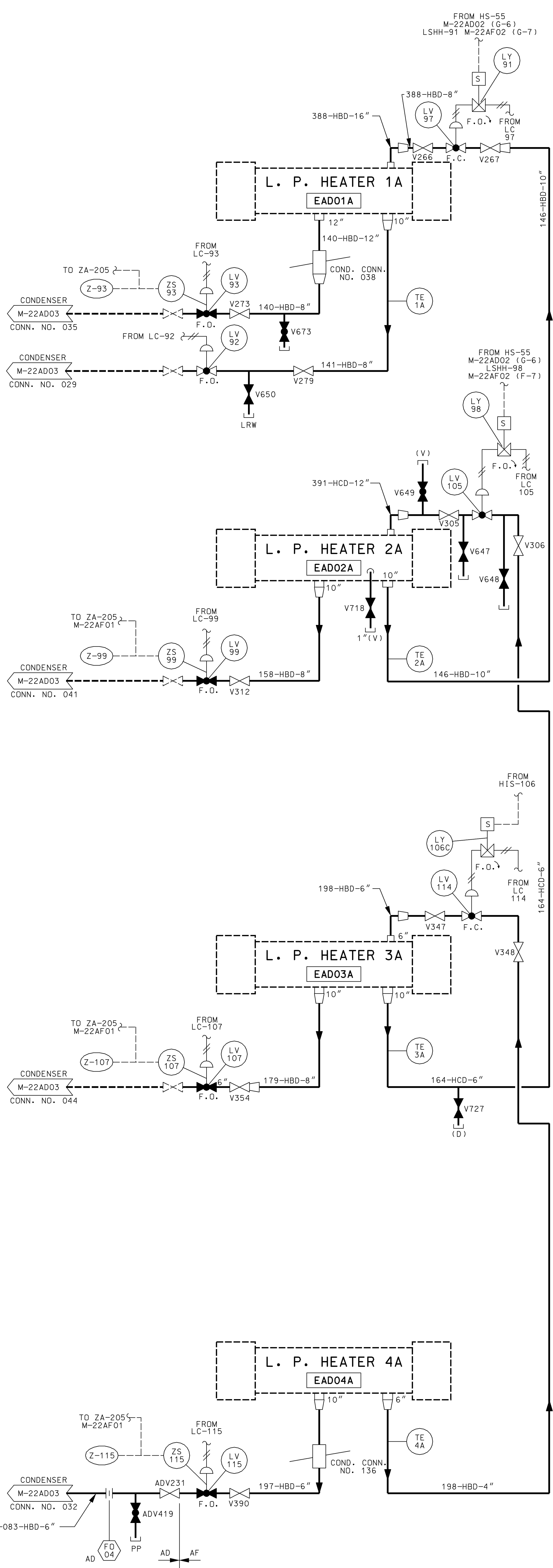


AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY			CLASS
ST. LOUIS, MO			M-22AF02A
			REV. 3

PIPING & INSTRUMENTATION DIAGRAM
FEEDWATER HEATER EXTRACTION
DRAINS & VENTS

FSAR FIGURE 10.4-6 SHEET 10



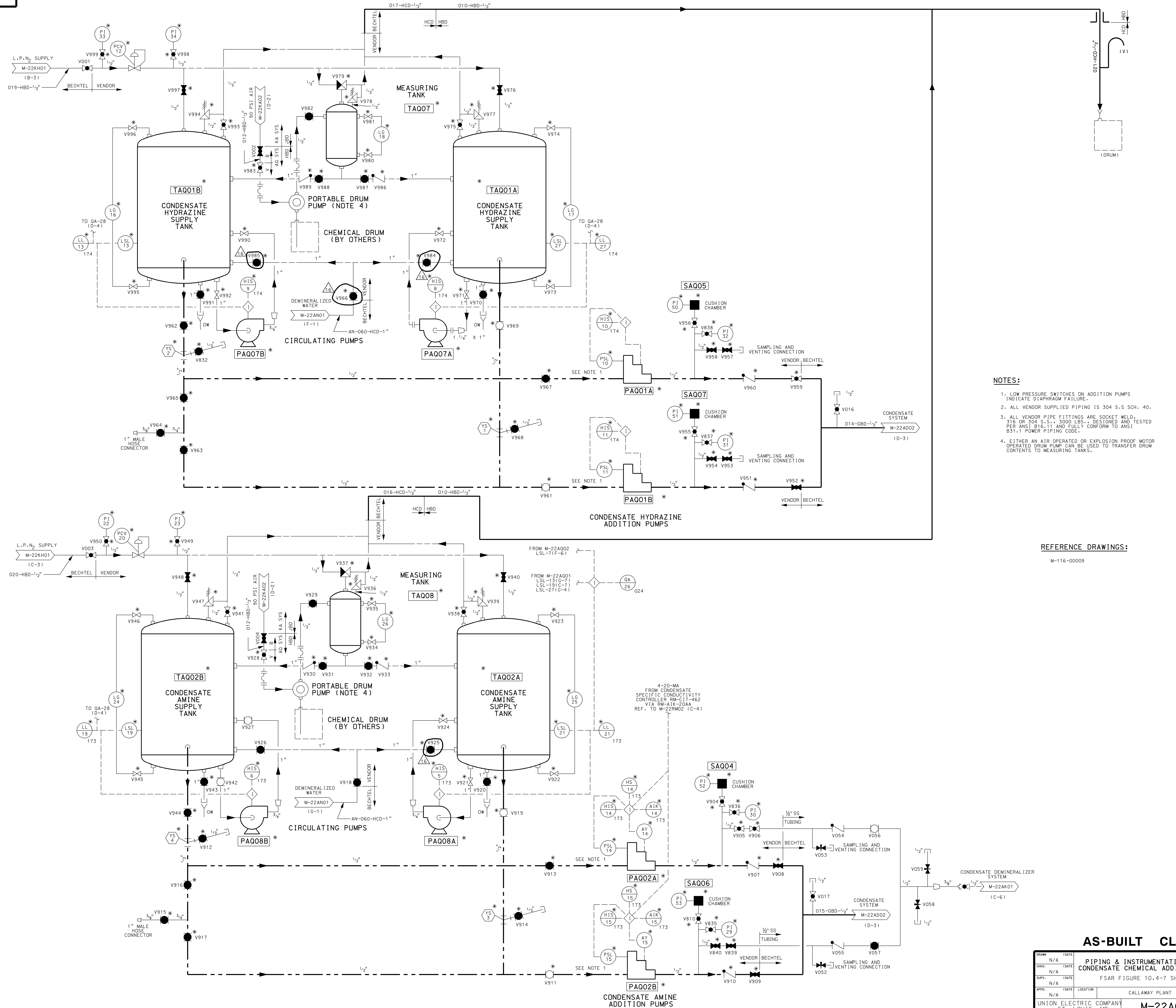
REV.	DATE	DRAWN	BY
INITIAL	ISSUE	PER	RFR-14529A.
CHKD.	SUPV.	APPR.	MAL
HLP.	AMR	N/A	
INCORP.	RMP	94-2009.	
REV.	DATE	DRAWN	BY
2	102396	JHK	
CHKD.	SUPV.	APPR.	MAL
HLP.	AMR	N/A	
INCORP.	RMP	95-2011.	
REV.	DATE	DRAWN	BY
3	031798	RLW	
CHKD.	SUPV.	APPR.	JHK
HLP.	AMR	N/A	
INCORP.	RFR	18815A.	
REV.	DATE	DRAWN	BY
4	041905	JHK	
CHKD.	SUPV.	APPR.	MAL
HLP.	AMR	N/A	
INCORP.	RFR	22941A	

AS-BUILT CLASS 1

PIPING & INSTRUMENTATION DIAGRAM
FEEDWATER HEATER EXTRACTION
DRAINS & VENTS

FSAR FIGURE 10.4-6 SHEET 11

APPD.	N/A	LOCATION	CALLAWAY PLANT	CLASS	
UNION ELECTRIC COMPANY					
ST. LOUIS, MO					
M-22AF02B					
REV.	4				



- NOTES:**
1. LOW PRESSURE SWITCHES ON ADDITION PUMPS INDICATE DIAPHRAGM FAILURE.
 2. ALL VENDOR SUPPLIED PIPING IS 304 S.S SCH. 40.
 3. ALL VENDOR PIPE FITTINGS ARE SOCKET WELD, 316 OR 304 S.S., 3000 LBS., DESIGNED AND TESTED PER ANSI B16.11 AND FULLY CONFORM TO ANSI B31.1 POWER PIPING CODE.
 4. EITHER AN AIR OPERATED OR EXPLOSION PROOF MOTOR OPERATED DRUM PUMP CAN BE USED TO TRANSFER DRUM CONTENTS TO MEASURING TANKS.

REFERENCE DRAWINGS:
M-116-00009

AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY ST. LOUIS, MO			REV. 16

PIPING & INSTRUMENTATION DIAGRAM
CONDENSATE CHEMICAL ADDITION SYSTEM
FSAR FIGURE 10.4-7 SHEET 1

REV. DATE DRAWN 011491 JHL
CHKD: SUPV: APPD: RBF TJM N/A
REDRAWN FOR CLARITY

REV. DATE DRAWN 010292 SBR
CHKD: SUPV: APPD: DJB TJM N/A
INCORP. RMP 90-3004.

REV. DATE DRAWN 011394 RJB
CHKD: SUPV: APPD: DJB TJM N/A
INCORP. RFR-14536A.

REV. DATE DRAWN 051094 RBF
CHKD: SUPV: APPD: DJB CDC N/A
INCORP. RFR-14839A.

REV. DATE DRAWN 011294 MAL
CHKD: SUPV: APPD: DJB AMR N/A
INCORP. RMP 91-2013.

REV. DATE DRAWN 022495 JHK
CHKD: SUPV: APPD: RBF AMR N/A
INCORP. RFR-10044B.

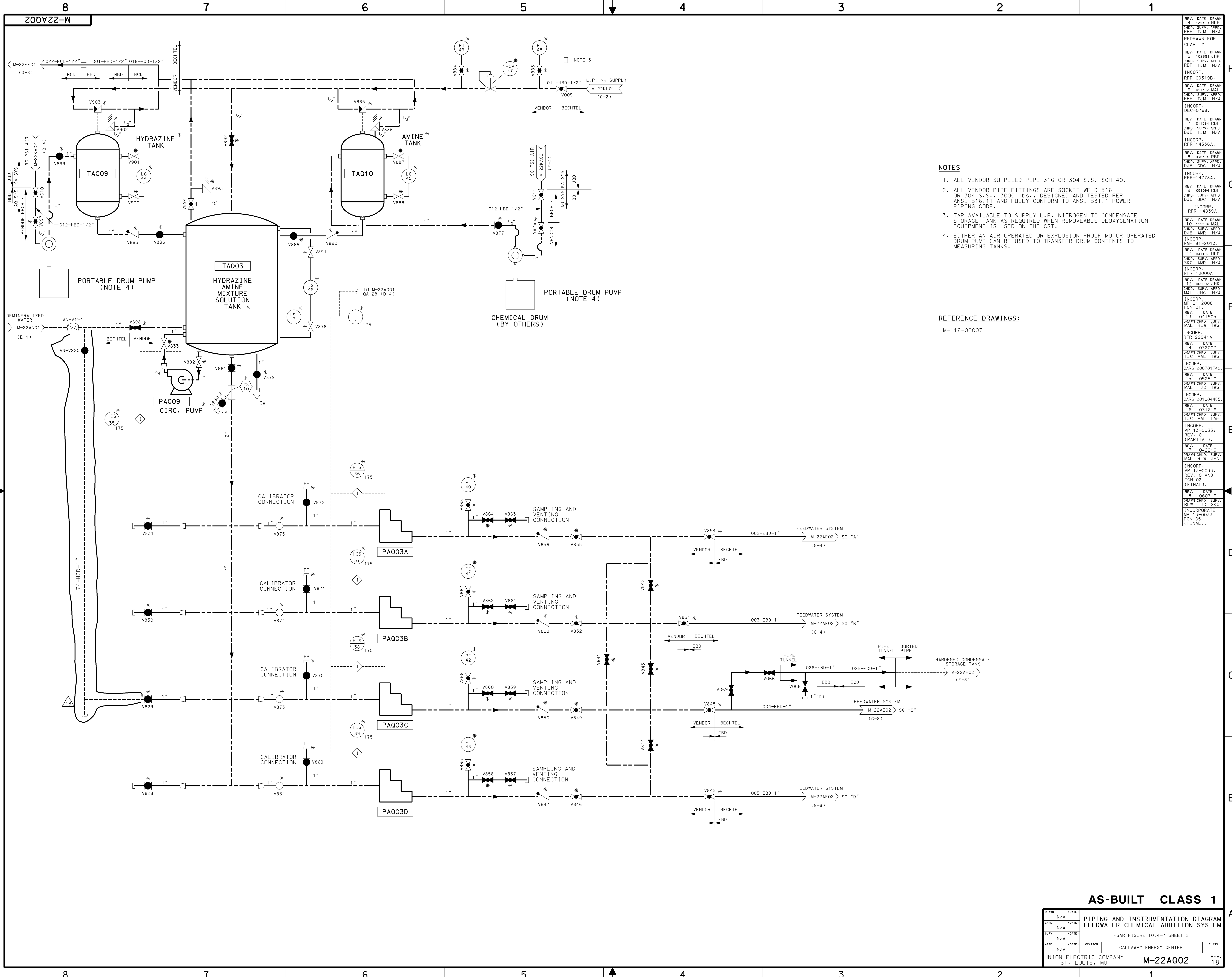
REV. DATE DRAWN 110096 JHK
CHKD: SUPV: APPD: MAL AMR N/A
INCORP. RMP 94-2007 FCN-01

REV. DATE DRAWN 11082098 JHK
CHKD: SUPV: APPD: MAL AMR N/A
INCORP. RFR-22220B.

REV. DATE DRAWN 14032604 JHK
CHKD: SUPV: APPD: RLW MAL TWS
INCORP. RFR-22220B.

REV. DATE DRAWN 151109304 JHK
CHKD: SUPV: APPD: TJC MAL TWS
INCORP. RFR-22341A.

REV. DATE DRAWN 16031505 JHK
CHKD: SUPV: APPD: EWM MAM
INCORP. RFR-22220C.



NOTES

1. ALL VENDOR SUPPLIED PIPE 316 OR 304 S.S. SCH 40.
2. ALL VENDOR PIPE FITTINGS ARE SOCKET WELD 316 OR 304 S.S., 3000 LBS., DESIGNED AND TESTED PER ANSI B16.11 AND FULLY CONFORM TO ANSI B31.1 POWER PIPING CODE.
3. TAP AVAILABLE TO SUPPLY L.P. NITROGEN TO CONDENSATE STORAGE TANK AS REQUIRED WHEN REMOVEABLE DEOXYGENATION EQUIPMENT IS USED ON THE CST.
4. EITHER AN AIR OPERATED OR EXPLOSION PROOF MOTOR OPERATED DRUM PUMP CAN BE USED TO TRANSFER DRUM CONTENTS TO MEASURING TANKS.

REFERENCE DRAWINGS:

M-116-00007

AS-BUILT CLASS 1

DATE	18	06	2016	REV.	18
DRWN	N/A	(DATE)		UNION ELECTRIC COMPANY	
CHKD	N/A	(DATE)		ST. LOUIS, MO	
SUPV	N/A	(DATE)		M-22AQ02	
APPD	N/A	(DATE)		CALLAWAY ENERGY CENTER	
				CLASS	
				REV.	18

REV.	DATE	DRWN	CHKD	SUPV	APPD	INCORP.
1	03/20/07	TJC	MAL	RLW	TWS	
2	03/15/16	TJC	MAL	RLW	LMP	
3	04/22/16	MAL	RLW	JEN		
4	06/07/16	TJC	MAL	SKC		
5	03/03/13	TJC	MAL	SKC		
6	03/03/13	TJC	MAL	SKC		
7	03/03/13	TJC	MAL	SKC		
8	03/03/13	TJC	MAL	SKC		
9	03/03/13	TJC	MAL	SKC		
10	03/03/13	TJC	MAL	SKC		
11	03/03/13	TJC	MAL	SKC		
12	03/03/13	TJC	MAL	SKC		
13	03/03/13	TJC	MAL	SKC		
14	03/03/13	TJC	MAL	SKC		
15	03/03/13	TJC	MAL	SKC		
16	03/03/13	TJC	MAL	SKC		
17	03/03/13	TJC	MAL	SKC		
18	03/03/13	TJC	MAL	SKC		

REV.	DATE	BY	CHKD.
38	10/21/15	DRWING/CDR/SUPV. RLW	MLP
39	07/03/15	DRWING/CDR/SUPV. VAL	RLW
40	04/23/14	DRWING/CDR/SUPV. VAL	RLW
41	02/24/14	DRWING/CDR/SUPV. VAL	RLW
42	02/24/14	DRWING/CDR/SUPV. VAL	RLW
43	02/24/14	DRWING/CDR/SUPV. VAL	RLW
44	02/24/14	DRWING/CDR/SUPV. VAL	RLW
45	02/24/14	DRWING/CDR/SUPV. VAL	RLW
46	02/24/14	DRWING/CDR/SUPV. VAL	RLW
47	02/24/14	DRWING/CDR/SUPV. VAL	RLW
48	02/24/14	DRWING/CDR/SUPV. VAL	RLW
49	02/24/14	DRWING/CDR/SUPV. VAL	RLW
50	02/24/14	DRWING/CDR/SUPV. VAL	RLW

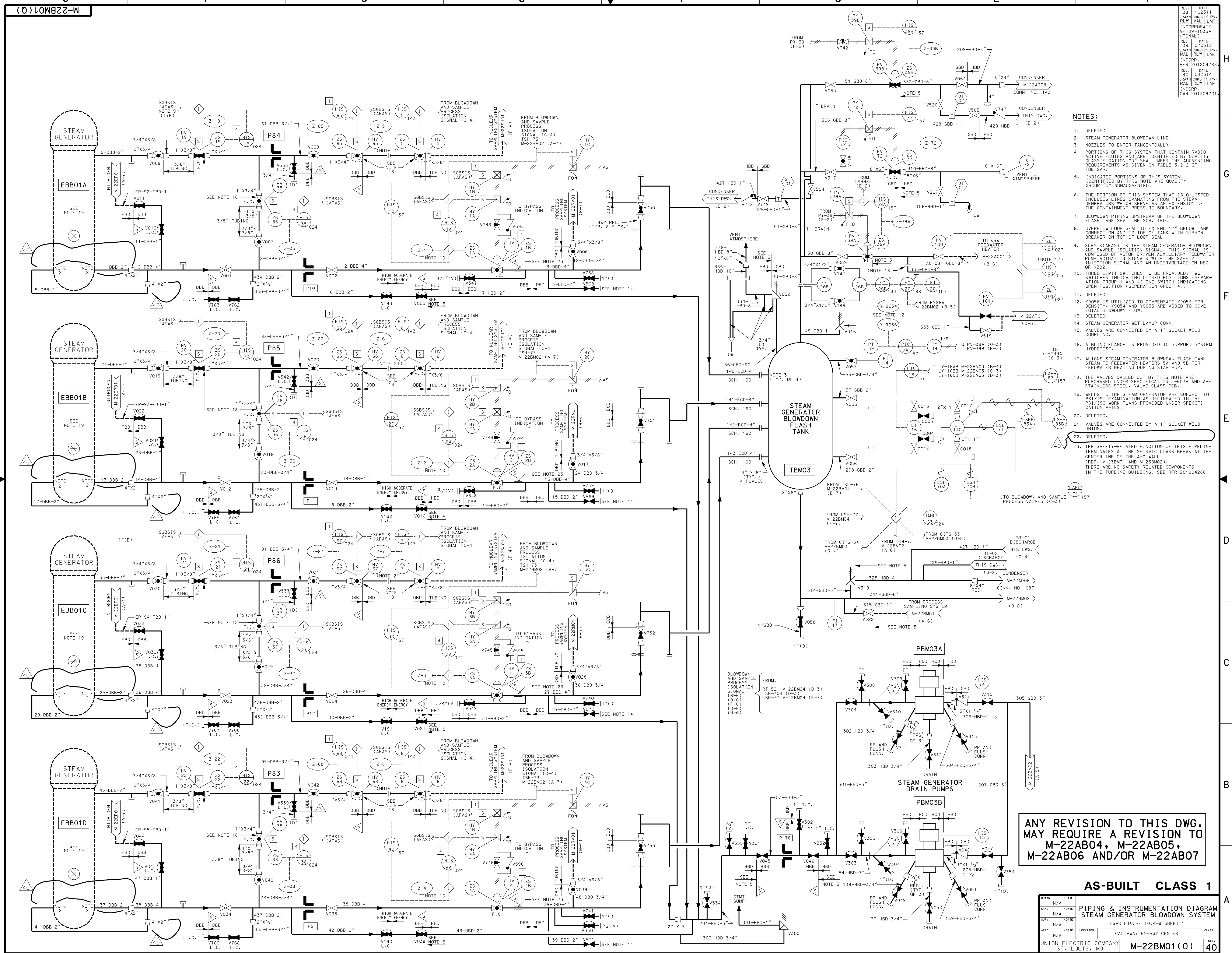
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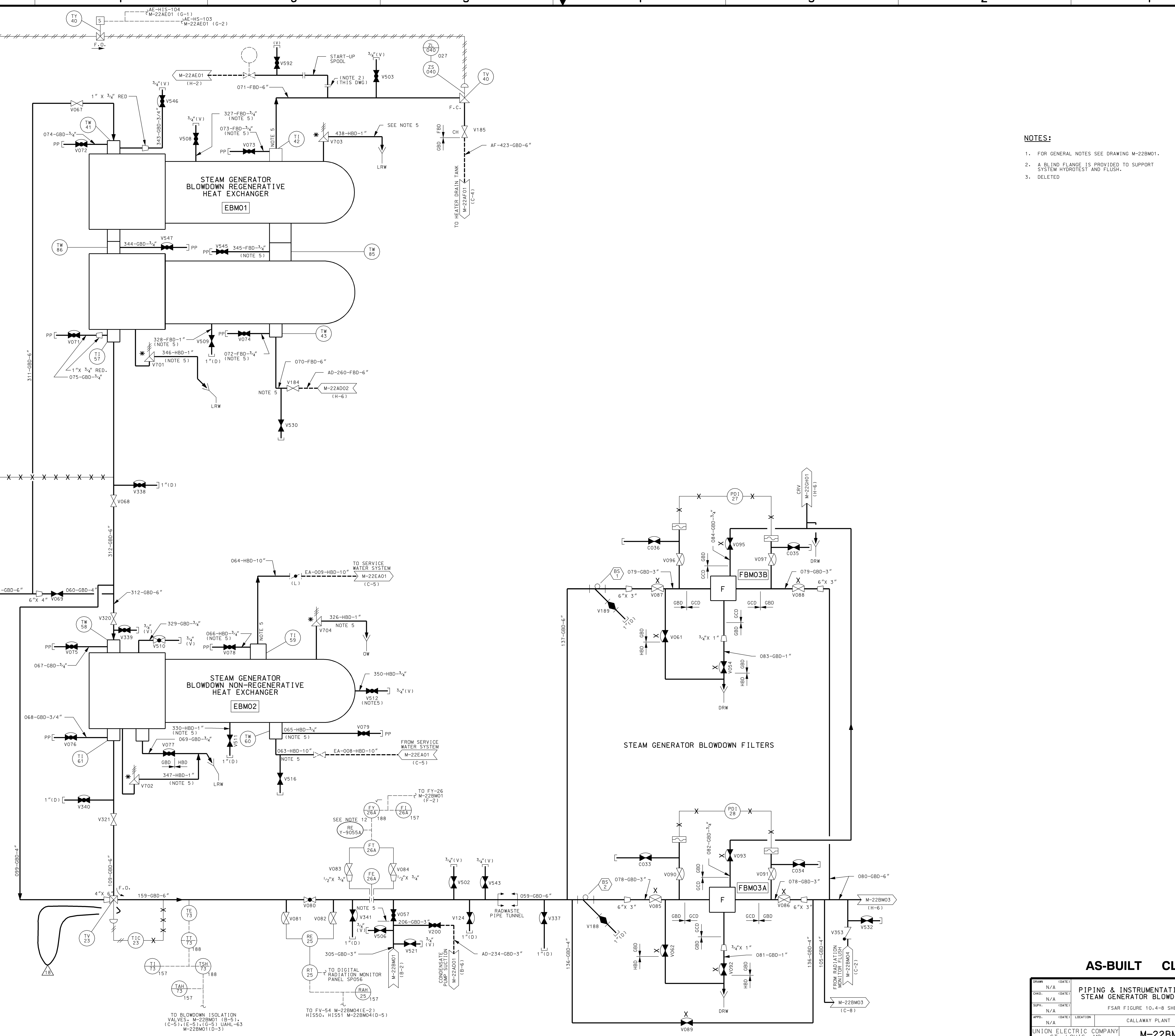
- DELETED
- STEAM GENERATOR BLOWDOWN LINE.
- NOZZLES TO ENTER TANGENTIALLY.
- PORTIONS OF THIS SYSTEM THAT CONTAIN RADIO-ACTIVE FLUIDS AND ARE IDENTIFIED BY QUALITY CLASSIFICATION "D" SHALL MEET THE AUGMENTING REQUIREMENTS AS GIVEN IN TABLE 3.2-2 OF THE SAR.
- INDICATED PORTIONS OF THIS SYSTEM IDENTIFIED BY THIS NOTE ARE QUALITY GROUP "D" NONAUGMENTED.
- THE PORTION OF THIS SYSTEM THAT IS Q-LISTED INCLUDES LINES EMANATING FROM THE STEAM GENERATORS WHICH SERVE AS AN EXTENSION OF THE CONTAINMENT PRESSURE BOUNDARY.
- BLOWDOWN PIPING UPSTREAM OF THE BLOWDOWN FLASH TANK SHALL BE SCH. 160.
- OVERFLOW LOOP SEAL TO EXTEND 12" BELOW TANK CONNECTION AND TO TOP OF TANK WITH SIPHON BREAKER ON TOP OF LOOP SEAL.
- SBGSI(AFAS) IS THE STEAM GENERATOR BLOWDOWN AND SAMPLE ISOLATION SIGNAL. THIS SIGNAL IS COMPOSED OF MOTOR DRIVEN AUXILIARY FEEDWATER STEAM TO FEEDWATER HEATERS 5A AND 5B FOR INJECTION SIGNAL AND AN UNDERVOLTAGE ON NB01 OR NB02.
- THREE LIMIT SWITCHES TO BE PROVIDED, TWO SWITCHES INDICATING CLOSED POSITIONS (SEPARATION GROUP 1 AND 4) ONE SWITCH INDICATING OPEN POSITION (SEPARATION GROUP 4).
- DELETED
- Y9056 IS UTILIZED TO COMPENSATE Y9054 FOR DENSITY, Y9054 AND Y9055 ARE ADDED TO GIVE TOTAL BLOWDOWN FLOW.
- DELETED.
- STEAM GENERATOR WET LAYOUT CONN.
- VALVES ARE CONNECTED BY A 1" SOCKET WELD COUPLING.
- A BLIND FLANGE IS PROVIDED TO SUPPORT SYSTEM HYDROTEST.
- ALIGNS STEAM GENERATOR BLOWDOWN FLASH TANK STEAM TO FEEDWATER HEATERS 5A AND 5B FOR FEEDWATER HEATING DURING START-UP.
- THE VALVES CALLED OUT BY THIS NOTE ARE PURCHASED UNDER SPECIFICATION J-603A AND ARE STAINLESS STEEL, VALVE CLASS CDB.
- WELDS TO THE STEAM GENERATOR ARE SUBJECT TO PS7151 EXAMINATION AS DELINEATED IN THE PS7151 WORK PLANS PROVIDED UNDER SPECIFICATION M-189.
- DELETED.
- VALVES ARE CONNECTED BY A 1" SOCKET WELD UNION.
- DELETED.
- THE SAFETY-RELATED FUNCTION OF THIS PIPELINE TERMINATES AT THE SEISMIC CLASS BREAK AT THE CENTERLINE OF THE A-9 WALL. (REF. M-23B01 AND M-23B02). THERE ARE NO SAFETY-RELATED COMPONENTS IN THE TURBINE BUILDING. SEE RFR 201204288.

ANY REVISION TO THIS DWG. MAY REQUIRE A REVISION TO M-22AB04, M-22AB05, M-22AB06 AND/OR M-22AB07

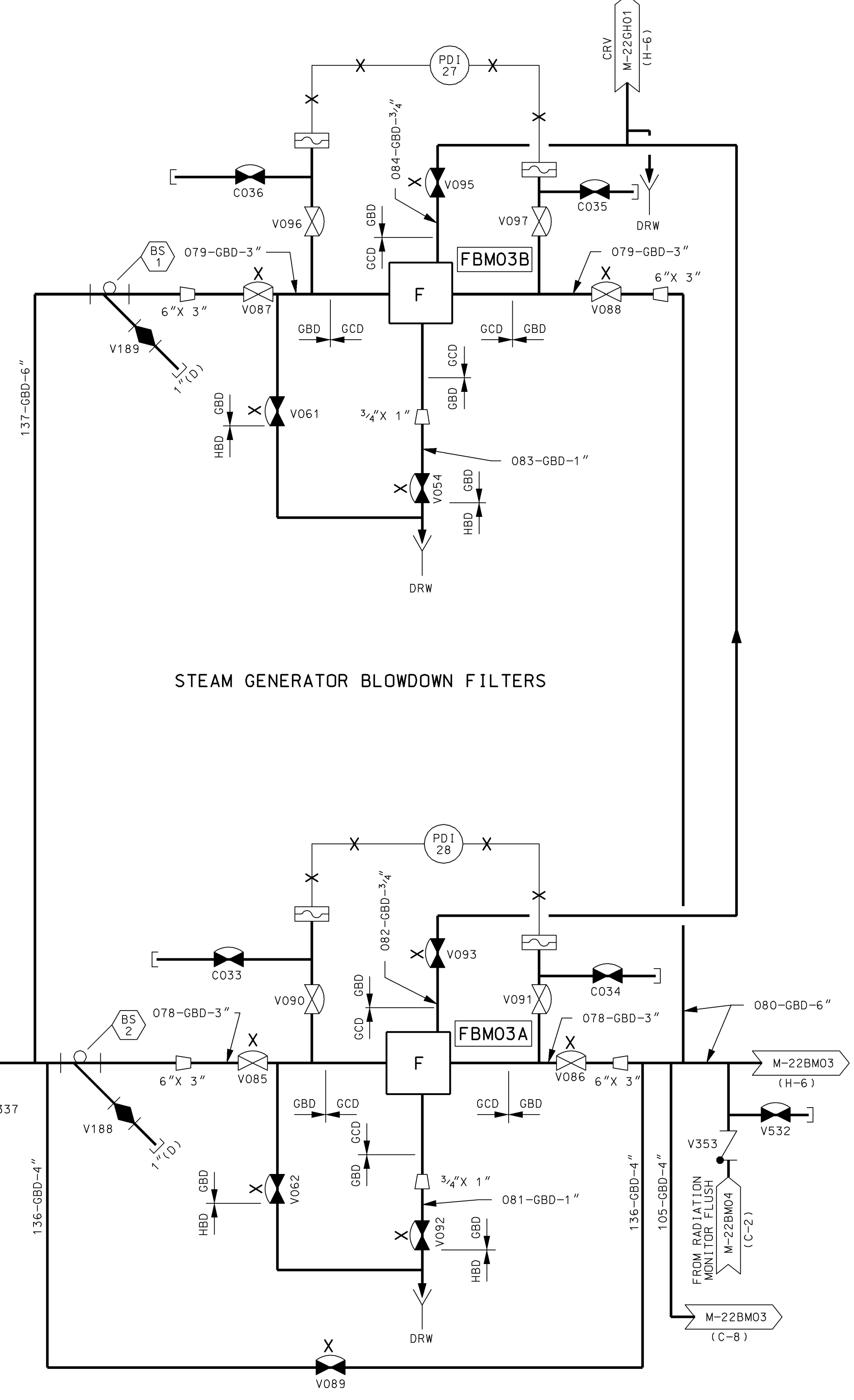
AS-BUILT CLASS 1

DRWING	DATE	BY	CHKD.
N/A			
CDR	DATE	BY	CHKD.
N/A			
SUPV.	DATE	BY	CHKD.
N/A			
APPD.	DATE	LOCATION	CLAS
N/A		CALLAWAY ENERGY CENTER	4645
UNION ELECTRIC COMPANY			
ST. LOUIS, MO			
M-22B01 (Q)			
REV.	DATE	BY	CHKD.
40			





- NOTES:**
- FOR GENERAL NOTES SEE DRAWING M-22BM01.
 - A BLIND FLANGE IS PROVIDED TO SUPPORT SYSTEM HYDROTEST AND FLUSH.
 - DELETED



AS-BUILT CLASS 1

DRAWN (DATE)		N/A ()	
CHKD. (DATE)		N/A ()	
SUPV. (DATE)		N/A ()	
APPR. (DATE)		N/A ()	
LOCATION		CALLAWAY PLANT	
CLASS		M-22BM02	
REV.		18	

PIPING & INSTRUMENTATION DIAGRAM
STEAM GENERATOR BLOWDOWN SYSTEM
FSAR FIGURE 10.4-8 SHEET 2

REV.	DATE	DRAWN	4/22/91	DJB
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				
REV.	DATE	DRAWN	6/10/22	SBR
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				
REV.	DATE	DRAWN	8/02/91	RLW
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				
REV.	DATE	DRAWN	11/04/88	RLW
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				
REV.	DATE	DRAWN	12/02/80	DJB
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				
REV.	DATE	DRAWN	04/19/88	RLW
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				
REV.	DATE	DRAWN	01/25/81	RLW
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				
REV.	DATE	DRAWN	04/19/85	RLW
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				
REV.	DATE	DRAWN	01/25/81	RLW
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				
REV.	DATE	DRAWN	01/25/81	RLW
CHKD.		SUPV.		RAM
APPR.		INCORP.		RAM
REVISIONS:				

TO BLOWDOWN ISOLATION VALVES: M-22BM01 (B-5), (C-5), (E-5), (G-5), UAHM-63, M-22BM01 (D-3)

TO FY-54 M-22BM04 (E-2), HIS50, HIS51 M-22BM04 (D-5)

CONDENSATE PUMP SUCTION M-22AD01 (B-6)

TO RADWASTE PIPE TUNNEL

TO FY-26 M-22BM01 (F-2)

FRM SERVICE WATER SYSTEM M-22EA01 (C-5)

TO SERVICE WATER SYSTEM M-22EA01 (C-5)

NOTE 5

NOTE 5

NOTE 5

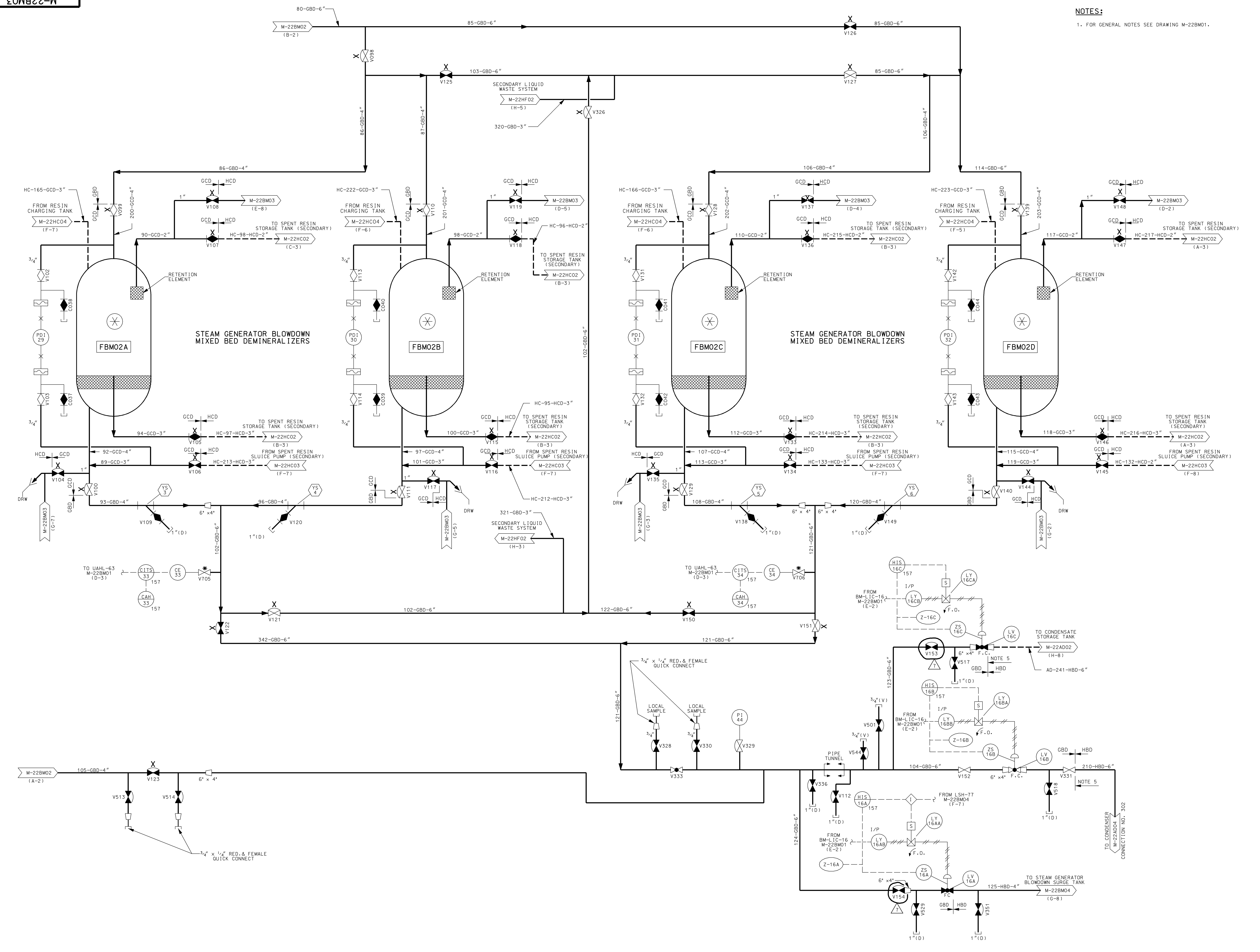
NOTE 2 (THIS Dwg)

START-UP SPOOL

AE-HIS-104 M-22AE01 (G-1), AE-HS-103 M-22AE01 (G-2)

NOTES:
1. FOR GENERAL NOTES SEE DRAWING M-22BM01.

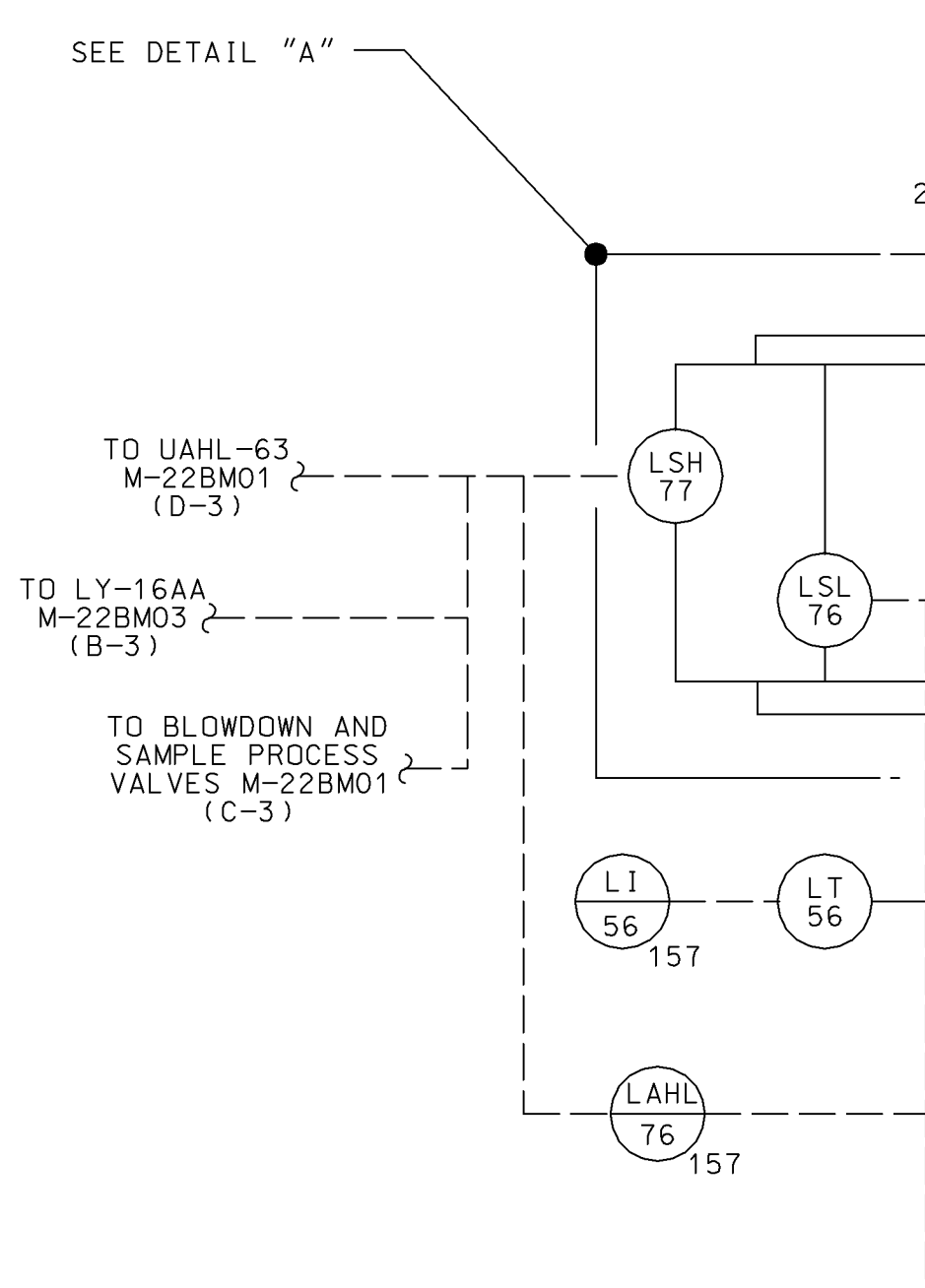
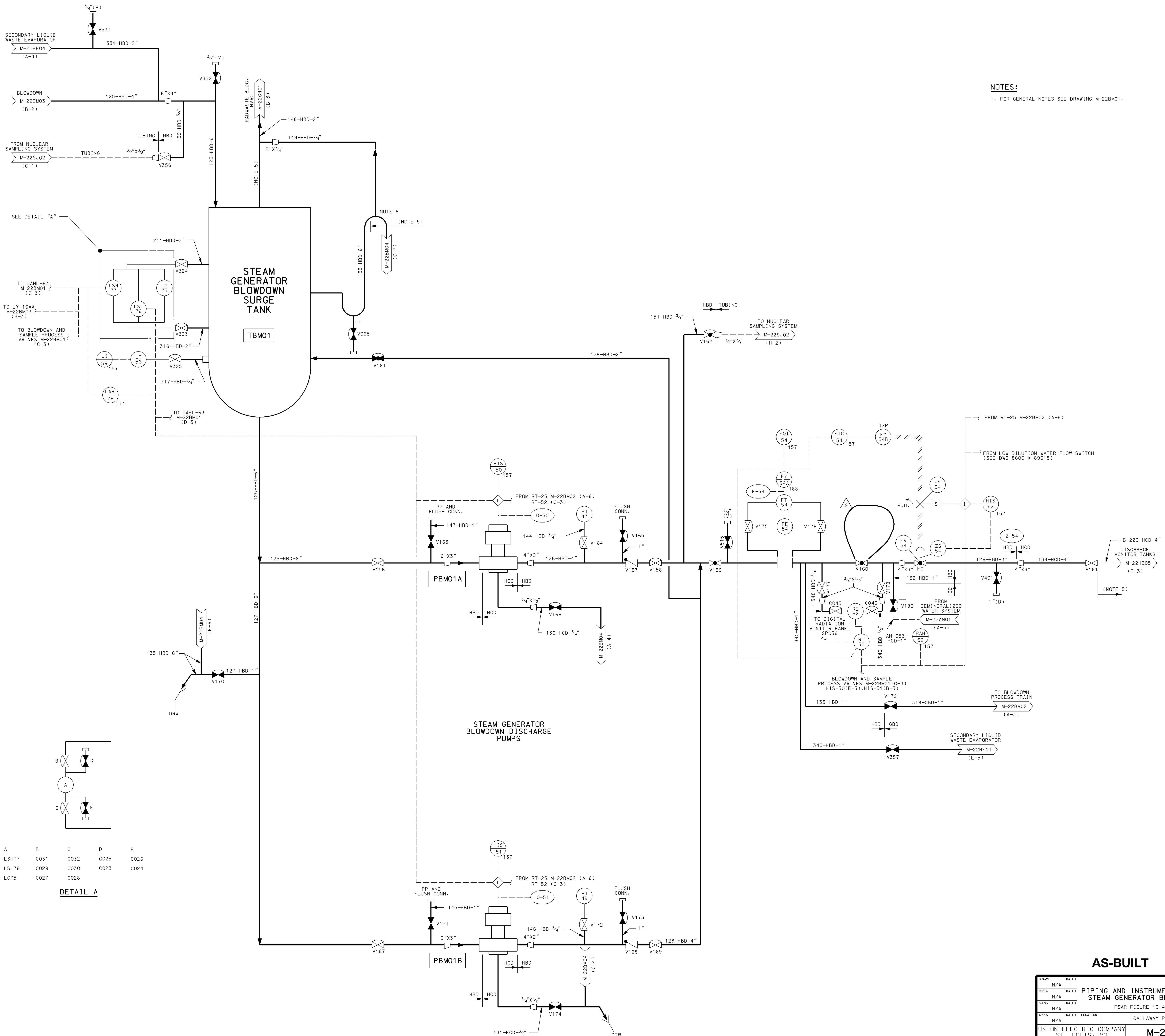
REV.	DATE	DRAWN	CHKD.	APPD.	INCORP.
1	092791	RJB	N/A	N/A	INCORPORATED
2					REVISION FOR CLARITY
3					REVISED DRAWING
4	100299	DJB	N/A	N/A	INCORPORATED
5	110499	RLW	N/A	N/A	INCORPORATED
6	041905	JHC	N/A	N/A	INCORP.
7	081035	JHC	N/A	N/A	INCORP.
8	041905	JHC	N/A	N/A	INCORP.
9	061606	JHC	N/A	N/A	INCORP.
10	061606	JHC	N/A	N/A	INCORP.
11	051606	JHC	N/A	N/A	INCORP.
12	051606	JHC	N/A	N/A	INCORP.
13	051606	JHC	N/A	N/A	INCORP.
14	051606	JHC	N/A	N/A	INCORP.
15	051606	JHC	N/A	N/A	INCORP.



AS-BUILT CLASS 1

DRAWN	DATE	CHKD.	DATE	APPD.	DATE	LOCATION	CLASS
N/A		N/A		N/A			

PIPING & INSTRUMENTATION DIAGRAM
STEAM GENERATOR BLOWDOWN SYSTEM
FSAR FIGURE 10.4-8 SHEET 3
CALLAWAY PLANT
UNION ELECTRIC COMPANY
ST. LOUIS, MO
M-22BM03
REV. 7



A	LSH77	C031	C032	C025	C026
B	LSL76	C029	C030	C023	C024
C	LG75	C027	C028		

DETAIL A

NOTES:

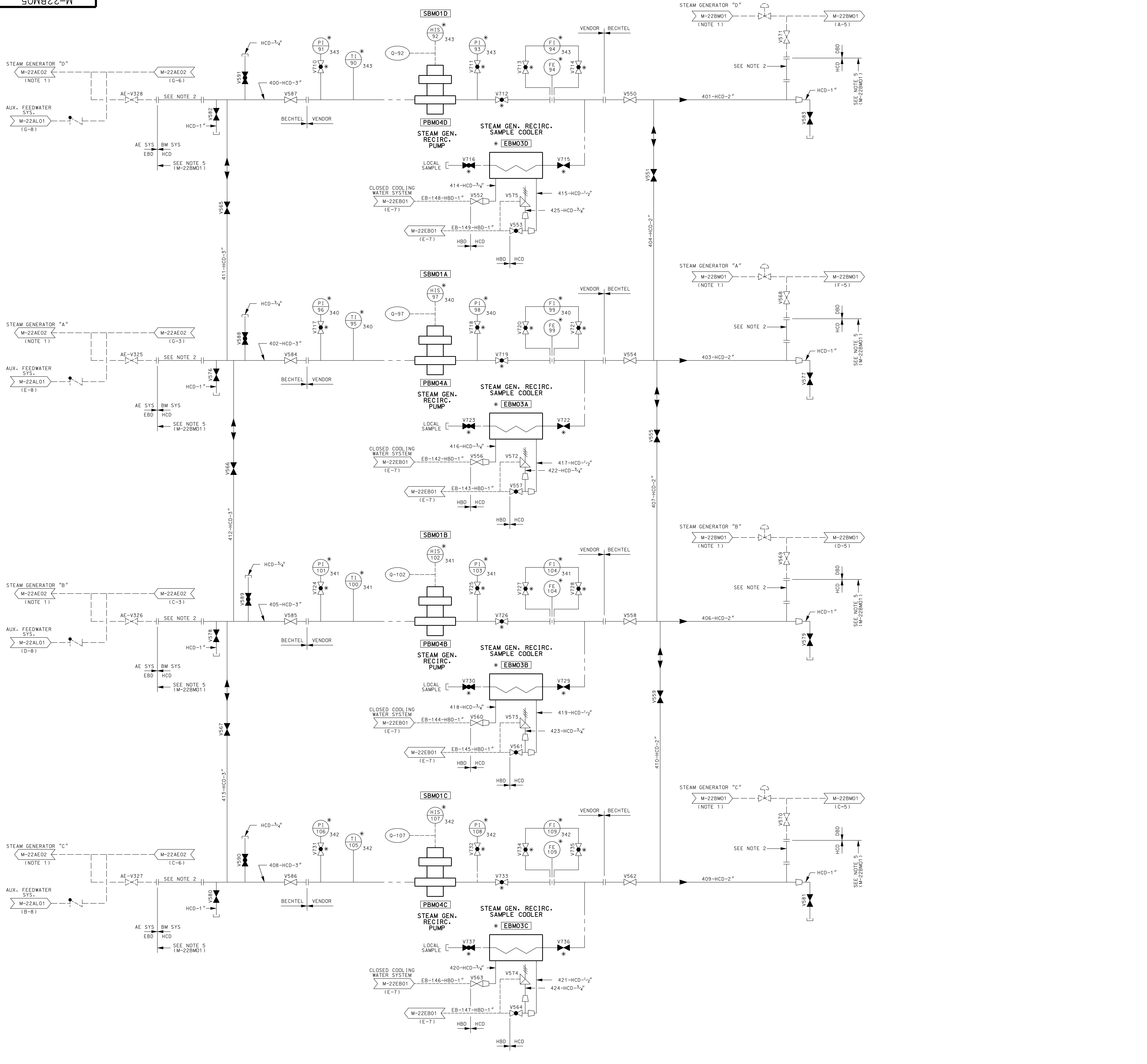
1. FOR GENERAL NOTES SEE DRAWING M-22BM01.

REV.	DATE	BY	CHKD.	APPD.	REV.	DATE	BY	CHKD.	APPD.
1	02/19/91	JHK			1	02/19/91	JHK		
2	08/20/93	JHK			2	08/20/93	JHK		
3	11/09/94	RLW			3	11/09/94	RLW		
4	06/05/95	RLW			4	06/05/95	RLW		
5	09/19/97	RLW			5	09/19/97	RLW		
6	08/01/98	RLW			6	08/01/98	RLW		
7	08/01/98	RLW			7	08/01/98	RLW		
8	08/01/98	RLW			8	08/01/98	RLW		
9	08/01/98	RLW			9	08/01/98	RLW		

AS-BUILT CLASS 1

DRAWN	N/A	DATE		PIPING AND INSTRUMENTATION DIAGRAM STEAM GENERATOR BLOWDOWN SYSTEM FSAR FIGURE 10.4-8 SHEET 4	CLASS CALLAWAY PLANT
CHKD.	N/A	DATE			
SUPV.	N/A	DATE			
APPD.	N/A	DATE			
UNION ELECTRIC COMPANY				REV.	
ST. LOUIS, MO				M-22BM04	9

REV.	DATE	BY	CHKD.	APPD.	DRWN.	DATE	BY	CHKD.	APPD.
1	090303								
2	110904								
3	110904								



NOTE:

1. SYSTEM INTERFACE ARROWS SHOW NORMAL FLOW DIRECTION. WET LAYUP RECIRCULATION FLOW IS IN THE OPPOSITE DIRECTION.
2. REMOVABLE SPOOL TO BE IN PLACE ONLY DURING STEAM GENERATOR WET LAYUP RECIRCULATION MODE. REMOVABLE SPOOL TO BE REPLACED WITH BLIND FLANGES DURING NORMAL OPERATION.

AS-BUILT CLASS 1

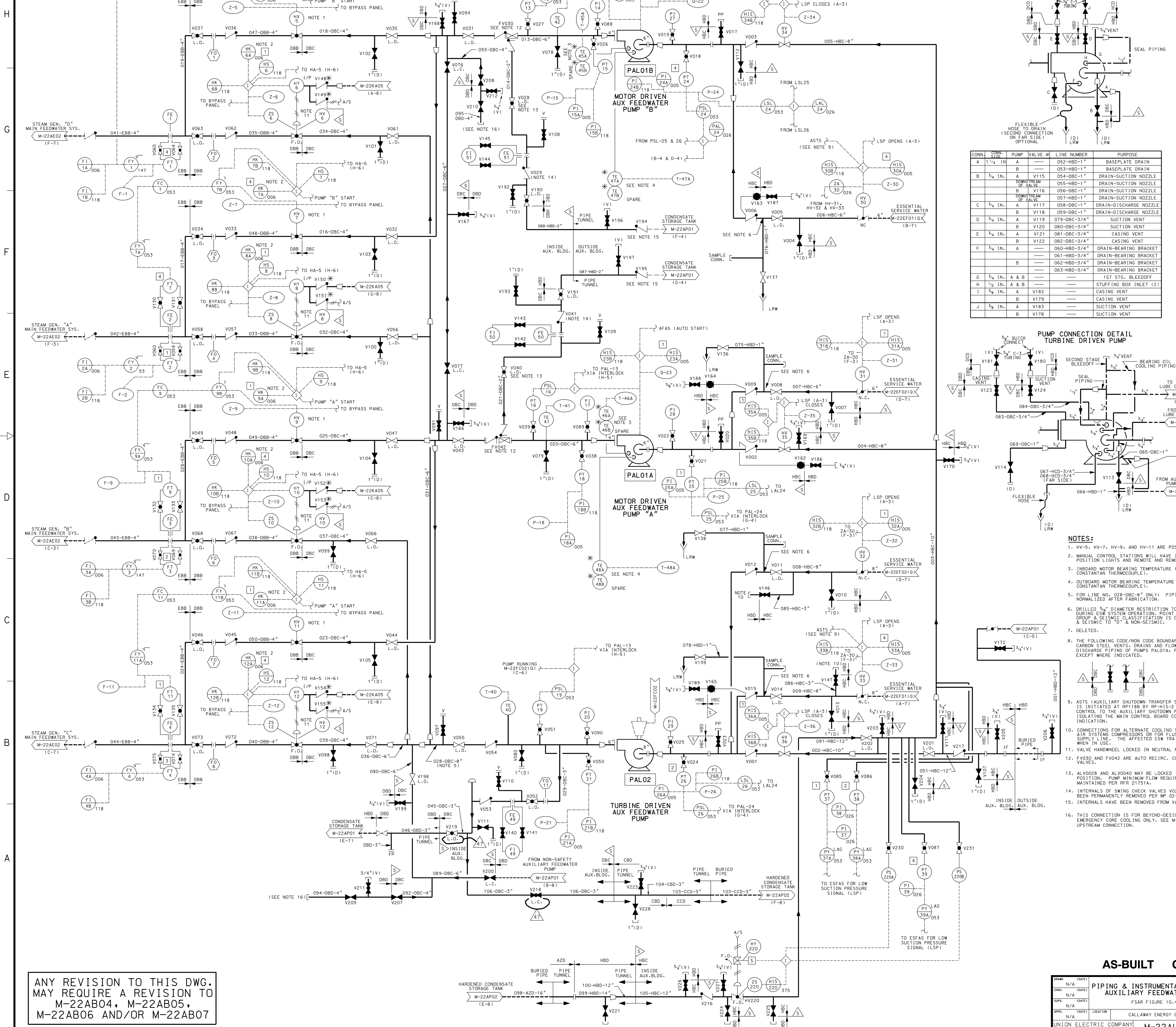
DRWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY		ST. LOUIS, MO	

PIPING AND INSTRUMENTATION DIAGRAM
STEAM GENERATOR BLOWDOWN SYSTEM

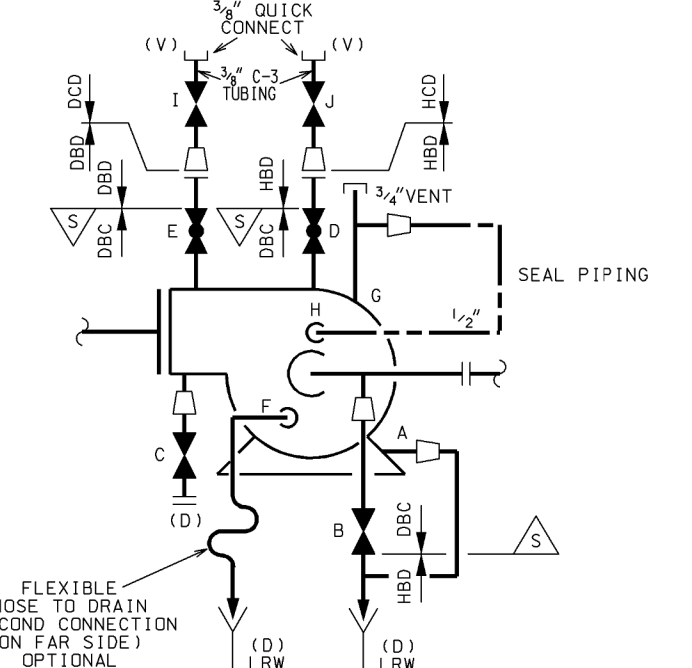
FSAR FIGURE 10.4-8 SHEET 5

REV. 3

(O) 101V22-W

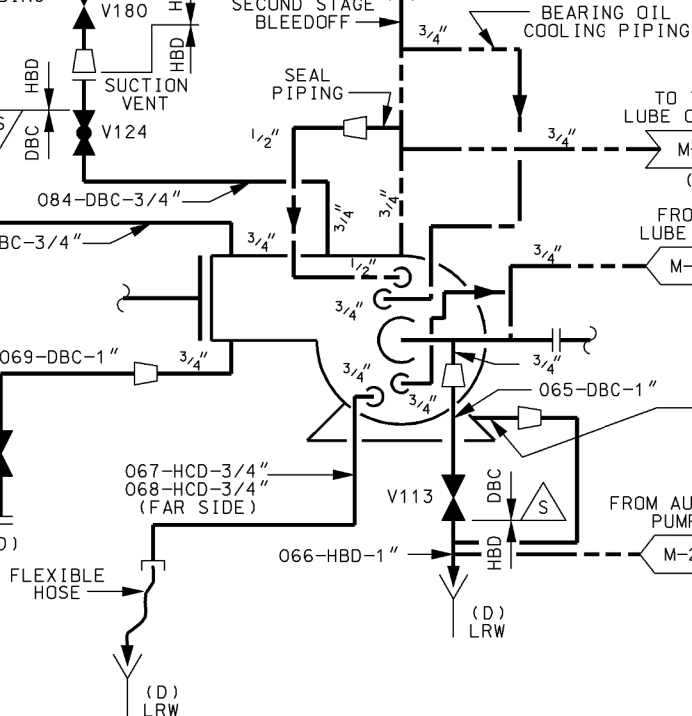


PUMP CONNECTION DETAIL
MOTOR DRIVEN PUMP



CONN.	SIZE	PUMP	VALVE #	LINE NUMBER	PURPOSE
A	1 1/4 IN.	B	---	052-HBD-1"	BASEPLATE DRAIN
B	3/4 IN.	A	V115	054-DBC-1"	BASELINE DRAIN
		B	V116	056-DBC-1"	DRAIN-SUCTION NOZZLE
		B	V117	058-DBC-1"	DRAIN-SUCTION NOZZLE
C	3/4 IN.	A	V118	059-DBC-1"	DRAIN-DISCHARGE NOZZLE
D	3/4 IN.	A	V119	079-DBC-3/4"	SUCTION VENT
E	3/4 IN.	B	V120	080-DBC-3/4"	SUCTION VENT
F	3/4 IN.	A	V121	081-DBC-3/4"	CASING VENT
		B	V122	082-DBC-3/4"	CASING VENT
G	3/4 IN.	A & B	---	060-HBD-3/4"	DRAIN-BEARING BRACKET
H	1/2 IN.	A & B	---	061-HBD-3/4"	DRAIN-BEARING BRACKET
I	3/8 IN.	A	V182	---	DRAIN-BEARING BRACKET
J	3/8 IN.	A	V183	---	DRAIN-BEARING BRACKET
		B	V178	---	DRAIN-BEARING BRACKET
		B	V178	---	1ST STG. BLEEDOFF
		A & B	---	---	STUFFING BOX INLET (2)
		A	V182	---	CASING VENT
		B	V179	---	CASING VENT
		A	V183	---	SUCTION VENT
		B	V178	---	SUCTION VENT

PUMP CONNECTION DETAIL
TURBINE DRIVEN PUMP

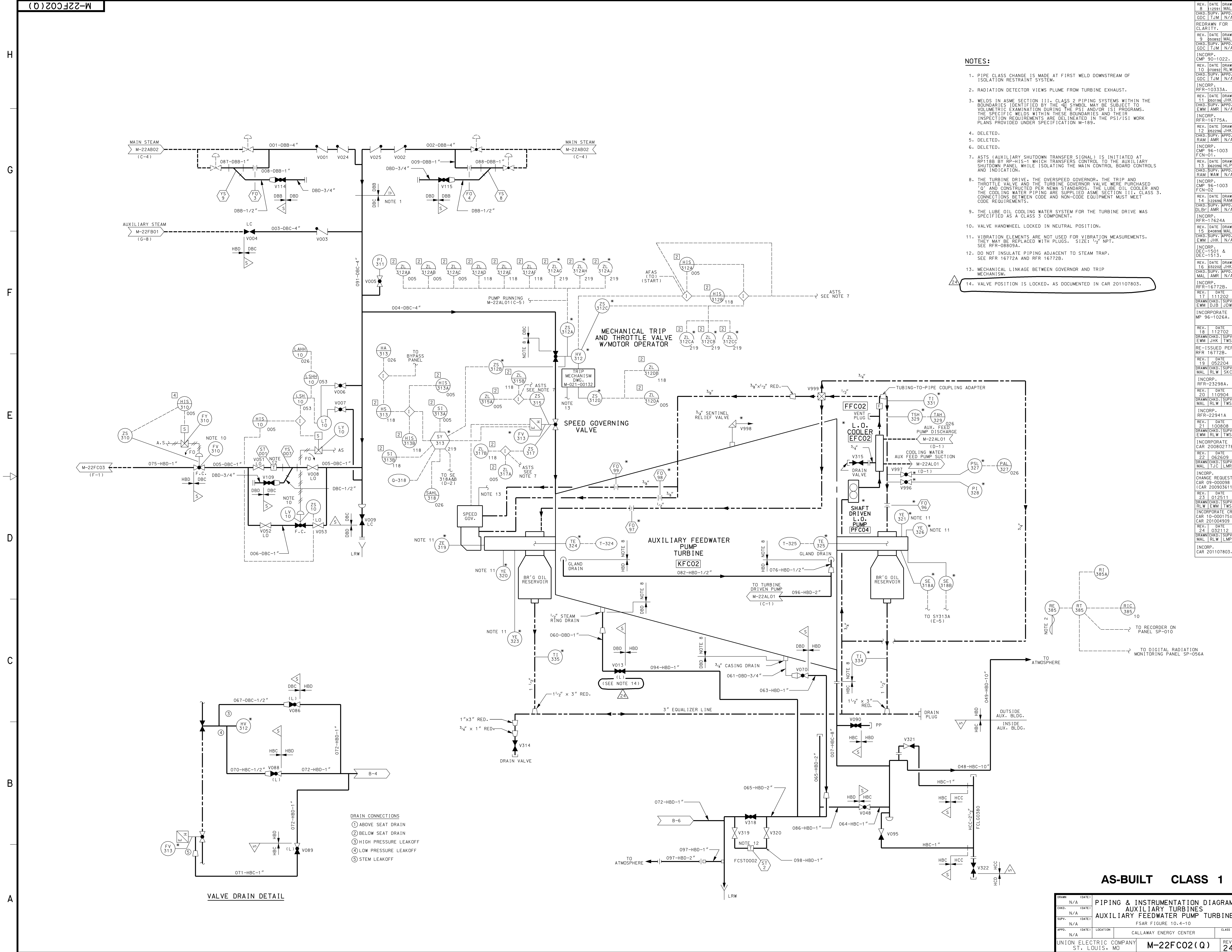


- NOTES:**
- HY-5, HY-7, HY-9, and HY-11 ARE POSITIONABLE.
 - MANUAL CONTROL STATIONS WILL HAVE INTEGRAL POSITION LIGHTS AND REMOTE CONTROL LIGHT.
 - INBOARD MOTOR BEARING TEMPERATURE (COPPER-CONSTANTAN THERMOCOUPLE).
 - OUTBOARD MOTOR BEARING TEMPERATURE (COPPER-CONSTANTAN THERMOCOUPLE).
 - FOR LINE NO. 028-DBC-8" ONLY: PIPING WILL BE NORMALIZED AFTER FABRICATION.
 - DRILLED 3/8" DIAMETER RESTRICTION TO MINIMIZE FLOW DURING ESW SYSTEM OPERATION. POINT AT WHICH QUALITY GROUP & SEISMIC CLASSIFICATION IS CHANGED FROM "C" & SEISMIC TO "D" & NON-SEISMIC.
 - DELETED.
 - THE FOLLOWING CODE/NON CODE BOUNDARIES APPLY TO ALL CARBON STEEL VENTS, DRAINS AND FLOW TAPS ON THE DISCHARGE PIPING OF PUMPS PAL01A, PAL01B AND PAL02, EXCEPT WHERE INDICATED.
 - ASTS (AUXILIARY SHUTDOWN TRANSFER SIGNAL) IS INITIATED AT RP118B BY RP-HIS-2 WHICH TRANSFERS CONTROL TO THE AUXILIARY SHUTDOWN PANEL WHILE ISOLATING THE MAIN CONTROL BOARD CONTROLS AND INDICATING.
 - CONNECTIONS FOR ALTERNATE COOLING SUPPLY FOR THE AIR SYSTEMS COMPRESSORS OR FOR FLUSHING THE ESW SUPPLY TO THE AFFECTED ESW TRAIN IS IMPROPER WHEN IN USE.
 - VALVE HANDWHEEL LOCKED IN NEUTRAL POSITION.
 - FV030 AND FV042 ARE AUTO RECIRC. CONTROL CHECK VALVES.
 - ALV0028 AND ALV0040 MAY BE LOCKED IN A THROTTLED POSITION. PUMP MINIMUM FLOW REQUIREMENTS MUST BE MAINTAINED PER RFR 21751A.
 - INTERNALS OF SWING CHECK VALVES V029 AND V041 HAVE BEEN PERMANENTLY REMOVED PER MP 02-1018, REV. B.
 - INTERNALS HAVE BEEN REMOVED FROM VALVES V194 AND V195.
 - THIS CONNECTION IS FOR BEYOND-DESIGN-BASIS (FLEX) EMERGENCY CORE COOLING ONLY. SEE M-22AP01 (D-8) FOR UPSTREAM CONNECTION.

AS-BUILT CLASS 1

PIPING & INSTRUMENTATION DIAGRAM AUXILIARY FEEDWATER SYSTEM			
DATE:	N/A	LOCATION:	CALLAWAY ENERGY CENTER
DESIGN:	N/A	CLASS:	M-22AL01 (Q)
SUPV.:	N/A	DATE:	REV. 47
APP.:	N/A	LOCATION:	ST. LOUIS, MO

ANY REVISION TO THIS DWG. MAY REQUIRE A REVISION TO M-22AB04, M-22AB05, M-22AB06 AND/OR M-22AB07



- NOTES:**
- PIPE CLASS CHANGE IS MADE AT FIRST WELD DOWNSTREAM OF ISOLATION RESTRAINT SYSTEM.
 - RADIATION DETECTOR VIEWS PLUME FROM TURBINE EXHAUST.
 - WELDS IN ASME SECTION III, CLASS 2 PIPING SYSTEMS WITHIN THE BOUNDARIES IDENTIFIED BY THE Δ SYMBOL MAY BE SUBJECT TO VOLUMETRIC EXAMINATION DURING THE PSI AND/OR ISI PROGRAMS. THE SPECIFIC WELDS WITHIN THESE BOUNDARIES AND THEIR INSPECTION REQUIREMENTS ARE DELINEATED IN THE PSI/ISI WORK PLANS PROVIDED UNDER SPECIFICATION M-189.
 - DELETED.
 - DELETED.
 - DELETED.
 - ASTS (AUXILIARY SHUTDOWN TRANSFER SIGNAL) IS INITIATED AT RP118B BY RP-HIS-1 WHICH TRANSFERS CONTROL TO THE AUXILIARY SHUTDOWN PANEL WHILE ISOLATING THE MAIN CONTROL BOARD CONTROLS AND INDICATION.
 - THE TURBINE DRIVE, THE OVERSPEED GOVERNOR, THE TRIP AND THROTTLE VALVE AND THE TURBINE GOVERNOR VALVE WERE PURCHASED '9' AND CONSTRUCTED PER NEMA STANDARDS. THE LUBE OIL COOLER AND THE COOLING WATER PIPING ARE SUPPLIED ASME SECTION II, CLASS 3. CONNECTIONS BETWEEN CODE AND NON-CODE EQUIPMENT MUST MEET CODE REQUIREMENTS.
 - THE LUBE OIL COOLING WATER SYSTEM FOR THE TURBINE DRIVE WAS SPECIFIED AS A CLASS 3 COMPONENT.
 - VALVE HANDWHEEL LOCKED IN NEUTRAL POSITION.
 - VIBRATION ELEMENTS ARE NOT USED FOR VIBRATION MEASUREMENTS. THEY MAY BE REPLACED WITH PLUGS. SIZE: 1/2" NPT. SEE RFR-98909A.
 - DO NOT INSULATE PIPING ADJACENT TO STEAM TRAP.
 - MECHANICAL LINKAGE BETWEEN GOVERNOR AND TRIP MECHANISM.
 - VALVE POSITION IS LOCKED, AS DOCUMENTED IN CAR 201107803.

AS-BUILT CLASS 1

DRAWN	N/A	DATE		PIPING & INSTRUMENTATION DIAGRAM AUXILIARY TURBINES AUXILIARY FEEDWATER PUMP TURBINE FSAR FIGURE 10.4-10
CHKD.	N/A	DATE		
SUPV.	N/A	DATE		
APPD.	N/A	DATE		
LOCATION		CALLAWAY ENERGY CENTER	CLASS	
UNION ELECTRIC COMPANY ST. LOUIS, MO			M-22FC02(Q)	REV. 24

REV. DATE DRAWN 8 112591 MAL
CHKD. SUPV. APPD. GDC TJM N/A
REDRAWN FOR CLARITY.

REV. DATE DRAWN 9 050892 MAL
CHKD. SUPV. APPD. GDC TJM N/A
INCORP. RFR-10333A.

REV. DATE DRAWN 10 050892 RLW
CHKD. SUPV. APPD. GDC TJM N/A
INCORP. RFR-10333A.

REV. DATE DRAWN 11 050892 JHK
CHKD. SUPV. APPD. EWM AMR N/A
INCORP. RFR-16775A.

REV. DATE DRAWN 12 050892 JHK
CHKD. SUPV. APPD. RAM AMR N/A
INCORP. RFR-16775A.

REV. DATE DRAWN 13 050892 JHK
CHKD. SUPV. APPD. RAM AMR N/A
INCORP. RFR-16775A.

REV. DATE DRAWN 14 122398 RAM
CHKD. SUPV. APPD. GDC TJM N/A
INCORP. RFR-16775A.

REV. DATE DRAWN 15 040898 MAL
CHKD. SUPV. APPD. DJB LJDW
INCORP. RFR-16775B.

REV. DATE DRAWN 16 022504 JHK
CHKD. SUPV. APPD. MAL RLV SKC
INCORP. RFR-23298A.

REV. DATE DRAWN 17 112702 JHK
CHKD. SUPV. APPD. TWS
INCORP. RFR-22941A.

REV. DATE DRAWN 18 110904 JHK
CHKD. SUPV. APPD. TWS
INCORP. RFR-22941A.

REV. DATE DRAWN 19 052204 JHK
CHKD. SUPV. APPD. TWS
INCORP. RFR-22941A.

REV. DATE DRAWN 20 062609 JHK
CHKD. SUPV. APPD. TWS
INCORP. RFR-22941A.

REV. DATE DRAWN 21 020808 JHK
CHKD. SUPV. APPD. TWS
INCORP. RFR-22941A.

REV. DATE DRAWN 22 062609 JHK
CHKD. SUPV. APPD. TWS
INCORP. RFR-22941A.

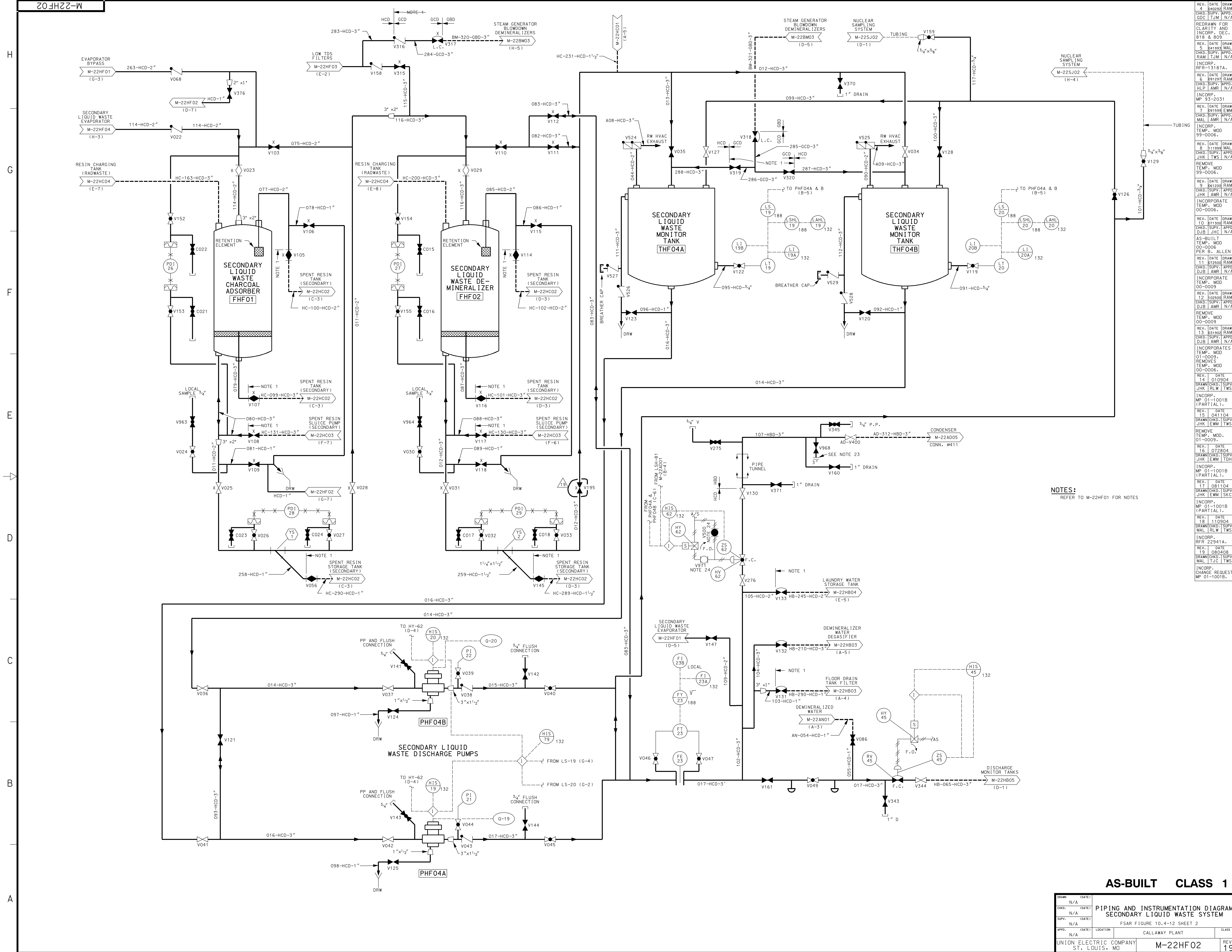
REV. DATE DRAWN 23 032511 JHK
CHKD. SUPV. APPD. TWS
INCORP. RFR-22941A.

REV. DATE DRAWN 24 032112 JHK
CHKD. SUPV. APPD. TWS
INCORP. RFR-22941A.

CALLAWAY - SP

FIGURE 10.4-11 is deleted

Rev. OL-10
11/98



NOTES:
REFER TO M-22HF01 FOR NOTES

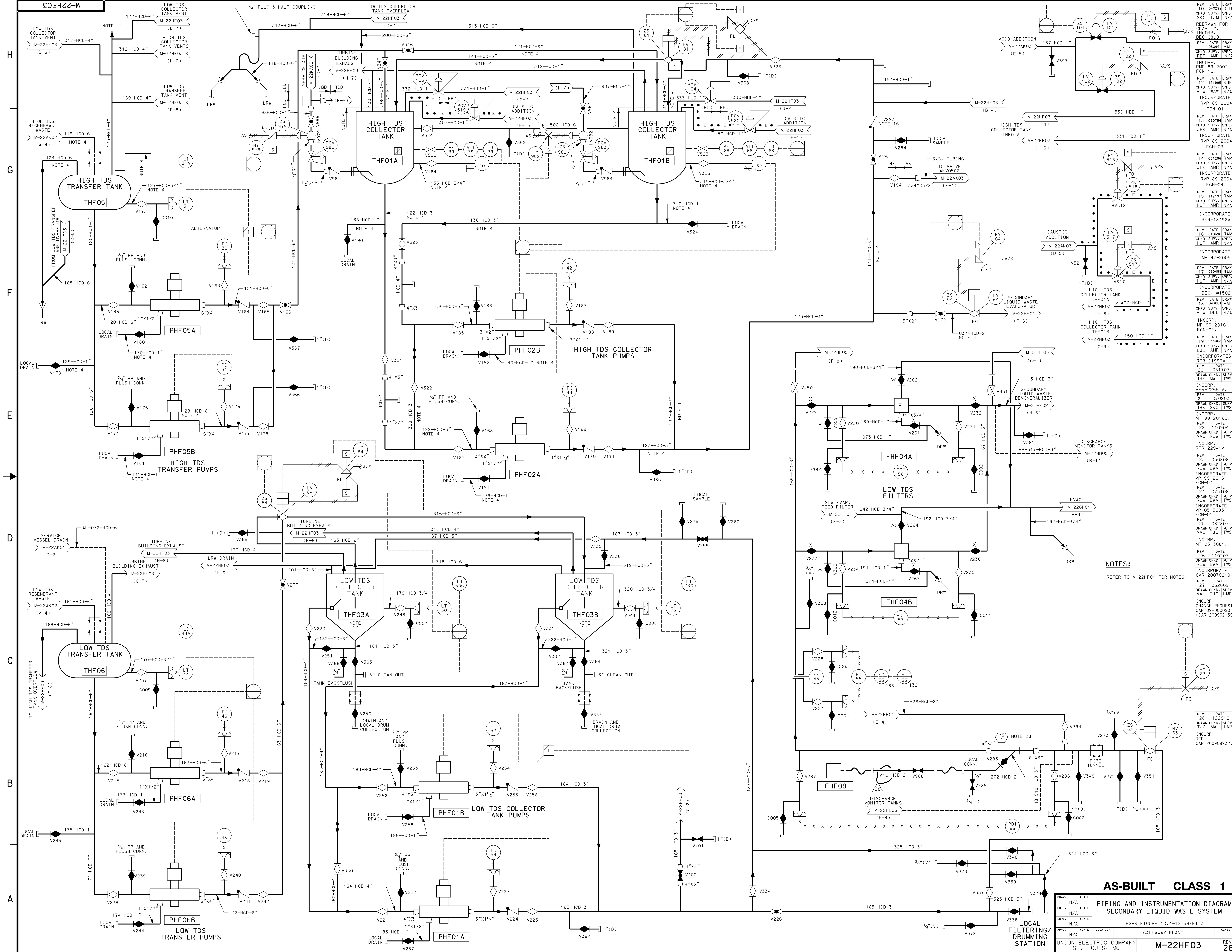
AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY ST. LOUIS, MO			REV. 19

PIPING AND INSTRUMENTATION DIAGRAM
SECONDARY LIQUID WASTE SYSTEM

FSAR FIGURE 10.4-12 SHEET 2

REV. DATE DRAWN 042992 RAM
CHKD. SUPV. APPD. GDC TUM N/A
REV. DATE DRAWN 5 041993 MAL
CHKD. SUPV. APPD. RAM TUM N/A
INCORP. RFR-13187A.
REV. DATE DRAWN 7 091993 RAM
CHKD. SUPV. APPD. HLP AMR N/A
INCORP. MP 93-2031
REV. DATE DRAWN 7 091993 EWM
CHKD. SUPV. APPD. MAL AMR N/A
INCORP. TEMP. MOD 99-0006.
REV. DATE DRAWN 8 111993 MAL
CHKD. SUPV. APPD. JHK AMR N/A
INCORP. TEMP. MOD 00-0006.
REV. DATE DRAWN 10 071993 RAM
CHKD. SUPV. APPD. JHK AMR N/A
AS-BUILT TEMP. MOD 00-0006 PER B. ALLEN
REV. DATE DRAWN 11 072000 RAM
CHKD. SUPV. APPD. JHK AMR N/A
INCORP. TEMP. MOD 00-0009
REV. DATE DRAWN 12 022000 RAM
CHKD. SUPV. APPD. JHK AMR N/A
INCORP. TEMP. MOD 00-0009
REV. DATE DRAWN 13 031993 RAM
CHKD. SUPV. APPD. JHK AMR N/A
INCORP. TEMP. MOD 01-0009
REV. DATE DRAWN 14 010904
DRAWN CHKD. SUPV. JHK RLW TWS
INCORP. MP 01-1001B (PARTIAL).
REV. DATE DRAWN 15 041104
DRAWN CHKD. SUPV. JHK EWM TWS
INCORP. TEMP. MOD. 01-0009
REV. DATE DRAWN 16 072804
DRAWN CHKD. SUPV. JHK EWM TDH
INCORP. MP 01-1001B (PARTIAL).
REV. DATE DRAWN 17 081104
DRAWN CHKD. SUPV. JHK EWM SKC
INCORP. MP 01-1001B (PARTIAL).
REV. DATE DRAWN 18 110904
DRAWN CHKD. SUPV. MAL RLW TWS
INCORP. RFR 22941A.
REV. DATE DRAWN 19 080408
DRAWN CHKD. SUPV. MAL TJC TWS
INCORP. CHANGE REQUEST MP 01-1001B.



NOTES:
REFER TO M-22HF01 FOR NOTES.

AS-BUILT CLASS 1	
PIPING AND INSTRUMENTATION DIAGRAM SECONDARY LIQUID WASTE SYSTEM	
FSAR FIGURE 10.4-12 SHEET 3	
APP. N/A	CLASS
UNION ELECTRIC COMPANY	M-22HF03
ST. LOUIS, MO	REV. 28

REV. DATE DRAWN 040394 DJB
CHKD. SUPV. APPR. SKC | TUM | N/A

REDRAWN FOR INCORP. DEC-0809.

REV. DATE DRAWN 11 08094 MAL
CHKD. SUPV. APPR. RFB | AMR | N/A

INCORPORATE RMP 89-2002 FCN-10.

REV. DATE DRAWN 12 121998 RFB
CHKD. SUPV. APPR. RFB | AMR | N/A

INCORPORATE RMP 89-2004 FCN-01.

REV. DATE DRAWN 13 020796 RAM
CHKD. SUPV. APPR. JHK | AMR | N/A

INCORPORATE RMP 89-2004 FCN-03.

REV. DATE DRAWN 14 032396 RAM
CHKD. SUPV. APPR. JHK | AMR | N/A

INCORPORATE RMP 89-2004 FCN-04.

REV. DATE DRAWN 16 010898 RAM
CHKD. SUPV. APPR. HLP | AMR | N/A

INCORPORATE RFR-18496A.

INCORPORATE MP 97-2005.

REV. DATE DRAWN 17 020498 RAM
CHKD. SUPV. APPR. JHK | AMR | N/A

INCORPORATE DEC. #1502.

REV. DATE DRAWN 19 043002 RAM
CHKD. SUPV. APPR. DJB | AMR | N/A

INCORPORATE MP 99-2016 FCN-01.

REV. DATE DRAWN 20 031703
CHKD. SUPV. APPR. JHK | MAL | TWS

INCORPORATE RFR-21397A.

REV. DATE 21 070203
CHKD. SUPV. APPR. JHK | SKC | TWS

INCORPORATE RFR-22667A.

REV. DATE 22 110904
CHKD. SUPV. APPR. MAL | RLW | TWS

INCORPORATE MP 99-2016 FCN-07.

REV. DATE 23 050806
CHKD. SUPV. APPR. RLW | EWM | TWS

INCORPORATE RFR 22941A.

REV. DATE 24 073106
CHKD. SUPV. APPR. MAL | TJC | TWS

INCORPORATE MP 05-083.

REV. DATE 25 082807
CHKD. SUPV. APPR. MAL | TJC | TWS

INCORPORATE MP 05-3081.

REV. DATE 26 110207
CHKD. SUPV. APPR. RLW | EWM | TWS

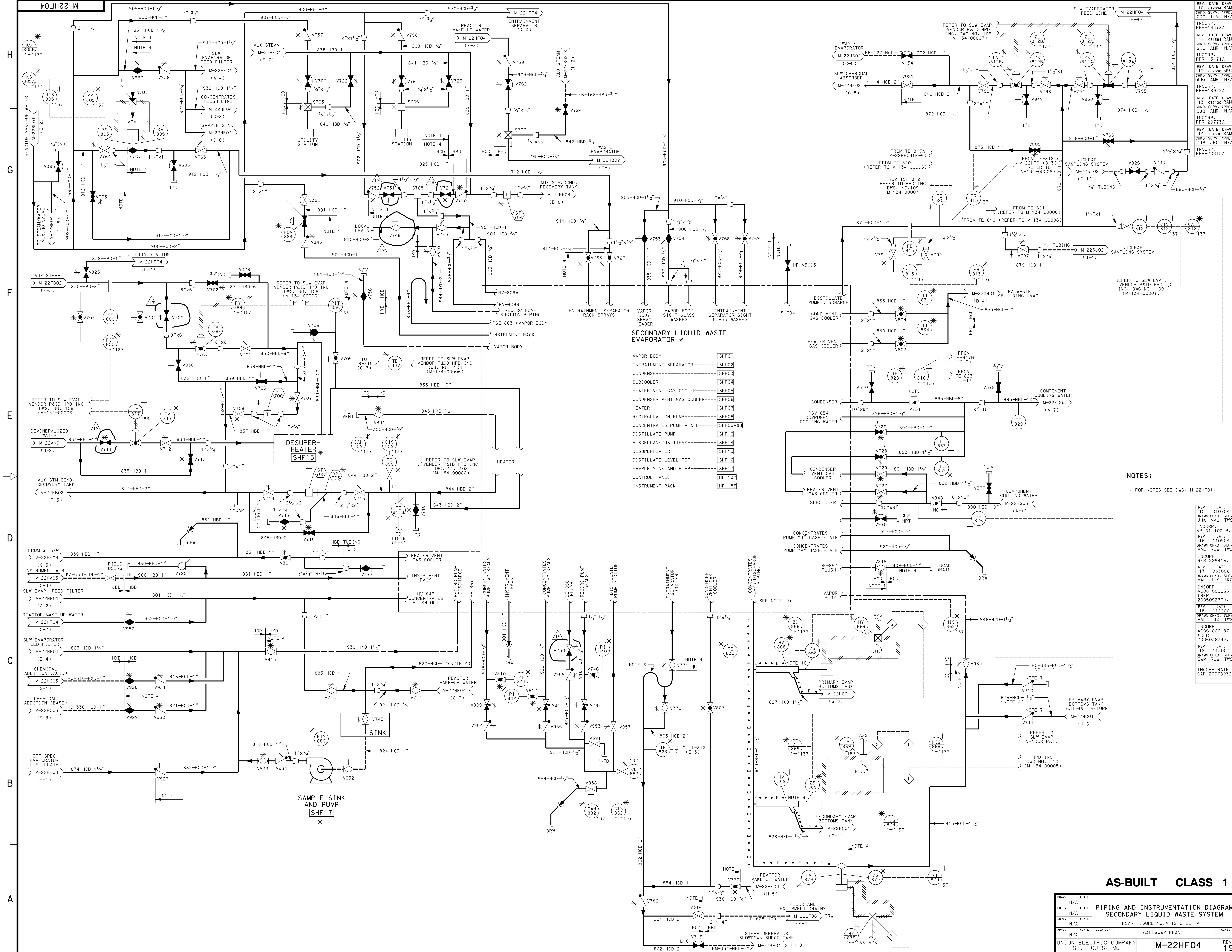
INCORPORATE CAR 200702191.

REV. DATE 27 062609
CHKD. SUPV. APPR. MAL | TJC | LMR

INCORP. CHANGE REQUEST CAR 09-00090 (CAR 200902139).

REV. DATE 28 122910
CHKD. SUPV. APPR. TJC | MAL | LMR

INCORP. RFR CAR 200909932.



SECONDARY LIQUID WASTE EVAPORATOR *

- VAPOR BODY-----SHF01
- ENTRAINMENT SEPARATOR-----SHF02
- CONDENSER-----SHF03
- SUBCOOLER-----SHF04
- HEATER VENT GAS COOLER-----SHF05
- CONDENSER VENT GAS COOLER-----SHF06
- HEATER-----SHF07
- RECIRCULATION PUMP-----SHF08
- CONCENTRATES PUMP A & B-----SHF09A/B
- DISTILLATE PUMP-----SHF10
- MISCELLANEOUS ITEMS-----SHF11
- DESUPERHEATER-----SHF12
- DISTILLATE LEVEL POT-----SHF13
- SAMPLE SINK AND PUMP-----SHF14
- CONTROL PANEL-----HF-137
- INSTRUMENT RACK-----HF-183

NOTES:
1. FOR NOTES SEE DWG. M-22HF01.

AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHEK	N/A	DATE	
SUPV.	N/A	DATE	
APP.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY ST. LOUIS, MO			CLASS
M-22HF04			REV.
			19

**PIPING AND INSTRUMENTATION DIAGRAM
SECONDARY LIQUID WASTE SYSTEM**

FSAR FIGURE 10.4-12 SHEET 4

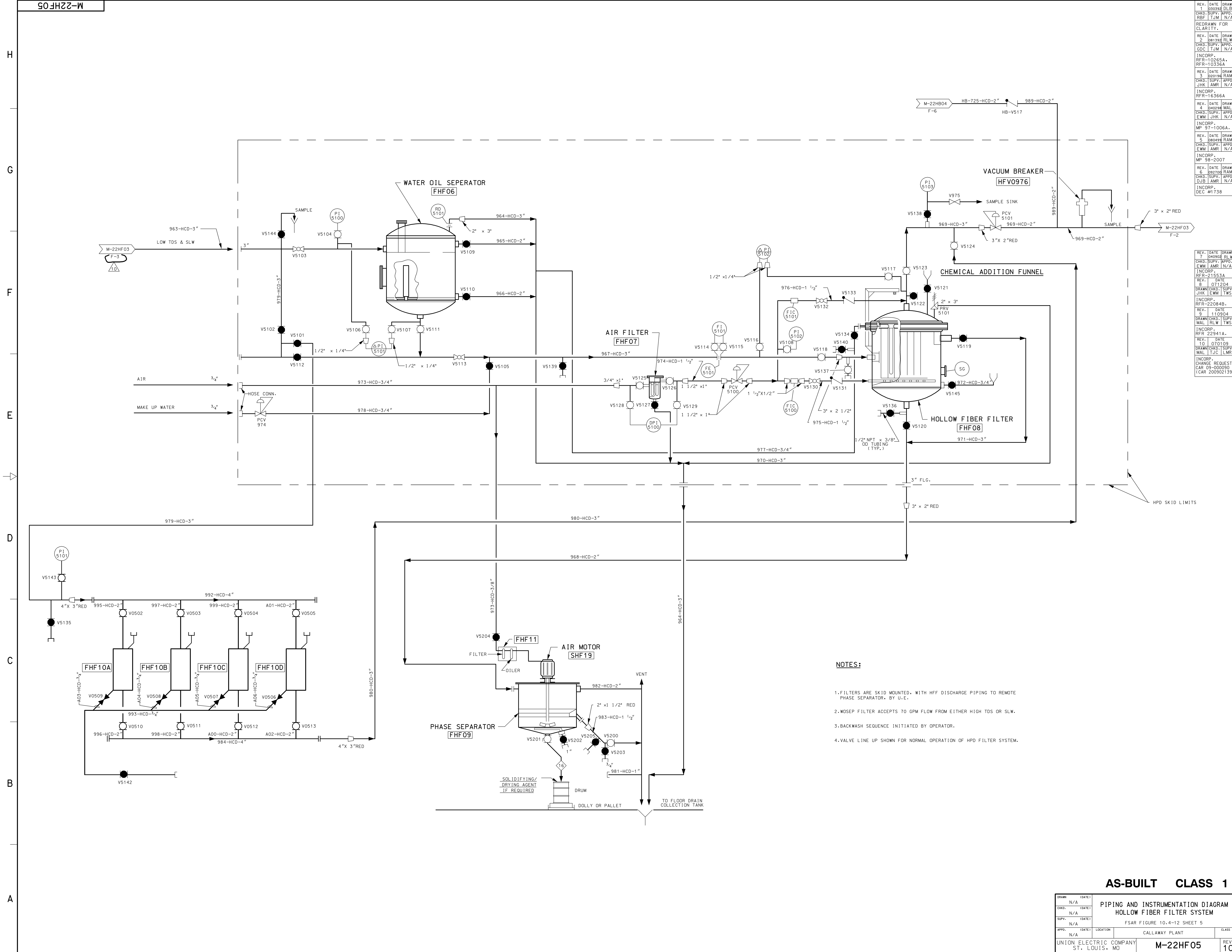
REV. DATE DRAWN
15 01/04
DRAWN CHKD. SUPV.
JHK MAL TWS
INCORP.
MP 01-1001B.

REV. DATE DRAWN
17 11/09/04
DRAWN CHKD. SUPV.
MAL RLW TWS
INCORP.
REF 22941A.

REV. DATE DRAWN
13 03/06
DRAWN CHKD. SUPV.
MAL JHK SKC
INCORP.
AC06-000053
(REF 200509237).

REV. DATE DRAWN
18 11/22/06
DRAWN CHKD. SUPV.
MAL TWC TWS
INCORP.
AC06-000187
(REF 200603624).

REV. DATE DRAWN
14 10/08
DRAWN CHKD. SUPV.
DJB JHC N/A
INCORP.
REF-20815A



- NOTES:**
1. FILTERS ARE SKID MOUNTED, WITH HFF DISCHARGE PIPING TO REMOTE PHASE SEPARATOR, BY U.E.
 2. WOSEP FILTER ACCEPTS TO GPM FLOW FROM EITHER HIGH TDS OR SLW.
 3. BACKWASH SEQUENCE INITIATED BY OPERATOR.
 4. VALVE LINE UP SHOWN FOR NORMAL OPERATION OF HPD FILTER SYSTEM.

AS-BUILT CLASS 1

DRAWN	N/A	DATE	
CHKD.	N/A	DATE	
SUPV.	N/A	DATE	
APPD.	N/A	LOCATION	CALLAWAY PLANT
UNION ELECTRIC COMPANY ST. LOUIS, MO			REV. 10

PIPING AND INSTRUMENTATION DIAGRAM
HOLLOW FIBER FILTER SYSTEM

FSAR FIGURE 10.4-12 SHEET 5

REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
1	030392	DLEB	RBF	TJM	N/A
REDRAWN FOR CLARITY.					
2	081392	RLW			
3	020196	RAM			
4	040298	MAL			
5	080498	RAM			
6	090208	RAM			
7	040902	RLW			
8	071204				
9	110904				
10	070109				

REV.	DATE	DRAWN	CHKD.	SUPV.	APPD.
1	040902	RLW			
2	071204				
3	110904				
4	070109				

CHANGE REQUEST
CAR 09-000030
(CAR 200902139)