FPL Energy Duane Arnold, LLC
3277 DAEC Road
Palo, Iowa 52324

FPL Energy

Duane Arnold Energy Center

November 3, 2006

NG-06-0733
10 CFR 50.55a

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49

Response To Request For Additional Information Related To Request For Relief Concerning Flow Measurement For the Standby Liquid Control Pumps

References: 1) Letter dated September 28, 2006, "Request For Additional Information Related To The Request For Relief Concerning Flow Measurement For The Standby Liquid Control Pumps," (TAC NO. MD1844)
2) Letter to NRC from G. Van Middlesworth, "Fourth Ten-Year Interval Inservice Testing Program Relief Requests," dated May 8, 2006

By letter dated September 28, 2006 (Reference 1), the NRC issued a request for additional information (RAI) related to the May 8, 2006 (Reference 2) request for relief concerning flow measurement for the Standby Liquid Control Pumps (Relief Request PR-03). Per discussions with the Staff on August 10, 2006, a response to this RAI is due within 30 days of receipt of the RAI. The RAI was received on October 5, 2006 (via e-mail). The requested additional information is contained in the Enclosure to this letter. Should you have any questions regarding this matter, please contact Steve Catron, Duane Arnold Energy Center Licensing Manager, at (319) 851-7234. This letter contains no new commitments or revisions to existing commitments.

Gary Van Middlesworth

Gary Van Middlesworth
Site Vice President, Duane Arnold Energy Center
FPL Energy Duane Arnold, LLC

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, DAEC, USNRC
Resident Inspector, DAEC, USNRC

A001

ENCLOSURE

Response To Request For Additional Information Related To Request For Relief Concerning Flow Measurement For The Standby Liquid Control Pumps

NRC Question 1

Please provide isometric diagram of the Standby Liquid Control (SBLC) System including details such as the length of piping and system components.

FPL Energy Duane Arnold Response to Question 1

The following diagrams of the Standby Liquid Control System are included in Attachment 1 to this Enclosure:

ISO-HCB-002-01 Rev. 8
FSK-03959 Rev. 9
FSK-3960 Rev. 8
FSK-3963 Rev. 1
FSK-3989 Rev. 2
FSK-3990 Rev. 2
FSK-3991 Rev. 2
FSK-3992 Rev. 4
FSK-3993 Rev. 5
FSK-3734 Rev. 16

NRC Question 2

The licensee stated that portable ultrasonic flow meters were installed on the common SBLC pump discharge piping to determine the practicality of using later technology ultrasonic flow meters to measure flow. The flow meter transducers were installed at three different locations on the discharge piping. However, each location resulted in significantly different measured flow rates compared to the other locations and the test tank level method. Please provide the data on the measured flow rates at different locations using the ultrasonic flow meters and compare them to those using the test tank level method.

FPL Energy Duane Arnold Response to Question 2

In March 2006, during the performance of Surveillance Test Procedure (STP) "SBLC Pump Operability Test," portable ultrasonic flow meters were installed on the SBLC pump discharge piping to determine the practicality of using ultrasonic flow meters to measure flow per the ASME OM Code. The flowmeter transducers were installed at three different locations on the discharge piping (as identified on the Attachment 1 drawings FSK-03959, FSK-3963, and FSK-3960). A vendor representative was on-site to facilitate proper installation and setup of the transducers and flow meters. The pump flow rate calculated using the change in tank level method of the STP was 28.7 gpm for the "A" SBLC pump. The reference value for the "A" pump is 28.8 gpm. The flow rate from each subsequent test is compared to this value. Because of the simplicity of this test method, 28.7 gpm is considered the correct baseline value. Following are the results of flow measurement at each of the locations using the portable ultrasonic flow meters.

Location 1:
The transducers at location 1 were originally set up in direct measurement mode. (In direct measurement mode the transducers are placed on opposite sides of the pipe and a signal is passed through the pipe and fluid from one transducer to the other in both directions.) This mode, which was recommended by the manufacturer, did not provide adequate signal strength. The flow meter was then reprogrammed and the transducers were reconfigured for reflective mode. (In reflective mode both transducers are installed on the same side of the pipe and the signal from each transducer is reflected off the opposite side of the pipe and into the other transducer.) This mode indicated adequate signal strength. Initial flow rate in this configuration was steady at 28.2 to 28.5 gpm. After several minutes running in this configuration the vendor representative added additional UT couplant to the transducer that had been moved earlier. Flow rate increased to 30 gpm following addition of couplant. The vendor representative then programmed into the flow meter the "T" in the flow path just upstream of the transducer. Resulting flow rate was about 31.2 gpm. No more changes were made to this flow meter.

Location 2:
The transducers for the flow meter mounted at location 2 were mounted and programmed for direct measurement. Following pump start, this flow meter read erratically between 20 and 26 gpm and occasionally indicated a faulted condition. It was judged that due to the location (only a few feet from where flow enters the test tank and on the same elevation and down stream of the throttle valve) there may be air in the pipe which caused the erratic flow rates and faults. The transducers were then moved to Location 3.

Location 3:
At location 3, the transducers were mounted for measurement in the reflective mode. Flow measured in this configuration was 27.5 gpm. In the judgement of the vendor representative, the lower flow rate was the result of the elbow just downstream of the transducers.

As can be seen from the flow variances between the location and the tank level method, the measured flow variance is much higher than would be desirable or acceptable. The flow variance is caused by the tight piping routing and minimal straight runs of piping.

NRC Question 3

Paragraph ISTB-3510(a) of the American Society of Mechanical Engineers Operation and Maintenance Code specifies that the flow rate determination shall be accurate to within ±2 percent actual. Please provide the flow rate determination methodology that meets this Code requirement. Also, include the correlation curve conversion from test tank level to water volume.

FPL Energy Duane Arnold Response to Question 3

SBLC pump flow rate is determined by measuring the time it takes for each pump to pump down at least 20 inches of test tank level. A graduated sight glass is used to determine tank level. A stopwatch, which is started when the meniscus passes through an inch mark on the sight glass and stopped when the meniscus passes through a second inch mark after at least 20 inches, is used to measure time. The change in tank level (in inches) is then divided by the elapsed time and multiplied by a conversion factor of 294 (gal·sec)/(in·min). This conversion factor is based on the inside diameter of the test tank (38 inches) and is calculated as follows:

$$\frac{\frac{\pi}{4}\cdot(38\cdot in)^2\cdot in}{in\_of\_tank}\cdot\left(\frac{ft}{12\cdot in}\right)^3\cdot\frac{7.48\cdot gal}{ft^3}\cdot\frac{60sec}{min} = 294.555\frac{gal\cdot sec}{in\cdot min}$$

The stopwatch used during this test has an accuracy of ±0.2 sec/hour with typical elapsed time of 205 seconds. This corresponds to an accuracy in gallons per minute of:

$$\frac{.2\cdot sec}{hr}\cdot\frac{hr}{3600\cdot sec}\cdot\frac{20in}{205\cdot sec}\cdot 294.555\frac{gal\cdot sec}{in\cdot min} = 1.597\times 10^{-3}\frac{gal}{min}$$

Readability of the test tank sight glass is assumed to be ±0.1 inches when the stopwatch is started and stopped. This corresponds to an accuracy in gallons per minute of:

$$\frac{.1\cdot in}{205\cdot sec}\cdot 294.555\cdot\frac{gal\cdot sec}{in\cdot min} = 0.144\frac{gal}{min}$$

Total accuracy of SBLC flow measurement is as follows:

$$A_{SBLC\_F} := \sqrt{(.0015gpm)^2 + 2\cdot(.144gpm)^2}$$

$$A_{SBLC\_F} = 0.204\,gpm$$

In percent of the reference value this corresponds to:

$$\frac{.204gpm}{28.8gpm} = 0.708\,\%$$

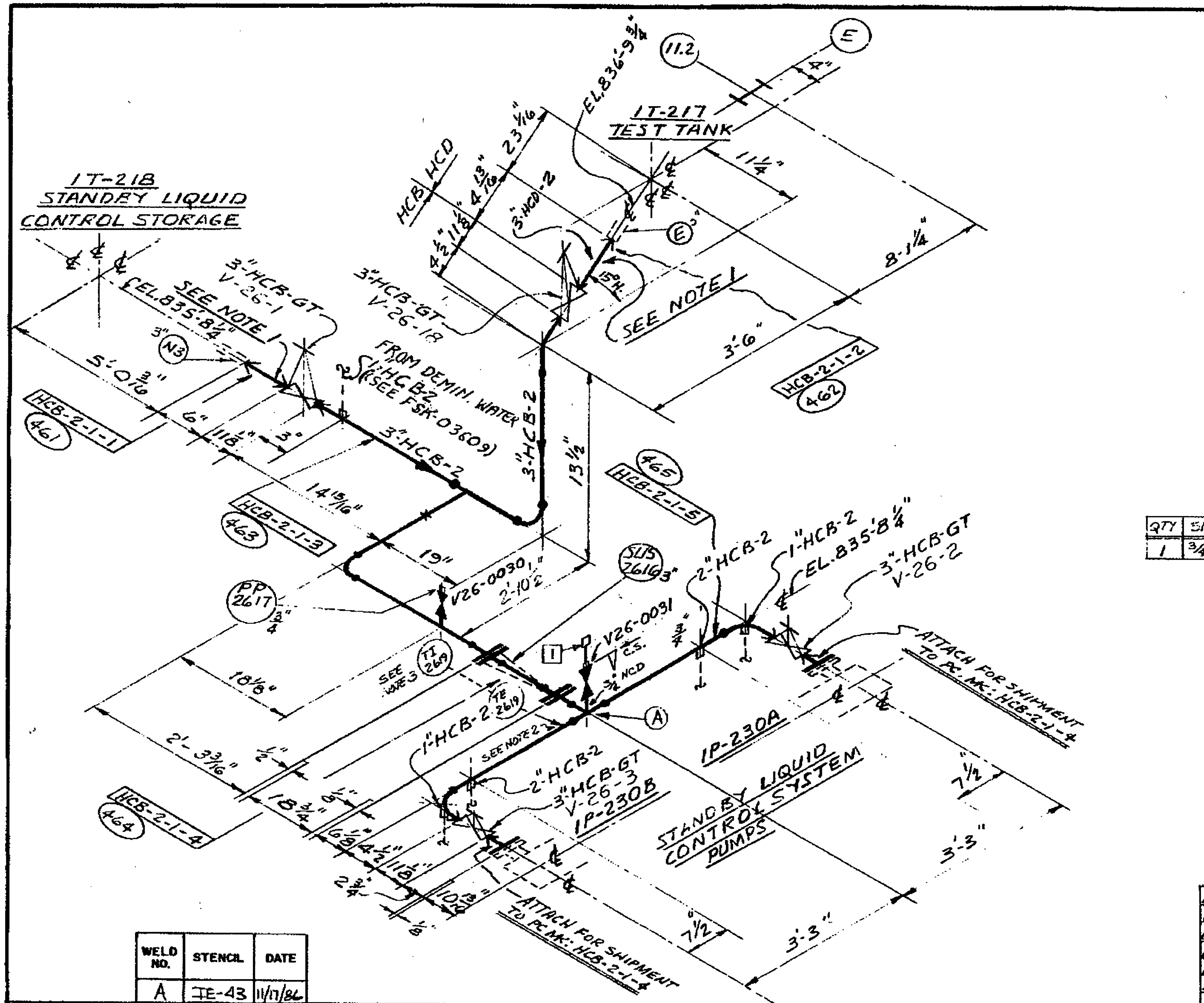
Since the portion of the test tank where the flow measurement is taken has a straight wall, the volume of water per inch of tank does not change as tank level changes. Therefore, the correlation curve of tank level versus tank volume would be a straight line. This correlation curve is not currently available. The change in level over measured time will be converted to flow rate using the formula (with the conversion factor of 294 (gal·sec)/(in·min)) as described in the original relief request submitted on May 8, 2006, and therefore, a correlation curve is not required. The correlation in terms of tank volume to level is 4.91 gal/inch. The tank level gage is 36 inches long, which allows for approximately 6 minutes of measured flow. Since the SBLC pumps are positive displacement pumps, suction and discharge parameters do not impact flow, and therefore, a minimum pump run time prior to testing is not required.

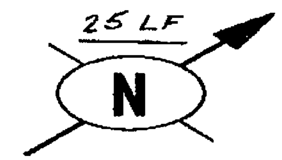
Attachment To Enclosure For Response To Request For Additional Information
Related To Request For Relief Concerning Flow Measurement
For the Standby Liquid Control Pumps

This Attachment contains the following diagrams:

ISO-HCB-002-01 Rev. 8
FSK-03959 Rev. 9
FSK-3960 Rev. 8
FSK-3963 Rev. 1
FSK-3989 Rev. 2
FSK-3990 Rev. 2
FSK-3991 Rev. 2
FSK-3992 Rev. 4
FSK-3993 Rev. 5
FSK-3734 Rev. 16

10 pages follow





NOTES.

1. PIPE INDICATED TO BE SCH. 40S TO MATCH TANK OUTLET NOZZLE WITH 1 END TO BE TAPER BORED FOR SCH.10S WELD
2. THERMOCOUPLE (TE2619) ATTACHED TO BOTTOM OF PIPE O.D.
3. TEMPERATURE INDICATOR (TI2619) MOUNTED TO STAND NEAR HEAT TRACE CONTROL BOX (IL30.)

REFERENCE DRAWINGS

M-126	P & ID
M-250	PIPING PLAN AREA 4
M-251	PIPING PLAN AREA 4

QTY	SIZE & DESCRIPTION	ASTM	G.R.	ITEM	HEAT #
1	3/4 CAP 3000# SW.	A-182	F-304	1	

WELD NO.	STENCIL	DATE
A	TE-43	11/11/86

INFORMATION ONLY

SPOOL SHT. 461-465 & 466F

5		REVISED PER DDC 743	TAK	
4		REV. PER LCR-68		
3		REV PER DDC-1650		
2	10-16-82	REV PER DDC-870 (79-14)		
1		REV PER DCP-1322	JW	
0		ISSUED FOR FAB	VF	

DRAWN V. F.

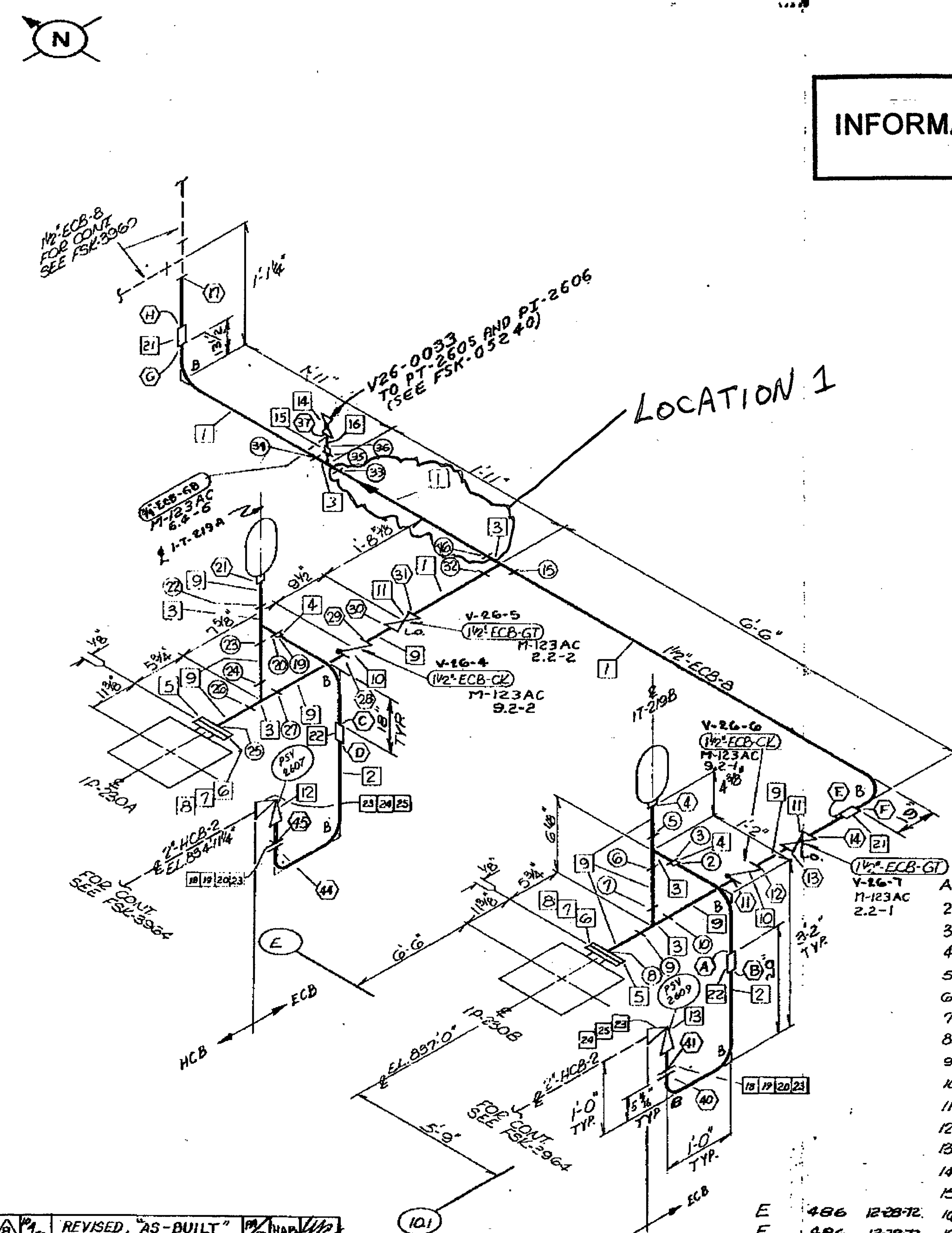
BECHTEL
SAN FRANCISCO

DUANE ARNOLD ENERGY CENTER—UNIT NO 1
IOWA ELECTRIC LIGHT AND POWER CO.
CEDAR RAPIDS IOWA

ISOMETRIC-REACTOR BLDG.
STANDBY LIQUID CONTROL

JOB No.	DRAWING No.	REV.
7884	ISO-HCB-002-01	8

INFORMATION ONLY



			A	486	12-27-72	21	486	1-24-73
			2	567	12-21-72	22	486	1-24-73
			3	125	12-15-72	23	567	12-20-72
			4	486	1-24-73	24	567	12-20-72
			5	486	1-23-73	25	470	2-7-73
			6	567	12-20-72	26	567	12-21-72
			7	567	12-20-72	27	567	12-21-72
			8	470	2-7-73	28	567	12-21-72
			9	567	12-21-72	29	125	12-18-72
			10	567	12-21-72	30	567	12-21-72
			11	567	12-21-72	31	486	12-28-72
			12	125	12-18-72	32	125	12-18-72
			13	126	12-18-72	33	125	12-15-72
			14	486	12-28-72	34	125	12-15-72
			15	125	12-15-72	35	125	12-15-72
E	486	12-28-72	16	125	12-15-72	36	486	12-28-72
F	486	12-28-72	17	486	1-2-73	37	125	12-18-72
G	486	1-2-73	B	486	12-27-72	C	486	12-27-72
44	269	3-15-73	19	567	12-21-72	D	486	12-27-72
H	486	1-2-73	20	125	12-15-72	40	269	3-14-73

41	P-37	8-16-73
45	P-37	8-16-73

8	10-4-73	REVISED, "AS-BUILT"	PA	HAB	
7	8-16-73	AS BUILT		HAB	
6	4-26-73	AS BUILT AS NOTED		RW	
5	2-21-73	REV. B.M.	PA	RW	

ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS | PIPING SYMBOLS SEE L-250 IN DRAFTING MANUAL | *VENDOR SUPPLIED | H = HORIZONTAL, V = VERTICAL | B = BEND | F.T.F. = FIELD TO FIT | F.W. FIELD WELD

BILL OF MATERIAL

QTY.	SIZE AND DESCRIPTION	ASTM	GR	PC. No.	HEAT No.
15'	1½" PIPE SCH. 80s	A376 A312	304	1	F4803
12'	1" PIPE SCH. 80s	↓	↓	2	F10710
6	1½" TEE 3000# S.W.	A-182	304	3	F11065
2	1½" x 1" RED. INSERT 3000# S.W.	↓	↓	4	F3584
2	1½" R.F. FLG. 600# S.W.	A182	316	5	F14687
2	1½" FLEXITALLIC GASKET	TYPE	'CG'	6	—
8	¾" ø x 4" LG. STUD BOLTS	A193	B7	7	—
16	HEXHEAD NUTS ¾"	A194	2H	8	—
10	1½" NIPPLE x 3½" LG. SCH. 80s	A376 A312	304	9	F4809
2	1½"-ECB-CK 600# S.W.	A-182	316	10	9.2-1&2
2	1½"-ECB-GT 600# S.W.	A-182	316	11	2.2-1&2
1	2" x 1"-PSV-2607	—		12	
1	2" x 1"-PSV-2609	—		13	
1	¾"-ECB-GB 600# S.W.	A-182	316	14	6.4-6
1	1½" x ¾" RED. INSERT 3000# S.W.	A182	304	15	F12921
1	¾" x 3½" LG. NIPPLE SCH. 80s	A376 A312	304	16	F3584
4	1"-600# SW. FLG.	A-182	F-316	18	F15865
2	1"-FLEXIT-CG-GSKT	—	—	19	—
8	3½" x ⅝" LG. STUD	A-193	B7	20	—
2	1½" CPLG. 3000# S.W.	A-182	304	21	F12904
2	1" CPLG. 3000# S.W.	A-182	304	22	F12904
32	⅝" NUTS, HEX., SEMI. FIN.	A-194	2H	23	—
2	2"-FLEXIT-GSKT. CG	—	—	24	—
16	4" x ⅝"-BOLTS ¼" RF	A-193	B7	25	—

QUALITY CONTROL DATA

Q – DOCUMENTATION: REQ'D ☒ NOT REQ'D ☐

SEISMIC ANALYSIS: REQ'D ☒ NOT REQ'D ☐

WELDING REQUIREMENTS P37, P486, P567

WELDING PROC.: PR-T-AG Rev. II

FILLER METAL: ER-308

PREHEAT TEMP.: 60° min.

WELDERS NAME: P125, P269, P470

WELDERS QUALIF.: P8-T-AG

WELD No's REV. 5: 36-17, 19-20, 40-44

REV. 7: 41, 45

NONDESTRUCTIVE EXAM.

Rev. 7: 7/30/73 AC

	DATE	INITIAL		DATE	INITIAL
VISUAL	4-26-73	DLC	RADIOGRAPHIC	NR	DLC
LIQUID PENET.	4-26-73	DLC	ULTRASONIC	NR	DLC
			MAGN. PARTICAL	NR	DLC

INSTALLATION INSPECTION

INSTALL. PER REV. 3-15-73 HAB

AS BUILT: 8-16-73 HAB

CLEANLINESS: 12-27-72 HAB

HANGER:

HYDRO TEST:

CODE INSPECTOR:

CERTIFIED CORRECT:

HANGER DET. DWG.:

SHOP FAB'D ☒ FIELD FAB'D ☐

START-UP No.: 53 | COST CODE: | INSUL. CL.: NONE | THICK:

P & I.D.: M-126, REV. 3 F1 | PLANT DESIGN DWG.: M-251

UNIT: 1 | ELEV.: 833'-6" | AREA: 4

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.
4	2/6/73	ADDED TEMP. VALVE & BM	PA	RW	
3	1/4/73	RELOCATED PI & PT CONN.	R.C.O.	RW	
2	11/1/72	ADDED SEISMIC REQMT.	LRH	RW	
1	10/3/72	ADDED PI & PT CONN.	LRH	RW	
9	10/4/73	REV PER DDC-1650			

BECHTEL
SAN FRANCISCO

IOWA ELECTRIC POWER & LIGHT
DUANE ARNOLD ENERGY PLANT

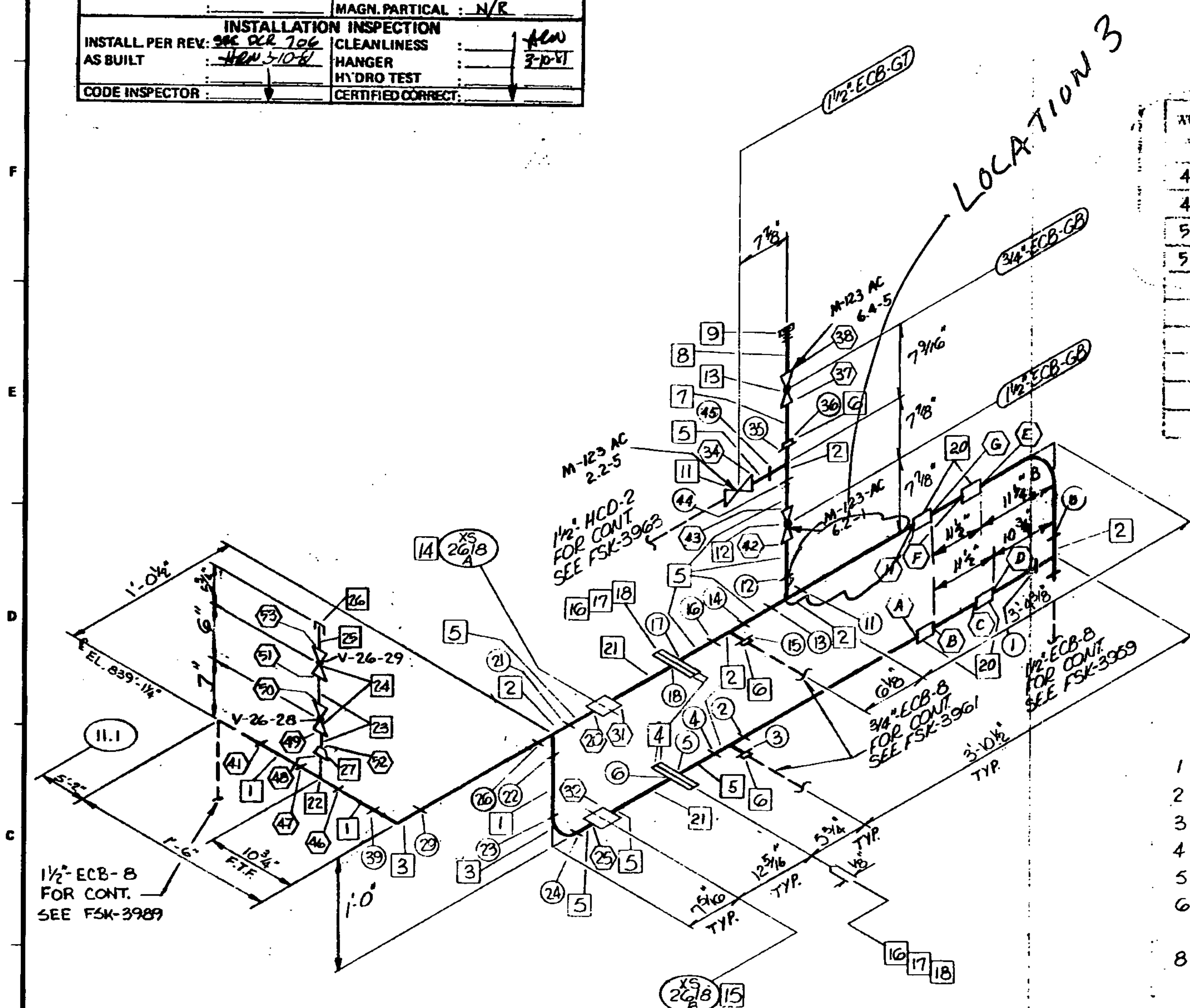
REACTOR BLDG - AREA #4
STANDBY LIQUID CONTROL PUMP DISCHARGE TO VESSEL

JOB No.	DRAWING No.	REV.
7884	FSK-03959	9

1015 MTI

ISO-FORM 100

INFORMATION ONLY



FOR WELD No's. 46 THRU 53 ONLY

QUALITY CONTROL DATA

Q – DOCUMENTATION: REQ'D ☒ NOT REQ'D ☐	SEISMIC ANALYSIS: REQ'D ☒ NOT REQ'D ☐
WELDING REQUIREMENTS	
WELDING PROC.: P8-T-AG Rev 4	WELDERS NAME: IE-35
FILLER METAL: ER308	WELDERS QUALIF.:
PREHEAT TEMP.: 60° MIN	WELD No's REV.:
	REV.:
NONDESTRUCTIVE EXAM. (DATE / INITIAL)	(DATE / INITIAL)
VISUAL: 2-14-80 DLC	RADIOGRAPHIC: N/R
LIQUID PENET.: 2-12-80 MM	ULTRASONIC: N/R
	MAGN. PARTICAL: N/R
INSTALLATION INSPECTION	
INSTALL. PER REV: SEE DCR 706	CLEANLINESS: HEW
AS BUILT: HEW 3-10-81	HANGER: 3-10-81
	HYDRO TEST:
CODE INSPECTOR:	CERTIFIED CORRECT:

WELD NO	STENCIL	DATE	WELD NO	STENCIL	DATE
47	IE35	2-14-80	48	IE35	2-12-80
49	IE35	2-12-80	50	IE35	2-12-80
51	IE35	2-12-80	52	IE35	2-12-80
53	IE35	2-12-80		P-	
	P-			P-	
	P-			P-	
	P-			P-	
	P-			P-	
	P-			P-	
	P-			P-	

						1	36	12-20-72	21	486	1-5-73
						2	36	12-20-72	22	36	12-21-72
						3	36	12-21-72	23	36	12-21-72
						4	36	12-20-72	24	486	1-5-73
						5	486	12-29-72	25	269	2-27-73
						6	269	2-27-73	26	36	12-21-72
						8	36	12-20-72			
									29	36	12-21-72
						11	36	12-20-72	31	269	1-23-73
						12	36	12-20-72	32	269	2-27-73
						13	36	12-20-72			
41	486	1-3-73	G	486	12-29-72	14	36	12-20-72	34	470	2-8-73
A	486	12-28-72	H	486	12-29-72	15	36	12-21-72	35	36	12-21-72
B	486	12-28-72	42	470	2-14-73	16	36	12-20-72	36	486	1-5-73
C	486	12-28-72	43	470	2-13-73	17	486	1-2-73	37	486	1-2-73
D	486	12-28-72	44	36	12-21-73	18	269	1-23-73	38	486	1-2-73
E	486	1-2-73	45	470	2-23-73				39	486	1-3-73
F	486	12-29-72	46	IE35	2-12-80	20	269	1-23-73			

△					
8	3/10/81	REVISED PER DCR-706	TNO	G	
7	11/5/73	"AS-BUILT"	PA	HAB	
6	10-29-73	REMOVED FS-2614	PA	EW	
5	4-26-73	AS BUILT AS NOTED	PA/RBO	EW	
NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.

BILL OF MATERIAL

QTY.	SIZE AND DESCRIPTION	ASTM	GR	PC. No.	HEAT No.
10'	1½" PIPE SCH. 80S	A376 A312	304	1	F4809
6	1½" TEE 3000# S.W.	A182	304	2	F11065
2	1½" 90° ELL. 3000# S.W.	↓	↓	3	F13313
4	1½" RF FLG. 600# S.W.	A182	316	4	F13623
8	1½" NIPPLE x 3½" LG. SCH. 80S	A376 A312	304	5	F10121
3	1½" x ¾" RED. INSERT 3000# SW	A182	304	6	F3584
1	¾" NIPPLE x 3½" LG. SCH. 80S	A376 A312	304	7	F7328
1	¾" NIPPLE x 3½" LG. (T.O.E.) SCH. 80S	↓	↓	8	F13649
1	¾" SCR'D. CAP 3000#	A182	304	9	F3884
1	1½"-ECB-GT 600# S.W.			11	2.2-5
1	1½"-ECB-GB 600# S.W.			12	6.2-1
1	¾"-ECB-GB 600# S.W.			13	6.4-5
1	1½"-XS-2618A			14	
1	1½" XS-2618B			15	
4	1½" FLEXITALLIC GASKET	TYPE	CG	16	
8	¾"ø x 4" LG. STUD BOLTS	A193	B7	17	
16	HEXHEAD NUTS	A194	2H	18	
4	1½" CPLG 3000# SW S.S.	A-182	304	20	F12904
18"	1½" PIPE	A-376 A-312	304	21	F13649
1	1½" x 1½" x 1½" TEE 3000# SW	A-182	304	22	F3305
2	¾" NIP. x 3½ LG. SCH 80S	A-376 A-312	304	23	497574
2	¾" ECB-GB 600# SW	A-182	316	24	N2
1	¾" NIP. x 3½" LG. (T.O.E.) SCH 80S	A-376 A-312	304	25	497703
1	¾" CAP 3000# SCR'D.	A-182	304	26	J4RYJ
1	1½" x ¾" RED. INSERT	A-182	304	27	55836M

QUALITY CONTROL DATA

Q – DOCUMENTATION: REQ'D ☒ NOT REQ'D ☐	SEISMIC ANALYSIS: REQ'D ☒ NOT REQ'D ☐
WELDING REQUIREMENTS	
WELDING PROC.: P8-T-AG Rev 11	WELDERS NAME: P490; P486; P36; P269
FILLER METAL: ER-308	WELDERS QUALIF.: P8-T-AG
PREHEAT TEMP.: 60° min.	WELD No's REV. 4: 1-6, 8, 11-18, 20-26, 29, 31
	REV. 4: 32, 34-39, 41-45, A-H
NONDESTRUCTIVE EXAM. (DATE / INITIAL)	(DATE / INITIAL)
VISUAL: 4-26-73 DLC	RADIOGRAPHIC: NR DLC
LIQUID PENET.: 4-26-73 DLC	ULTRASONIC: NR DLC
	MAGN. PARTICAL: NR DLC
INSTALLATION INSPECTION	
INSTALL. PER REV: 2-28-73 HAB	CLEANLINESS: 12-29-72 HAB
AS BUILT: 11-9-73 HAB	HANGER: 3-15-73 HAB
	HYDRO TEST:
CODE INSPECTOR:	CERTIFIED CORRECT:
SHOP FAB'D ☒ FIELD FAB'D ☐	HANGER DET. DWG.:

START-UP No.: 53	COST CODE:	INSUL. CL.: NONE	THICK:
P & I. D.: M-126		PLANT DESIGN DWG.: M-251	
UNIT: 1	ELEV.: 833'-6"	AREA: 4	

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.
4	11/14/72	ADDED SEISMIC REQM'T	LRH	EW	
3	11/7/72	REMOVED 1½"-CCA-CK	LRH	EW	
2	10/24/72	REMOVED PRESSURE CONN. AND PLACED FS-2614 TO AN INLINE CONN.	LRH	EW	
1	10/20/72	ADDED PRESSURE CONN.	LRH	EW	
0	10/4/72	ISSUED FOR CONSTRUCTION	LRH	EW	

BECHTEL
SAN FRANCISCO

IOWA ELECTRIC POWER & LIGHT
DUANE ARNOLD ENERGY PLANT

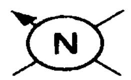
REACTOR BLDG. - AREA
STANDBY LIQUID CONTROL
PUMP DISCH. TO VESSEL

JOB No.	DRAWING No.	REV.
7884–	FSK-3960	8

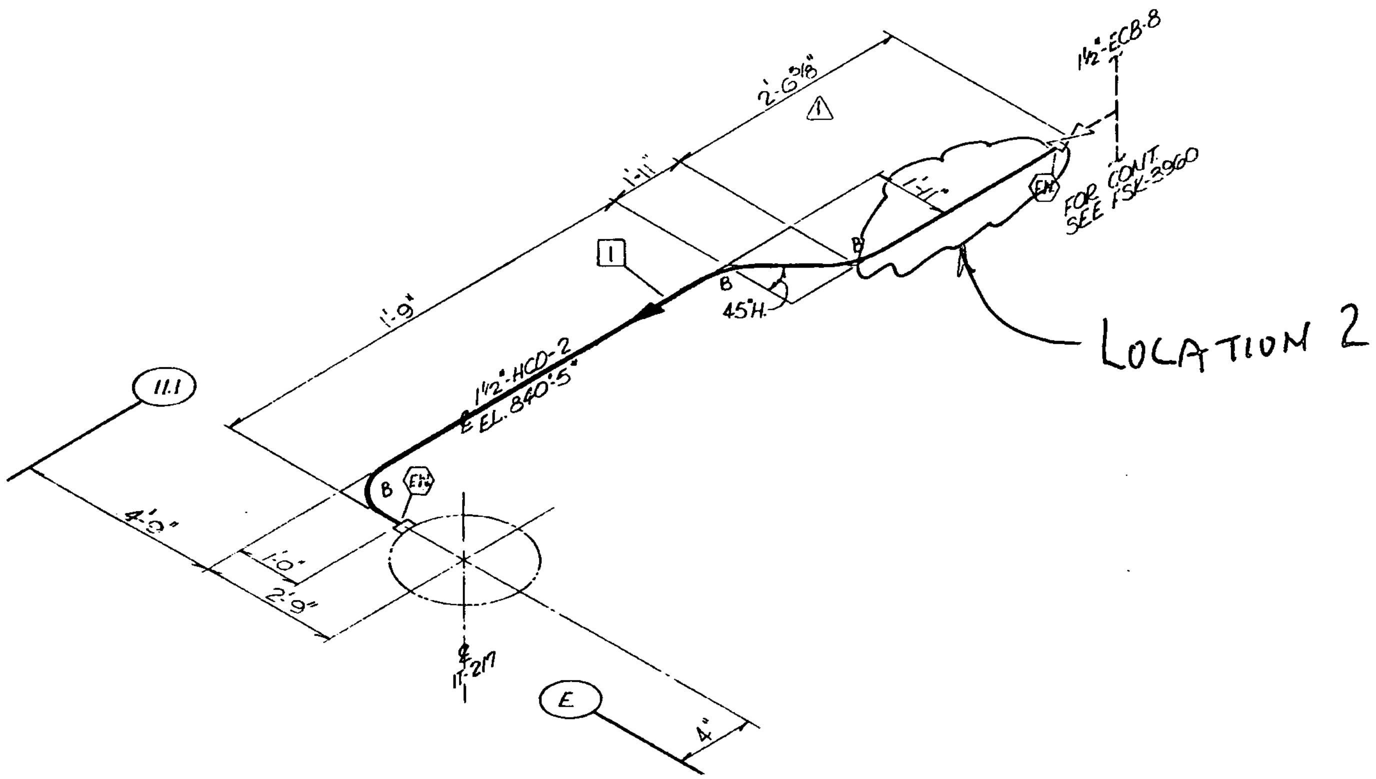
FSK-3960
1030 MTI

ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS	PIPING SYMBOLS SEE L-250 IN DRAFTING MANUAL	*VENDOR SUPPLIED	H = HORIZONTAL, V = VERTICAL	B = BEND	F.T.F. = FIELD TO FIT	F.W. FIELD WELD

ISO-FORM 100



INFORMATION ONLY



BILL OF MATERIAL

	QTY.	SIZE AND DESCRIPTION	ASTM	GR	PC. No.	HEAT No.
1	10'	1½" PIPE SCH. 40S	A376 A312	304	1	

QUALITY CONTROL DATA

Q – DOCUMENTATION	SEISMIC ANALYSIS
REQ'D ☐ NOT REQ'D ☒	REQ'D ☐ NOT REQ'D ☒

WELDING REQUIREMENTS

WELDING PROC.	P8-T-AG Rev 11	WELDERS NAME	
FILLER METAL	ER-308	WELDERS QUALIF.	
PREHEAT TEMP.		WELD No's REV.	
		REV.	

NONDESTRUCTIVE EXAM.

	DATE	INITIAL		DATE	INITIAL
VISUAL			RADIOGRAPHIC	NR	
LIQUID PENET.	NR		ULTRASONIC	NR	
	NR		MAGN. PARTICAL	NR	

INSTALLATION INSPECTION

INSTALL. PER REV.			CLEANLINESS		
AS BUILT			HANGER		
			HYDRO TEST		
CODE INSPECTOR			CERTIFIED CORRECT		

SHOP FAB'D ☒ FIELD FAB'D ☐ | HANGER DET. DWG.:

START-UP No.:	COST CODE:	INSUL. CL.:	THICK:
53		NONE	

P & I. D.:	PLANT DESIGN DWG.:
M-126	M-251

UNIT:	ELEV.:	AREA:
1	833'-6	4

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.
1	9/20/72	CHANGED DIMEN.	LRH	EW	[illegible]
0	7/24/72	ISSUED FOR CONSTRUCTION	LRH	RW	[illegible]

BECHTEL
SAN FRANCISCO

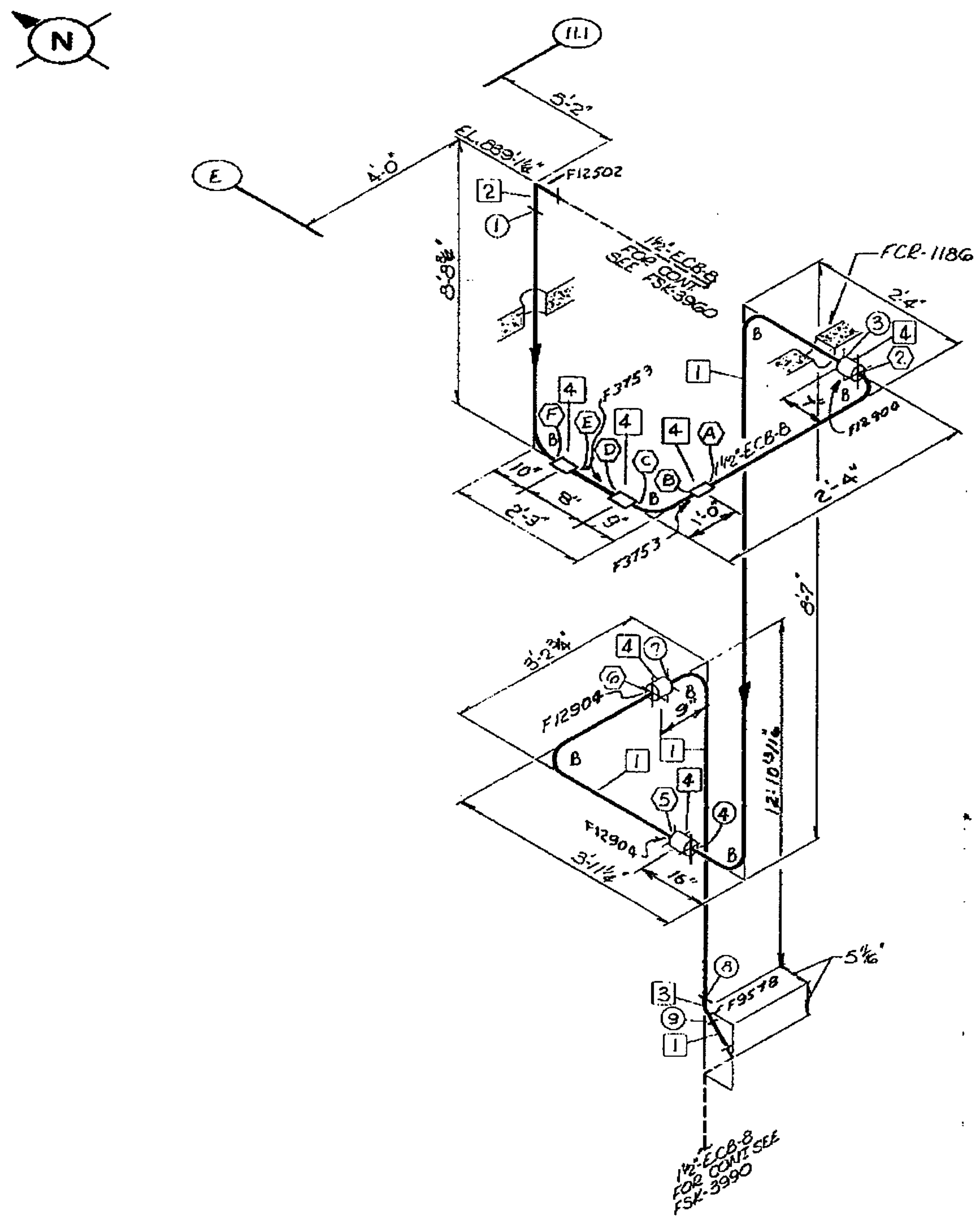
IOWA ELECTRIC POWER & LIGHT
DUANE ARNOLD ENERGY PLANT

REACTOR BLDG. - AREA 4
VENT OVERFLOW FROM 1½" ECB-8
TO STANDBY LIQUID CONTROL TEST TANK

JOB No.	DRAWING No.	REV.
7884-	FSK-3963	1

ISO-FORM 100

ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS	PIPING SYMBOLS SEE L-250 IN DRAFTING MANUAL	*VENDOR SUPPLIED	H = HORIZONTAL, V = VERTICAL	B = BEND	F.T.F. = FIELD TO FIT	F.W. FIELD WELD



INFORMATION ONLY

1	486	1-22-73
2	486	1-22-73
3	256	1-8-73
4	256	1-8-73
5	486	1-12-73
6	486	1-12-73
7	256	1-8-73
8	486	1-12-73
9	256	1-8-73
A	269	1-19-73
B	269	1-19-73
C	486	1-22-73
D	269	1-19-73
E	269	1-19-73
F	486	1-22-73

BILL OF MATERIAL

QTY.	SIZE AND DESCRIPTION	ASTM	GR	PC. No.	HEAT No.
45'	1½" PIPE SCH. 80s	A376 A312	304	1	F13649
1	1½" 90° ELBOW 3000# S.W.	A182	304	2	F12502
1	1½" 45° ELBOW 3000# S.W.	|	|	3	F9578
3	1½" COUPLING 3000# S.W.	|	|	4	F12904
3	½" COUPLING 3000# S.W.	"	"	"	F3753

QUALITY CONTROL DATA

Q – DOCUMENTATION: REQ'D ☒ NOT REQ'D ☐
SEISMIC ANALYSIS: REQ'D ☒ NOT REQ'D ☐

WELDING REQUIREMENTS

WELDING PROC. : PR-T-AG Rev.11
FILLER METAL : ER-308
PREHEAT TEMP. : 60° Min.
WELDERS NAME : P256 P269 P486
WELDERS QUALIF. : P8-T-AG
WELD No's REV. 1 : 1 thru 9, A thru F
REV. :

NONDESTRUCTIVE EXAM.

	DATE	INITIAL		DATE	INITIAL
VISUAL	4-25-73	DLC	RADIOGRAPHIC	NR	DLC
LIQUID PENET.	4-25-73	DLC	ULTRASONIC	NR	DLC
			MAGN. PARTICAL	NR	DLC

INSTALLATION INSPECTION

INSTALL. PER REV. 1 : 1-23-73
AS BUILT : 4-26-73
CLEANLINESS : 1-23-73
HANGER : 3-9-63
HYDRO TEST :
CODE INSPECTOR :
CERTIFIED CORRECT:
HANGER DET. DWG.:

SHOP FAB'D ☒ FIELD FAB'D ☐

START-UP No.: 53
COST CODE:
INSUL. CL.: NONE THICK:
P & I.D.: M-126 REV. 2F1
PLANT DESIGN DWG.: M-251 REV.
UNIT: 1
ELEV.: 833'-6"
AREA: 4

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.
△					
△					
2	4-26-73	AS BUILT	RVP	RW	
1	12-21-72	CHANGED DIM. (was 10'-11 9/16)	RFY	RW	
0	11-9-72	ISSUED FOR CONSTRUCTION	LRH	RW	

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IOWA ELECTRIC POWER & LIGHT
DUANE ARNOLD ENERGY PLANT

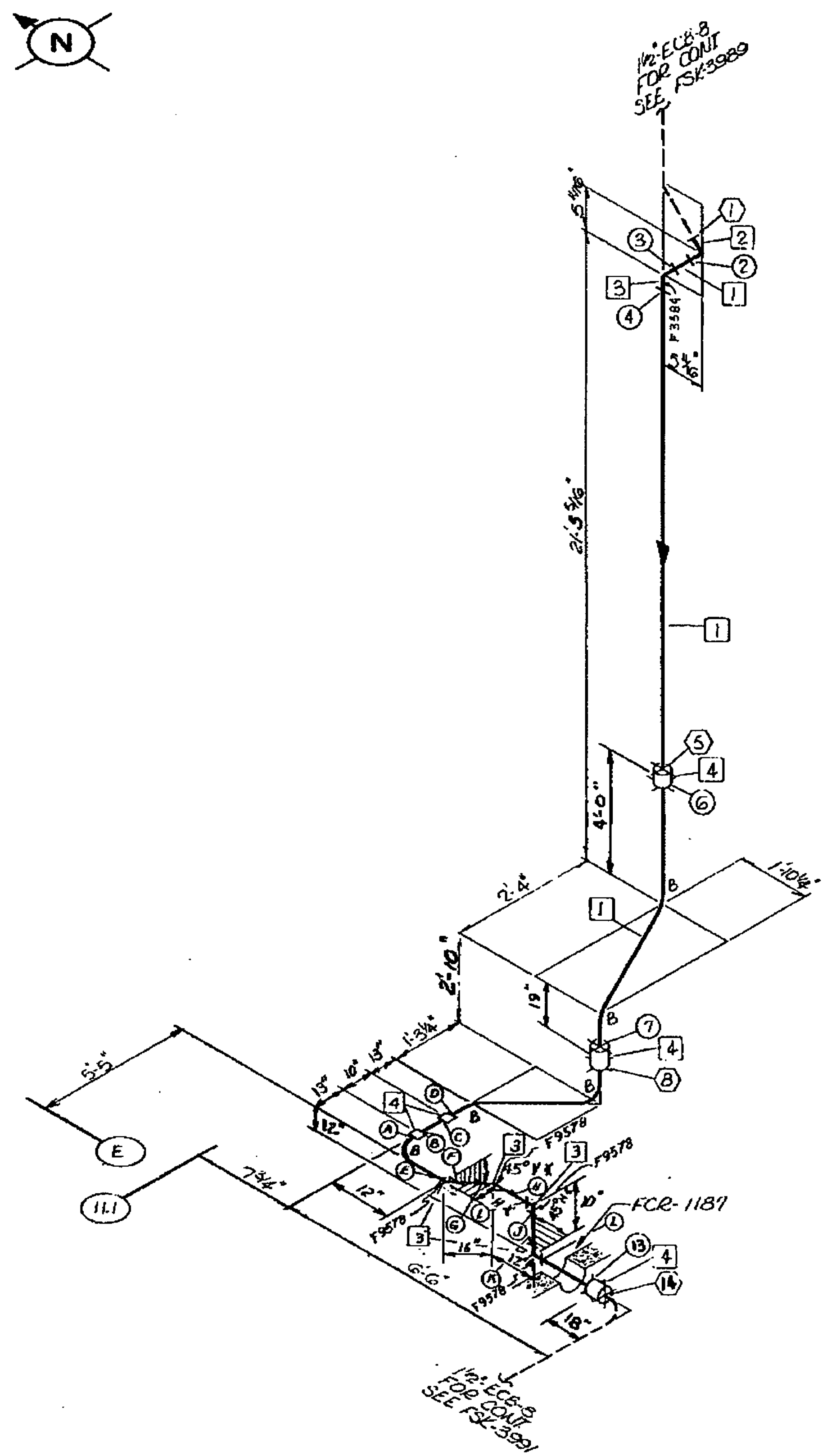
REACTOR BLDG.-AREA 4
STANDBY LIQUID CONTROL TO VESSEL

JOB No.	DRAWING No.	REV.
7884-	FSK-3989	2

ISO-FORM 100

ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS	PIPING SYMBOLS SEE L-250 IN DRAFTING MANUAL	*VENDOR SUPPLIED	H = HORIZONTAL, V = VERTICAL	B = BEND	F.T.F. = FIELD TO FIT	F.W. FIELD WELD

1063 MTI



INFORMATION ONLY

1	486	1-16-73	G	486	1-16-73
2	78	11-29-72	H	486	1-18-73
3	78	11-29-72	I	486	1-18-73
4	78	11-29-72	J	486	1-18-73
5	218	12-18-72	K	486	1-18-73
6	78	11-29-72	L	486	1-18-73
7	78	11-29-72			
8	218	12-18-72			
9	78	11-29-72			
10	486	1-9-73			

A	218	12-14-72
B	218	12-14-72
C	218	12-14-73
D	218	12-14-73
E	486	1-18-73
F	486	1-16-73

BILL OF MATERIAL

QTY.	SIZE AND DESCRIPTION	ASTM	GR	PC. No.	HEAT No.
40'	1½" PIPE SCH. 80s	A376 A312	304	1	F4803
1	1½" 90° ELBOW 3000# S.W.	A182	304	2	F3584
5	1½" 45° ELBOW 3000# S.W.	|	|	3	NOTED
5	1½" COUPLING 3000# S.W.	|	|	4	F12904

QUALITY CONTROL DATA

Q – DOCUMENTATION: REQ'D ☒ NOT REQ'D ☐
SEISMIC ANALYSIS: REQ'D ☒ NOT REQ'D ☐

WELDING REQUIREMENTS

WELDING PROC.: P8-T-AG Rev 11
FILLER METAL: ER-308
PREHEAT TEMP.: 60° min.
WELDERS NAME: P78; P218; P486
WELDERS QUALIF.: P8-T-AG
WELD No's REV. 1: 1 thru 10; A thru L
REV.:

NONDESTRUCTIVE EXAM.

	DATE	INITIAL		DATE	INITIAL
VISUAL	4-25-73	DLC	RADIOGRAPHIC	NR	DLC
LIQUID PENET.	4-25-73	DLC	ULTRASONIC	NR	DLC
2, 3, 4, 6, 7, 9	11-30-72	DLC	MAGN. PARTICAL	NR	DLC

INSTALLATION INSPECTION

INSTALL. PER REV. 1-18-73 [illegible]
AS BUILT 1 4-26-73 [illegible]
CLEANLINESS: 1-18-73 [illegible]
HANGER: 3-12-73 [illegible]
HYDRO TEST:
CODE INSPECTOR:
CERTIFIED CORRECT:
HANGER DET. DWG.:
SHOP FAB'D ☒ FIELD FAB'D ☐

START-UP No.: 53
COST CODE:
INSUL. CL.: THICK: NONE
P & I. D.: M-126 REV. 2F1
PLANT DESIGN DWG.: M-251 REV.
UNIT: 1
ELEV.: 833'-6"
AREA: 4

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.
2	4-26-73	AS BUILT	PH/RFD	TW	[illegible]
1	12/10/72	CHANGED DIM'S & PIPE ROUTE	RFV	EW	[illegible]
0	11/9/72	ISSUED FOR CONSTRUCTION	LRH	EW	[illegible]

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IOWA ELECTRIC POWER & LIGHT
DUANE ARNOLD ENERGY PLANT

REACTOR BLDG. - AREA 4
STANDBY LIQUID CONTROL TO VESSEL

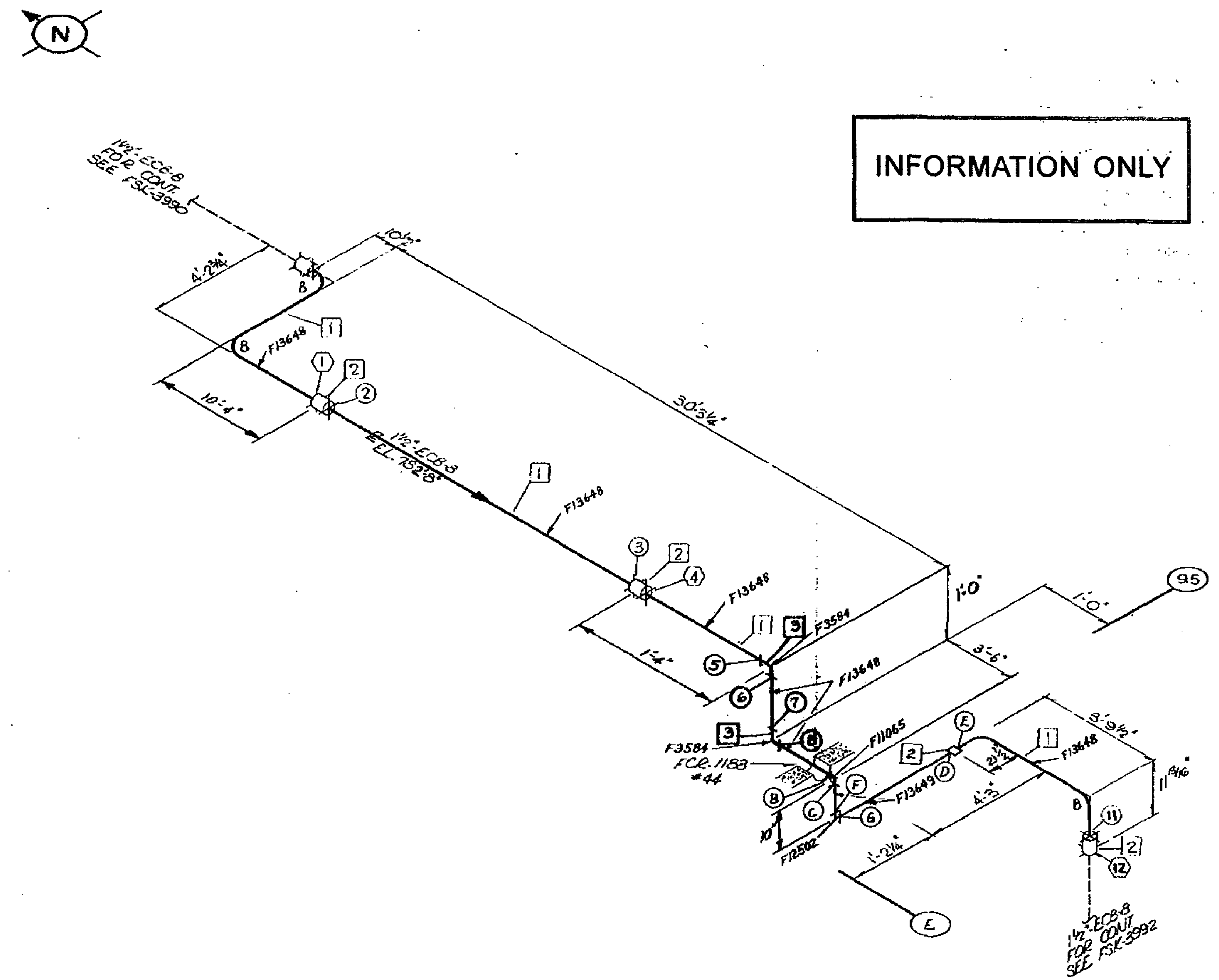
JOB No.	DRAWING No.	REV.
7884–	FSK-3930	2

ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS	PIPING SYMBOLS SEE L-250 IN DRAFTING MANUAL	*VENDOR SUPPLIED	H = HORIZONTAL, V = VERTICAL	B = BEND	F.T.F. = FIELD TO FIT	F.W. FIELD WELD

ISO-FORM 100

1039 NTI

INFORMATION ONLY



1	486	1-9-73	B	486	1-11-73
2	256	1-8-73	C	486	1-11-73
3	256	1-8-73	11	256	1-5-73
4	486	1-10-73	12	486	1-10-73
5	256	1-5-73	D	486	1-11-73
6	256	1-5-73	E	486	1-10-73
7	256	1-5-73	F	486	1-11-73
8	256	1-5-73	G	486	1-11-73

BILL OF MATERIAL

QTY.	SIZE AND DESCRIPTION	ASTM	GR.	PC. No.	HEAT No.
57'	1½" PIPE SCH. 80S	A376 A312	304	1	NOTED
4	1½" COUPLING 3000# S.W.	A182	304	2	F12094
4	1½" - 90° ELLS 3000# SW	A182	304	3	NOTED

QUALITY CONTROL DATA

Q – DOCUMENTATION: REQ'D ☒ NOT REQ'D ☐
SEISMIC ANALYSIS: REQ'D ☒ NOT REQ'D ☐

WELDING REQUIREMENTS

WELDING PROC. : P8-T-AG Rev11
FILLER METAL : ER-308
PREHEAT TEMP. : 60° min.
WELDERS NAME : P256; P486
WELDERS QUALIF. : P8-T-AG
WELD No's REV. 1 : 1 thru 8, 11, 12, B thru G
REV. :

NONDESTRUCTIVE EXAM.

	DATE	INITIAL		DATE	INITIAL
VISUAL	4-25-73	DLC	RADIOGRAPHIC	NR	DLC
LIQUID PENET.	4-25-73	DLC	ULTRASONIC	NR	DLC
			MAGN. PARTICAL	NR	DLC

INSTALLATION INSPECTION

INSTALL. PER REV. : 1/11/73 BS
AS BUILT : 4/26/73 BS
CLEANLINESS : 1/11/73 BS
HANGER : 3/5/73 BS

CODE INSPECTOR :
CERTIFIED CORRECT :
SHOP FAB'D ☒ FIELD FAB'D ☐
HANGER DET. DWG. :

START-UP No.: 53
COST CODE:
INSUL. CL.: NONE
THICK:
P & I. D.: M-126 REV. 2F1
PLANT DESIGN DWG.: M-251 REV.
UNIT: 1
ELEV.: 833'-6"
AREA: 4

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.
2	4/26/73	AS BUILT		EW	
1	12/14/72	ADDED ELLS, CHG. DIM. & EL.	RPV	EW	
0	11/14/72	ISSUED FOR CONSTRUCTION	LRH	EW	

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IOWA ELECTRIC POWER & LIGHT
DUANE ARNOLD ENERGY PLANT

REACTOR BLDG. - AREA 4
STANDBY LIQUID CONTROL TO VESSEL

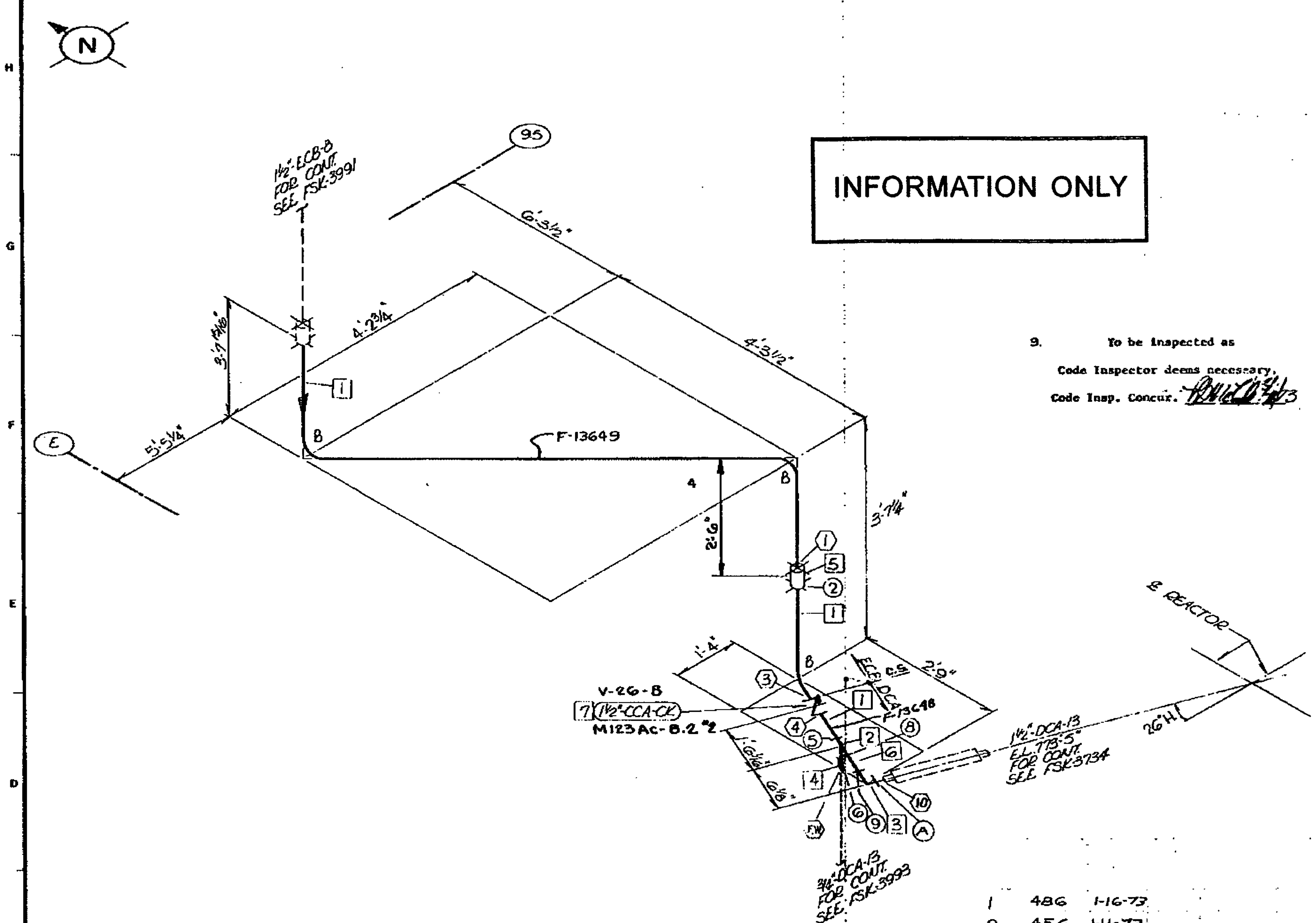
JOB No.: 7884-
DRAWING No.: FSK-3991
REV.: 2

ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS	PIPING SYMBOLS SEE L-250 IN DRAFTING MANUAL	*VENDOR SUPPLIED	H = HORIZONTAL, V = VERTICAL	B = BEND	F.T.F. = FIELD TO FIT	F.W. FIELD WELD

SF-8

1054 NTI

ISO. FORM 100



INFORMATION ONLY

9. To be inspected as Code Inspector deems necessary.
Code Insp. Concur. [signature] 5/2/73

1	486	1-16-73
2	456	1-11-73
3	442	2-19-73
4	269	5-15-73
5	269	5-15-73
6	269	5-15-73
8	269	5-15-73
9	269	5-15-73
10	486	1-16-73
A	486	1-16-73

BILL OF MATERIAL

QTY.	SIZE AND DESCRIPTION	ASTM	GR	PC. No.	HEAT No.
16'	1½" PIPE SCH. 80s	A376 A312	304	1	F-73698 F-73179
1	1½" TEE 3000# S.W.	A182	304	2	F7353
1	1½" 90° ELL. 3000# S.W.			3	F7358
1	1½" x ¾" RED. INSERT 3000# S.W.			4	F3305
1	1½" COUPLING 3000# S.W.			5	F12904
1	1½" x 3½" LG. NIPPLE SCH. 80s	A376 A312	304	6	F13648
1	1½"-CCA-CK 1500# S.W.	—	—	7	NOTED

QUALITY CONTROL DATA

Q – DOCUMENTATION: REQ'D ☒ NOT REQ'D ☐
SEISMIC ANALYSIS: REQ'D ☒ NOT REQ'D ☐

WELDING REQUIREMENTS

WELDING PROC.: PB-T-AG REV.11
FILLER METAL: ER-308
PREHEAT TEMP.: ≥ 60°
WELDERS NAME: P486, P443, P456, P269
WELDERS QUALIF.: P8-T-AG
WELD No's REV. 1: 1,2,3,4,5,6,8,9,10,A
REV.:

NONDESTRUCTIVE EXAM.

	DATE	INITIAL		DATE	INITIAL
VISUAL	5/29/73	DRC	RADIOGRAPHIC	NR	DRC
LIQUID PENET.	5/24/73	DRC	ULTRASONIC	NR	DRC
A	5/29/73	DRC	MAGN. PARTICAL	NR	DRC

INSTALLATION INSPECTION

INSTALL. PER REV.: 5/29/73 [initials]
AS BUILT: 9/11/73 [initials]
CLEANLINESS: 5/29/73 [initials]
HANGER:

CODE INSPECTOR: SEE NOTE 9
CERTIFIED CORRECT:
HANGER DET. DWG.:
SHOP FAB'D ☒ FIELD FAB'D ☐

START UP No.: 53
COST CODE:
INSUL. CL.: NONE THICK.:
P & I.D.: M-126 REV. 2F1
PLANT DESIGN DWG.: M-248 REV.
UNIT: 1
ELEV.: 757'-6"
AREA: 4

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.
4	9/11/73	REVISED, AS BUILT	PCD	HAB	[signature]
3	9/20/73	AS BUILT	[initials]	HAB	[signature]
2	5/4/73	REVISED PER NCR-1175	[initials]	P.D.	[signature]
1	1/14/73	AS BUILT	[initials]	RW	[signature]
0	9/1/72	ISSUED FOR CONSTRUCTION	LRH	RW	[signature]

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IOWA ELECTRIC POWER & LIGHT
DUANE ARNOLD ENERGY PLANT

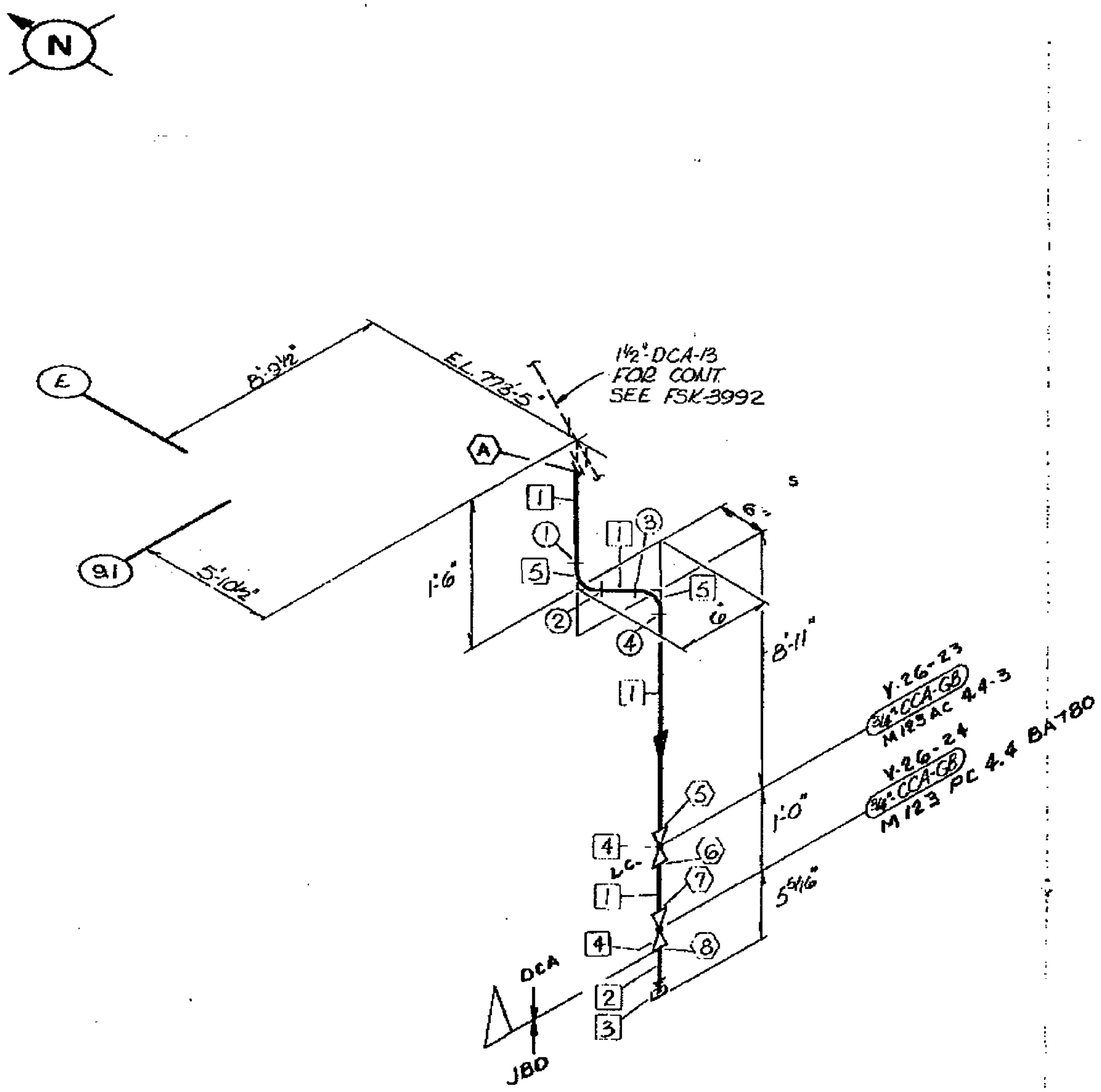
REACTOR BLDG.-AREA 4
STANDBY LIQUID CONTROL TO VESSEL

JOB No.	DRAWING No.	REV.
7884-	FSK-3992	4

ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS | PIPING SYMBOLS SEE L-250 IN DRAFTING MANUAL | *VENDOR SUPPLIED | H = HORIZONTAL, V = VERTICAL | B = BEND | F.T.F. = FIELD TO FIT | F.W. FIELD WELD

ISO-FORM 100

1069 NTI



9. To be inspected as Code Inspector deems necessary.
Code Insp. Concur.

1	269	5-15-73
2	269	5-15-73
3	269	5-15-73
4	442	5-17-73
5	2 9	1-25-73
6	2 9	1-25-73
7	9	4-23-73
8	9	4-23-73
A	269	6-15-73

INFORMATION ONLY

BILL OF MATERIAL

QTY.	SIZE AND DESCRIPTION	ASTM	GR	PC. No.	HEAT No.
16'	3/4" PIPE SCH. 80S	A376 A312	304	1	F7328
1	3/4" x 3½" NIPPLE (T.O.E.) SCH. 80S	↓	↓	2	F7328
1	3/4" SCRD CAP	A182	304	3	F3384
2	3/4"-CCA-GB 1500# S.W.	—	—	4	NOTED
2	3/4" 90° ELL. 3000# S.W.	A182	304	5	F8305

QUALITY CONTROL DATA

Q – DOCUMENTATION: REQ'D ☒ NOT REQ'D ☐
SEISMIC ANALYSIS: REQ'D ☒ NOT REQ'D ☐

WELDING REQUIREMENTS P 44 L

WELDING PROC.: P8-T-AG Bull
FILLER METAL: ER-308
PREHEAT TEMP.: 60° MIN.
WELDERS NAME: P 9, R269
WELDERS QUALIF.: P8-T-AG
WELD No's REV. 1: 1 THRU. 8 & A
REV.:

NONDESTRUCTIVE EXAM.

	DATE	INITIAL		DATE	INITIAL
VISUAL	5-22-73	DLC	RADIOGRAPHIC	NR	DLC
LIQUID PENET.	5-22-73	DLC	ULTRASONIC	NR	DLC
#4	7/23/73	DLC	MAGN. PARTICAL	NR	DLC

INSTALLATION INSPECTION

INSTALL. PER REV.: 5/24/73 BA
AS BUILT: 9/11/73 BA
CLEANLINESS: 5/24/73 BA
HANGER:

CODE INSPECTOR: SEE NOTE 9
CERTIFIED CORRECT:
SHOP FAB'D ☒ FIELD FAB'D ☐
HANGER DET. DWG.:

START-UP No.: 53
COST CODE:
INSUL. CL.: NONE
THICK:
P & I.D.: M-126, REV. 2F1
PLANT DESIGN DWG.: M-251
UNIT: 1
ELEV.: 833'-6"
AREA: 4

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.
5	9/73	REVISED, AS BUILT	PCD	HAB	
4		AS BUILT	PD	HAB	
3		REVISED PER NCR-1176		PCD	
2	7/24/73	AS BUILT	PCD	RW	
1	2/7/73	ADDED UNIQUE VALVE No	DD	EW	
0		ISSUED FOR CONSTRUCTION	URH	EW	

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IOWA ELECTRIC POWER & LIGHT
DUANE ARNOLD ENERGY PLANT

REACTOR BLDG.-AREA
STANDBY LIQUID CONTROL
TEST CONN.

JOB No.	DRAWING No.	REV.
7884–	FSK-3993	5

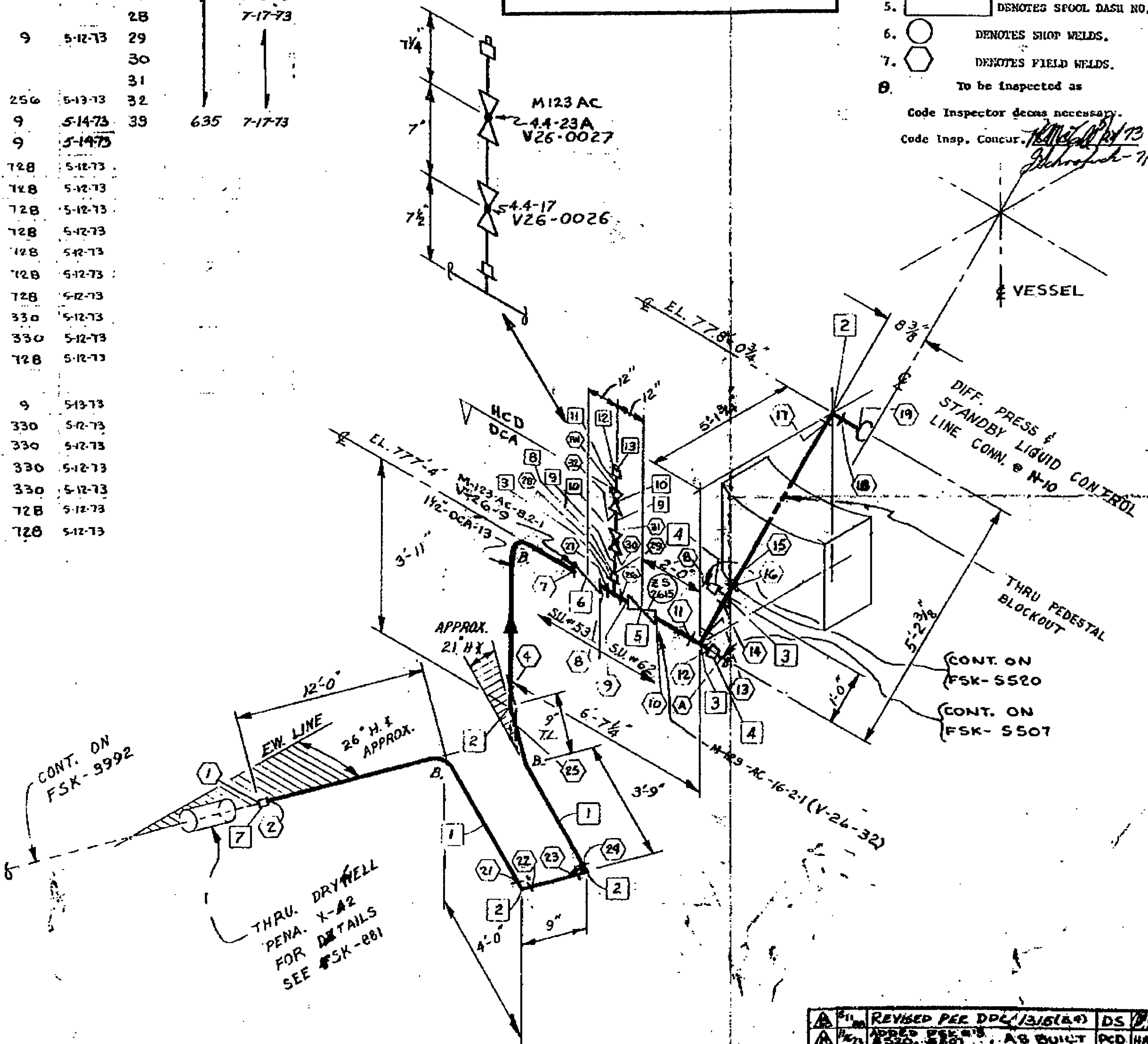
ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS | PIPING SYMBOLS SEE L-250 IN DRAFTING MANUAL | *VENDOR SUPPLIED | H = HORIZONTAL, V = VERTICAL | B = BEND | F.T.F. = FIELD TO FIT | F.W. FIELD WELD

ISO-FORM 100

SF-7   1135 MTI

INFORMATION ONLY

1	442	5-17-73	26	635	7-16-73
2	330	5-12-73	27		7-16-73
			28		7-17-73
4	9	5-12-73	29		
			30		
			31		
7	256	5-13-73	32		
8	9	5-14-73	33	635	7-17-73
9	9	5-14-73			
10	728	5-12-73			
11	728	5-12-73			
12	728	5-12-73			
13	728	5-12-73			
14	728	5-12-73			
15	728	5-12-73			
16	728	5-12-73			
17	330	5-12-73			
18	330	5-12-73			
19	728	5-12-73			
21	9	5-13-73			
22	330	5-12-73			
23	330	5-12-73			
24	330	5-12-73			
25	330	5-12-73			
A	728	5-12-73			
B.	728	5-12-73			



NOTES:

1. MIN. BEND RADIUS = 5 DIA.
2. MARK EACH ERECTABLE SPOOL WITH SKETCH AND DASH NO.
3. PROVIDE MIN. OF 6" FIT-UP AT ALL FIELD WELDS.
4. ALL FLANGES TO BE ATTACHED IN FIELD
5. ▭ DENOTES SPOOL DASH NO.
6. ○ DENOTES SHOP WELDS.
7. ⬡ DENOTES FIELD WELDS.
8. To be inspected as Code Inspector deems necessary.

Code Insp. Concur. [signature] 7/20/73

BILL OF MATERIAL

QTY.	SIZE AND DESCRIPTION	ASTM	GR	PC. No.	HEAT No.
37'-0"	1 1/2" PIPE SMLS. SCH. 80S	A-376	TP 304	1	F3648
4	1 1/2" - 90° ELL. 3000 # S.W.	A-182	F-304	2	F3353
3	1 1/2" TEE 3000 # S.W.	A-182	F-304	3	F3305
2	1 1/2" x 1" RED. INSERT 3000 # S.W.	A-182	F-304	4	F3305
1	1 1/2" ES-2615 1500 # S.W.	A-182	316	5	NOTED
1	1 1/2" CCA-CK 1500 # S.W.	A-182	316	6	NOTED
1	1 1/2" CPLG. 3000 # S.W.	A-182	F-304	7	F3305
1	1 1/2" x 3/4" RED. INSERT 3000 # S.W.	A-182	F304	8	F-3305
2	3/4" x 3" LG. NIP. SCH-80	A-376	TP304	9	F-16193
2	3/4"-CCA-GB 1500 # S.W.	A-182	316	10	NOTED
1	3/4" x 3" LG. NIP. TOE. SCH-80	A-376	F304	11	F-16193
1	3/4" SCR'D COUP.	A-182	F304	12	—
1	3/4" PLUG 3000 # SCR'D.	A-182	F304	13	—

QUALITY CONTROL DATA

Q – DOCUMENTATION: REQ'D ☒ NOT REQ'D ☐
SEISMIC ANALYSIS: REQ'D ☒ NOT REQ'D ☐

WELDING REQUIREMENTS:
WELDING PROC.: P8-TAG Rev II
FILLER METAL: ER-308
PREHEAT TEMP.: ≥ 60°
WELDERS NAME: P9, P236, P3..
WELDERS QUALIF.: P8-T-A..
WELD No's REV. 7: 1237-1931-2628
REV 11: 26 & 33

NONDESTRUCTIVE EXAM.

	DATE	INITIAL		DATE	INITIAL
VISUAL	7-18-73	DLC	RADIOGRAPHIC	NR	DLC
LIQUID PENET.	7-18-73	DLC	ULTRASONIC	NR	DLC
8+9	5-14-73	DLC	MAGN. PARTICAL	NR	DLC

INSTALLATION INSPECTION
INSTALL. PER REV.: 7-13-73 BL
AS BUILT: [redacted] BL / 11-16-73
CLEANLINESS: 7-17-73
HANGER:
HYDRO TEST:
CODE INSPECTOR: SEE NOTE 8
CERTIFIED CORRECT:
SHOP FAB'D ☐ FIELD FAB'D ☒
HANGER DET. DWG.:
START-UP No.: 62 / 53
COST CODE:
INSUL. CL.: NONE
THICK:
P & I.D.: M-115/2 F2 / M-126/
PLANT DESIGN DWG.: M-333 REV. 4
UNIT: 1
ELEV.: ABOVE 757'-6"
AREA: 5

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	APPR.
	5-17-73	REWELDED WELD NO. 1 AT PENA. X-42 PER NCR # 1194	B.I.	HAB	
	5-14-73	AS BUILT	PCD	HAB	
	5-13-73	REVISE PIPE PER NCR # 1158	RLR	PCD	
	9-16-75	AS BUILT	PA / PCD	TW	
16	10-5-81	REV PER DDC-1650	MJ		

	5-11-80	REVISED PER DDC-1316 (R4)	DS		
	11-16-73	ADDED REF. #'S 5520, 5507, AS BUILT	PCD	HAB	
	9-11-73	REVISED, AS BUILT	PCD	HAB	
12	7-20-73	AS BUILT	PA / PA	HAB	
11	7-9-73	ADDED TEST CONN. PER DCN M-126-1	PCD	RW	
10	5-10-73	AS BUILT	B.I.	HAB	

ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS | PIPING SYMBOLS SEE L-250 IN DRAFTING MANUAL | *VENDOR SUPPLIED | H = HORIZONTAL, V = VERTICAL | B = BEND | F.T.F. – FIELD TO FIT | F.W. FIELD WELD

Bechtel Power Corporation
SAN FRANCISCO

IOWA ELECTRIC POWER & LIGHT
DUANE ARNOLD ENERGY PLANT

REACTOR BLDG. - AREA 5
STANDBY LIQUID CONTROL TO VESSEL

JOB No.: 7884- | DRAWING No.: FSK-03734 | REV.: 16

000-0763

SF-B