



**IMU BOARD OF TRUSTEES OF THE ELECTRIC,
WATER AND COMMUNICATIONS UTILITIES**

December 12, 2022

5:30 PM

City Hall Council Chambers

Agenda

- 1. Call to Order**
- 2. Roll Call**
- 3. Public Comment**
- 4. Consent Agenda:**
 - A. Approval of Claims
 - B. Approval of the October 2022 Financial Report
 - C. Approval of Minutes of the November 28, 2022 Board of Trustees meeting
- 5. Electric Utility Action Items**
 - A. Turbine 8 Control Replacement Project
 1. Public hearing regarding the Turbine 8 Control Replacement Project.
 2. Resolution adopting the plans, specifications, form of contract and estimate of costs for the Turbine 8 Control Replacement Project.
 3. Resolution making award of construction contract for the Turbine 8 Control Replacement Project.
 - B. Resolution approving a marketing agent agreement between Indianola Municipal Utilities and the Municipal Energy of Nebraska (MEAN).
- 6. Electric Utility Informational Items**
- 7. Water Utility Informational Items**
- 8. Communications Utility Informational Items**
- 9. Combined Electric, Water and Communications Action Items**
 - A. Consider approval of utility accounts to be written off and to use any customary collection method, including submission to the state offset program, and to charge any applicable collection fees.
 - B. Discussion and direction on the Fiscal Year 24 budget.
- 10. Combined Electric, Water and Communications Informational Items**
- 11. Other Business**

- A. Enter into closed session in accordance with Iowa Code Section 388.9(1) to discuss marketing and pricing strategies and proprietary information of the telecommunications division whose competitive position will be harmed by public disclosure that is not required of potential or actual competitors and no public purpose is served by such disclosure.
- B. Approval of a CISCO equipment purchase for the Communications Department.

12. Adjourn

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities
From:
Date: December 12, 2022
Subject: Approval of Claims

Recommendation: Simple motion is in order.

Attachments: 1. 121322 Elation Claims List

AP Check Preview

Date Range: All Dates

Indianola Municipal Utilities

Thursday, December 8, 2022

2:16:10 PM

Vendor	Due Date	Notes	Terms	Bill Total	Discount	Interest	Amount Due	Payment	Invoice Number	Bill Number
Account To Be Paid From			0000-10120-999							
AGRILAND FS INC - VEND-48228										
12/1/2022	Turbine fuel	Open Terms	22,330.01	0.00	0.00	22,330.01	22,330.01	92132591	BL-9871	
12/1/2022	Turbine fuel	Open Terms	22,342.32	0.00	0.00	22,342.32	22,342.32	92132592	BL-9872	
12/1/2022	Turbine fuel	Open Terms	22,339.24	0.00	0.00	22,339.24	22,339.24	92132593	BL-9875	
12/1/2022	Turbine fuel	Open Terms	22,330.01	0.00	0.00	22,330.01	22,330.01	92132594	BL-9877	
							89,341.58	89,341.58		
American Registry For Internet Numbers, Ltd - VEND-1083										
12/27/2022	Annual fee for registration services plan	Net 30	1,000.00	0.00	15.00	1,000.00	1,000.00	SI433546	BL-9880	
							1,000.00	1,000.00		
AUTOMATIC SYSTEMS CO. - VEND-51495										
12/1/2022	Water treatment plant SCADA upgrade	Open Terms	35,968.00	0.00	0.00	35,968.00	35,968.00	38530	BL-9908	
							35,968.00	35,968.00		
Avesis Third Party Administrators Inc - VEND-1108										
12/31/2022	1222 Vision	Net 30	456.04	0.00	15.00	456.04	456.04	2934218	BL-9838	
							456.04	456.04		
Big Ten Network - VEND-1096										
12/30/2022	BTN	Net 30	1,885.18	0.00	15.00	1,885.18	1,885.18	185825	BL-9890	
							1,885.18	1,885.18		
Border States Industries Inc - VEND-1070										
9/15/2022	1 1/2" PVC - 20' STICK	Net 30	12,317.25	0.00	15.00	12,317.25	12,317.25	924763611	BL-9901	
							12,317.25	12,317.25		
Calix Inc - VEND-1028										
12/28/2022	PO: 717-07072022KR	Net 30	7,650.92	0.00	15.00	7,650.92	7,650.92	315192	BL-9837	
12/30/2022	PO: 09232022 - ONTKR	Net 30	7,650.92	0.00	15.00	7,650.92	7,650.92	315468	BL-9864	
							15,301.84	15,301.84		
Cappel's Ace Hardware - VEND-1204										
12/28/2022	Drain bladder	Net 30	43.98	0.00	15.00	43.98	43.98	3621	BL-9790	
							43.98	43.98		
Casual Rags - VEND-1006										
12/28/2022	FR shirts embroidery - Dahl	Net 30	187.25	0.00	15.00	187.25	187.25	155113	BL-9813	

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							187.25	187.25		
CDW Government - VEND-1029										
12/21/2022	WD Red Pro	Net 30	908.09	0.00	15.00	908.09	908.09	FF94656	BL-9897	
							908.09	908.09		
Cedar Falls Utilities - VEND-1045										
12/31/2022	Labor and rack space	Net 30	5,422.90	0.00	15.00	5,422.90	5,422.90	92490	BL-9842	
							5,422.90	5,422.90		
Cintas Corporation - VEND-1007										
12/31/2022	First aid supplies	Net 30	63.73	0.00	15.00	63.73	63.73	5135070200	BL-9843	
							63.73	63.73		
City Of Indianola - VEND-1008 - BL-9898										
1/4/2023	1222 Professional Services	Net 30	12,122.34	0.00	15.00	12,122.34	12,122.34	2996	BL-9898	
							12,122.34	12,122.34		
City Of What Cheer - VEND-1352										
12/29/2022	14' Sewer pipe	Net 30	4,032.00	0.00	15.00	4,032.00	4,032.00		BL-9818	
							4,032.00	4,032.00		
Communication Innovators - VEND-1329										
1/4/2023	Access control system	Net 30	16,406.00	0.00	15.00	16,406.00	16,406.00	110313	BL-9911	
							16,406.00	16,406.00		
Crystal Clear Communications LLC - VEND-1205										
12/31/2022	Monthly retainer and stock photography	Net 30	2,549.00	0.00	15.00	2,549.00	2,549.00	CCC-0327	BL-9819	
							2,549.00	2,549.00		
DES PLANQUES, CHRIS - VEND-101766										
12/2/2022	1222 Cellular Phone	Open Terms	75.00	0.00	0.00	75.00	75.00	1222 Cellular Phone	BL-9833	
							75.00	75.00		
DITTMER, GREG - VEND-11221										
12/3/2022	Used personal card by mistake for material	Open Terms	122.33	0.00	0.00	122.33	122.33	A573451	BL-9909	
12/4/2022	Used personal card by mistake for material	Open Terms	540.67	0.00	0.00	540.67	540.67	11477	BL-9910	
							663.00	663.00		
Doug Pagel - VEND-1283										

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	12/31/2022	1222 Cellular Phone	Net 30	75.00	0.00	15.00	75.00	75.00	1222 Cellular Phone	BL-9834
							75.00	75.00		
Doug Shull - VEND-1105										
	12/31/2022	1222 Treasury Contract	Net 30	83.34	0.00	15.00	83.34	83.34	1222 Treasury Contract	BL-9895
							83.34	83.34		
DOWNEY TIRE PROS - VEND-11879										
	12/1/2022	Work on backhoe	Open Terms	265.97	0.00	0.00	265.97	265.97	93945	BL-9820
							265.97	265.97		
Dylan Michelsen - VEND-1180										
	12/31/2022	1222 Cellular Phone	Net 30	75.00	0.00	15.00	75.00	75.00	1222 Cellular Phone	BL-9829
							75.00	75.00		
Elisha Brown - VEND-1209										
	12/31/2022	1222 Cellular Phone	Net 30	50.00	0.00	15.00	50.00	50.00	1222 Cellular Phone	BL-9832
							50.00	50.00		
Fuse Technic LLC - VEND-1012										
	12/31/2022	Troubleshooting	Net 30	375.00	0.00	15.00	375.00	375.00	FT20221201004	BL-9847
							375.00	375.00		
GRAYMONT WESTERN LIME INC - VEND-101387										
	11/30/2022	High calcium quicklime	Open Terms	5,813.75	0.00	0.00	5,813.75	5,813.75	177751	BL-9823
							5,813.75	5,813.75		
Hearst Television Inc - VEND-1131										
	12/30/2022	KCCI	Net 30	5,761.55	0.00	15.00	5,761.55	5,761.55	481521	BL-9899
							5,761.55	5,761.55		
ImOn Communications LLC - VEND-1072										
	12/30/2022	Regulatory and billing	Net 30	7,088.74	0.00	15.00	7,088.74	7,088.74	INV0033642	BL-9845
							7,088.74	7,088.74		
IMU - VEND-8629										
	12/2/2022	Utilities - WA	Open Terms	11,591.30	0.00	0.00	11,591.30	11,591.30	10249979	BL-9836

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	12/2/2022	Utilities - Fiber	Open Terms	1,189.33	0.00	0.00	1,189.33	1,189.33	10246181	BL-9853
	12/2/2022	Utilities - Util Svcs	Open Terms	210.28	0.00	0.00	210.28	210.28	10251743	BL-9789
	12/2/2022	Utilities - EL	Open Terms	1,529.00	0.00	0.00	1,529.00	1,529.00	10246164	BL-9799
							14,519.91	14,519.91		
IMWCA - VEND-1130										
	12/31/2022	Premiums - Installment 6	Net 30	2,957.14	0.00	15.00	2,957.14	2,957.14	INV85325	BL-9824
							2,957.14	2,957.14		
Independent Advocate - VEND-1136										
	12/25/2022	BOT minutes and publication report	Net 30	219.21	0.00	15.00	219.21	219.21	2772	BL-9839
	12/30/2022	Official notification - Hearing and letting turbine	Net 30	89.16	0.00	15.00	89.16	89.16	2801	BL-9840
	12/30/2022	Print and digital advertising bundle	Net 30	500.00	0.00	15.00	500.00	500.00	2785	BL-9848
							808.37	808.37		
Innovative Systems - VEND-1048										
	12/31/2022	1222 Maint/Software Fees	Net 30	22,435.56	0.00	15.00	22,435.56	22,435.56	INV-07175	BL-9816
	1/4/2023	1122 Printing, Postage & Flyer	Net 30	6,835.68	0.00	15.00	6,835.68	6,835.68	INV-07309	BL-9900
							29,271.24	29,271.24		
Internal Revenue Service - VEND-1307										
	12/25/2022	941 Payable	Net 30	25,914.65	0.00	15.00	25,914.65	25,914.65	112522	BL-9794
							25,914.65	25,914.65		
Iowa Department Of Human Services - VEND-1310										
	12/25/2022	Garnishment payable	Net 30	1,040.99	0.00	15.00	1,040.99	1,040.99	112522 Payroll	BL-9797
							1,040.99	1,040.99		
Iowa Dept Of Revenue - VEND-1117										
	12/25/2022	IA Income tax payable	Net 30	4,567.77	0.00	15.00	4,567.77	4,567.77	112522 Payroll	BL-9796
	12/30/2022	Nov 2022 Use Tax	Net 30	7.97	0.00	15.00	7.97	7.97	Nov 2022 Use Tax	BL-9904
	12/31/2022	Sales Tax Billed 12-1-22	Net 30	39,386.88	0.00	15.00	39,386.88	39,386.88	Sales Tax Billed 12-1-22	BL-9905
							43,962.62	43,962.62		
Iowa One Call - VEND-1015										
	12/22/2022	Locates	Net 30	426.60	0.00	15.00	426.60	426.60	246842	BL-9791
	12/22/2022	Locates	Net 30	387.00	0.00	15.00	387.00	387.00	246214	BL-9812
	12/22/2022	Locates	Net 30	225.90	0.00	15.00	225.90	225.90	246841	BL-9850
							1,039.50	1,039.50		

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IPERS - VEND-1309										
	12/25/2022	1122 Employer & Employee	Net 30	35,109.34	0.00	15.00	35,109.34	35,109.34	1122 Employer & Employee	BL-9793
							35,109.34	35,109.34		
Irby - VEND-1259										
	12/23/2022	Transformer Secondary Connectors	Net 30	207.37	0.00	15.00	207.37	207.37	S013296527.001	BL-9867
							207.37	207.37		
KEYSTONE LABORATORIES INC - VEND-29056										
	12/1/2022	Drinking analysis	Open Terms	206.00	0.00	0.00	206.00	206.00	NT2214941	BL-9822
							206.00	206.00		
KNIA/KRLS - VEND-1090										
	12/27/2022	:30 Spot	Net 30	634.32	0.00	15.00	634.32	634.32	22110526	BL-9854
							634.32	634.32		
Kurt Gocken - VEND-1023										
	12/31/2022	1222 Cellular Phone	Net 30	75.00	0.00	15.00	75.00	75.00	1222 Cellular Phone	BL-9826
							75.00	75.00		
Kurt Ripperger - VEND-1025										
	12/31/2022	1222 Cellular Phone	Net 30	75.00	0.00	15.00	75.00	75.00	1222 Cellular Phone	BL-9827
							75.00	75.00		
LINDE INC - VEND-6415										
	12/4/2022	Carbon dioxide	Open Terms	2,462.80	0.00	0.00	2,462.80	2,462.80	32875058	BL-9907
							2,462.80	2,462.80		
LONGER, CHRIS - VEND-34025										
	12/2/2022	1222 Cellular Phone	Open Terms	75.00	0.00	0.00	75.00	75.00	1222 Cellular Phone	BL-9830
							75.00	75.00		
Marquee Sports Network - VEND-1165										
	12/30/2022	1122 Expanded Basic	Net 30	2,812.19	0.00	15.00	2,812.19	2,812.19	1122 Expanded Basic	BL-9891
							2,812.19	2,812.19		

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MESA TECHNICAL ASSOCIATES INC - VEND-102987										
	11/23/2022	West side sub battery charger card	Open Terms	690.53	0.00	0.00	690.53	690.53	14654	BL-9807
							690.53	690.53		
METCALF, MIKE - VEND-34230										
	12/2/2022	1222 Cellular Phone	Open Terms	75.00	0.00	0.00	75.00	75.00	1222 Cellular Phone	BL-9831
							75.00	75.00		
MH EQUIPMENT - VEND-103149										
	11/11/2022	Forklift maint	Open Terms	400.50	0.00	0.00	400.50	400.50	S21004932-1	BL-9815
							400.50	400.50		
Mid American Energy Co - VEND-1018										
	12/22/2022	Gas - 111 S Buxton	Net 30	417.59	0.00	15.00	417.59	417.59	533216118	BL-9814
							417.59	417.59		
Midwest Alarm Services - VEND-1116										
	12/8/2022	Fire alarm inspection	Net 30	288.90	0.00	15.00	288.90	288.90	397554	BL-9862
							288.90	288.90		
Mike Holtz - VEND-1141 - BL-9803										
	12/5/2022	Credit Refund	Net 30	7.12	0.00	0.00	7.12	7.12	00024128-3	BL-9803
							7.12	7.12		
Mission Square - VEND-1303										
	12/25/2022	457 Payable	Net 30	5,648.29	0.00	15.00	5,648.29	5,648.29	112522 Payroll	BL-9795
							5,648.29	5,648.29		
MUNICIPAL SUPPLY INC - VEND-35810										
	12/1/2022	5 1/2:" Mueller Break	Open Terms	186.00	0.00	0.00	186.00	186.00	0857377-IN	BL-9906
							186.00	186.00		
National Cable Television Cooperative, Inc. - VEND-1095										
	12/16/2022	MICRO BATTERY BACKUP - UPS	Net 30	134.64	0.00	15.00	134.64	134.64	SI52295	BL-9913
	12/29/2022	1122 Cable	Net 30	50,676.44	0.00	15.00	50,676.44	50,676.44	22110828	BL-9894
							50,811.08	50,811.08		
NewCom Technologies, Inc - VEND-1091										
	12/22/2022	Permit application fees	Net 30	100.00	0.00	15.00	100.00	100.00	49714	BL-9881

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	12/22/2022	Fiber network design engineering services	Net 30	2,993.96	0.00	15.00	2,993.96	2,993.96	49713	BL-9882
	12/22/2022	Fiber network design engineering services	Net 30	11,523.72	0.00	15.00	11,523.72	11,523.72	49712	BL-9883
	12/22/2022	Fiber Network Design Engineering Services	Net 30	99.71	0.00	15.00	99.71	99.71	49711	BL-9884
	12/22/2022	Fiber network design engineering services	Net 30	1,205.95	0.00	15.00	1,205.95	1,205.95	49710	BL-9885
	12/22/2022	Fiber network design engineering services	Net 30	4,171.43	0.00	15.00	4,171.43	4,171.43	49709	BL-9886
	12/22/2022	Fiber network design engineering services	Net 30	651.95	0.00	15.00	651.95	651.95	49708	BL-9887
	12/22/2022	Fiber network design engineering services	Net 30	1,046.07	0.00	15.00	1,046.07	1,046.07	Fiber network design engi	BL-9888
	12/22/2022	Consulting Services Bid Prep & Let	Net 30	5,725.00	0.00	15.00	5,725.00	5,725.00	49706	BL-9889
							27,517.79	27,517.79		
Nexstar Broadcasting, Inc - VEND-1092										
	12/30/2022	WHO	Net 30	7,519.03	0.00	15.00	7,519.03	7,519.03	482725	BL-9892
	12/30/2022	Newsnation	Net 30	366.13	0.00	15.00	366.13	366.13	482726	BL-9893
							7,885.16	7,885.16		
Pamela Stockwell - VEND-1141 - BL-9802										
	12/2/2022	Credit Refund	Net 30	92.49	0.00	0.00	92.49	92.49	00064259-5	BL-9802
							92.49	92.49		
Power & Tel - VEND-1037										
	12/28/2022	FIBER DROP - 300'	Net 30	1,109.36	0.00	15.00	1,109.36	1,109.36	7606096-02	BL-9896
							1,109.36	1,109.36		
POWER LINE SUPPLY - VEND-103039										
	12/7/2022	Elbow Seal Kits	Open Terms	719.04	0.00	0.00	719.04	719.04	56708522	BL-9865
							719.04	719.04		
Quality Pest Control - VEND-1087										
	1/1/2023	Pest control	Net 30	76.62	0.00	15.00	76.62	76.62	69825	BL-9835
							76.62	76.62		
RESCO - VEND-47234										
	11/30/2022	Wide Range 500:5 CT's	Open Terms	465.45	0.00	0.00	465.45	465.45	880574-00	BL-9878
							465.45	465.45		
SHRED IT USA - VEND-103010										
	12/4/2022	Shred service	Open Terms	110.50	0.00	0.00	110.50	110.50	8002921574	BL-9841
							110.50	110.50		
SKARSHAUG TESTING LABORATORY INC - VEND-50410										

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	12/3/2022	Annual PPE Testing	Open Terms	1,471.21	0.00	0.00	1,471.21	1,471.21	264570	BL-9870
							1,471.21	1,471.21		
Skye McBroom - VEND-1026										
	12/31/2022	1222 Cellular Phone	Net 30	75.00	0.00	15.00	75.00	75.00	1222 Cellular Phone	BL-9828
							75.00	75.00		
Teklink - VEND-1262										
	12/21/2022	Conduit Bury And Bore	Net 30	3,989.00	0.00	15.00	3,989.00	3,989.00	WE 11-19-22	BL-9849
							3,989.00	3,989.00		
TRM DISPOSAL LLC - VEND-101016										
	11/25/2022	1222 Trash	Open Terms	42.00	0.00	0.00	42.00	42.00	25520	BL-9792
							42.00	42.00		
Unite Private Networks - VEND-1054										
	12/31/2022	Dark fiber	Net 30	3,368.60	0.00	15.00	3,368.60	3,368.60	SI-22-036572	BL-9846
							3,368.60	3,368.60		
UPHDM Occupational Medicine - VEND-1101										
	12/30/2022	Employee testing	Net 30	570.50	0.00	15.00	570.50	570.50	154332	BL-9861
							570.50	570.50		
VEENSTRA & KIMM - VEND-57600										
	11/24/2022	Engineer X	Open Terms	1,350.00	0.00	0.00	1,350.00	1,350.00	28108-10	BL-9817
							1,350.00	1,350.00		
WESCO - VEND-60220										
	11/24/2022	FR Bibs - Dahl	Open Terms	871.30	0.00	0.00	871.30	871.30	410890	BL-9805
	11/24/2022	FR hooded sweatshirt - Dahl	Open Terms	158.64	0.00	0.00	158.64	158.64	411864	BL-9806
	11/30/2022	Lineman knife	Open Terms	72.91	0.00	0.00	72.91	72.91	415705	BL-9804
	11/30/2022	Portable LED light	Open Terms	215.96	0.00	0.00	215.96	215.96	415706	BL-9801
	12/1/2022	200 Amp Elbows	Open Terms	689.35	0.00	0.00	689.35	689.35	417156	BL-9800
	12/2/2022	1" Locknuts	Open Terms	38.61	0.00	0.00	38.61	38.61	419536	BL-9869
	12/6/2022	Locate Flags	Open Terms	889.17	0.00	0.00	889.17	889.17	422444	BL-9868
							2,935.94	2,935.94		
Wiegert Disposal Inc - VEND-1081										
	12/31/2022	1222 Dumpster Service	Net 30	110.00	0.00	15.00	110.00	110.00	1222 Dumpster Service	BL-9852

AP Check Preview

Date Range: All Dates

Indianola Municipal Utilities

Thursday, December 8, 2022

2:16:10 PM

Vendor	Due Date	Notes	Terms	Bill Total	Discount	Interest	Amount Due	Payment	Invoice Number	Bill Number
							110.00	110.00		
Wisconsin Independent Network, LLC - VEND-1067										
	12/31/2022	Ethernet	Net 30	7,383.00	0.00	15.00	7,383.00	7,383.00	WIN018418	BL-9844
							7,383.00	7,383.00		
YMCA Of Greater Des Moines - VEND-1169										
	12/31/2022	1222 Employee Wellness	Net 30	416.40	0.00	15.00	416.40	416.40	1222 Employee Wellness	BL-9825
							416.40	416.40		
Check Count: 72				Totals:			\$497,716.04	\$497,716.04		

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities

From:

Date: December 12, 2022

Subject: Approval of the October 2022 Financial Report

Recommendation: Simple motion is in order.

Attachments: 1. 1022 Financials Summary

Water Utility Financial Summary
October 31, 2022

600 WATER OPERATING FUND

	FY22		
	Budget	YTD Actual	% of Budget
Water Service Sales	2,537,500	913,415	36.00%
Other Water Revenue	289,100	85,475	29.57%
Total Revenue:	2,826,600	998,890	35.34%
Water O&M Expense	2,381,557	967,536	
Total Expense:	2,381,557	967,536	40.63%
Beginning Net Position		13,348,270	
Net Surplus (Deficit)		31,354	
Ending Net Position		13,379,624	

700 WATER CAPITAL FUND

From Water Operations	424,900	293,267	
Total Transfers In:	424,900	293,267	69.02%
Water Capital Expense	849,800	233,996	
Total Expense:	849,800	233,996	27.54%
Beginning Net Position		2,611,158	
Net Surplus (Deficit)		59,271	
Ending Net Position		2,670,429	

780 WATER IMPROVE FUND

Beginning Net Position		75,000	
Net Surplus (Deficit)		0	
Ending Net Position		75,000	

WATER CASH ON HAND	O&M	\$	267,075
(110 days or greater)	Capital	\$	2,664,593
	Reserves	\$	75,000
240 days		\$	3,006,668

FY23		
Budget	YTD Actual	% of Budget
2,941,250	1,018,777	34.64%
310,700	94,964	30.56%
3,251,950	1,113,741	34.25%
3,292,411	1,172,672	
3,292,411	1,172,672	35.62%
	13,956,134	
	(58,931)	
	13,897,203	

1,174,000	391,333	
1,174,000	391,333	33.33%
1,174,000	88,406	
1,174,000	88,406	7.53%
	2,470,342	
	302,927	
	2,773,269	

	75,000	
	0	
	75,000	

Gallons Billed			
	FY22-23	FY21-22	YOY Increase %
July	31,583,030	35,679,910	-11%
August	37,092,320	33,673,809	10%
September	43,870,320	34,099,809	29%
October	36,165,050	37,829,440	-4%
November	30,973,650	31,689,630	-2%
December			
January			
February			
March			
April			
May			
June			
YTD TOTAL	179,684,370	172,972,598	3.9%

Inventory on Hand			
	FY22-23	FY21-22	YOY Increase %
July	\$ 112,249	\$ 70,025	60%
August	\$ 110,331	\$ 86,918	27%
September	\$ 104,559	\$ 86,965	20%
October	\$ 108,675	\$ 81,330	34%
November	\$ 109,309	\$ 114,388	-4%
December			
January			
February			
March			
April			
May			
June			
YTD AVG	\$ 109,025	\$ 87,925	24.0%

IMU Admin/US Financial Summary
October 31, 2022

	FY22			FY23		
	Budget	YTD Actual	% of Budget	Budget	YTD Actual	% of Budget
620 ADMIN & UTILITY SERVICES						
Admin/US Revenue	1,251,911	471,231		1,342,700	446,941	33.29%
Total Revenue:	1,251,911	471,231	37.64%	1,342,700	446,941	33.29%
Admin/US O&M Expense	1,283,000	388,966		1,342,700	461,346	
Total Expense:	1,283,000	388,966	30.32%	1,342,700	461,346	34.36%
Beginning Net Position		318,783			35,687	
Net Surplus (Deficit)		82,266			(14,405)	
Ending Net Position		401,049			21,282	
855 LIABILITY INS FUND						
Beginning Net Position		14,099			9,099	
Net Surplus (Deficit)		0			0	
Ending Net Position		14,099			9,099	

US/ADMIN CASH ON HAND O&M \$ 360,476

Electric Utility Financial Summary
October 31, 2022

630 ELECTRIC OPERATING FUND

	FY22			FY23		
	Budget	YTD Actual	% of Budget	Budget	YTD Actual	% of Budget
Electric Service Sales	15,439,900	6,913,898	44.78%	16,520,384	7,058,388	42.73%
Other Electric Revenue	1,147,978	395,855	34.48%	1,133,472	456,467	40.27%
Total Revenue:	16,587,878	7,309,753	44.07%	17,653,856	7,514,855	42.57%
Electric O&M Expense	15,564,255	5,342,000		16,204,529	5,338,309	
Total Expense:	15,564,255	5,342,000	34.32%	16,204,529	5,338,309	32.94%
Beginning Net Position		31,495,131			33,191,504	
Net Surplus (Deficit)		1,967,753			2,176,547	
Ending Net Position		33,462,884			35,368,051	

730 ELECTRIC CAPITAL FUND

Electric Capital Revenue	1,173,600	520,551		1,021,600	553,918	
Total Revenue:	1,173,600	520,551	44.36%	1,021,600	553,918	54.22%
Electric Capital Expense	2,348,000	107,302		2,477,500	280,750	
Total Expense:	2,348,000	107,302	4.57%	2,477,500	280,750	11.33%
Beginning Net Position		5,801,373			6,564,867	
Net Surplus (Deficit)		413,249			273,168	
Ending Net Position		6,214,622			6,838,035	

793 ELECTRIC DEBT SERVICE

From Electric Operations	1,133,450	377,817		1,133,750	382,073	
Total Transfers In:	1,133,450	377,817	33.33%	1,133,750	382,073	33.70%
Electric Debt Service	1,133,450	135,275		1,133,750	176,961	
Total Payments:	1,133,450	135,275	11.93%	1,133,750	176,961	15.61%
Beginning Net Position		1,368,248			1,368,750	
Net Surplus (Deficit)		242,542			205,111	
Ending Net Position		1,610,789			1,573,861	

ELECTRIC CASH ON HAND	O&M	\$	9,656,273
(110 days or greater)	Capital	\$	5,333,487
	Reserves	\$	1,573,861
293 days		\$	16,563,621

Kwhs Billed			
	FY22-23	FY21-22	YOY Increase %
July	10,121,595	11,445,992	-12%
August	12,793,186	12,112,667	6%
September	14,210,937	13,038,750	9%
October	11,648,038	13,556,254	-14%
November	8,657,190	9,944,562	-13%
December			
January			
February			
March			
April			
May			
June			
YTD TOTAL	57,430,946	60,098,225	-4.4%

Inventory on Hand				
	FY22-23	FY21-22	YOY Increase %	
July	\$ 1,165,007	\$ 989,343	18%	
August	\$ 1,208,115	\$ 992,348	22%	
September	\$ 1,251,752	\$ 997,025	26%	
October	\$ 1,211,972	\$ 1,020,121	19%	
November	\$ 1,164,591	\$ 1,057,167	10%	
December				
January				
February				
March				
April				
May				
June				
YTD AVG	\$ 1,200,287	\$ 1,011,201	18.7%	

Fiber Utility Financial Summary
October 31, 2022

640 FIBER OPERATING FUND

	FY22			FY23		
	Budget	YTD Actual	% of Budget	Budget	YTD Actual	% of Budget
Fiber Service Sales	3,915,000	1,275,696	32.58%	4,133,970	1,447,645	35.02%
Other Fiber Revenue	517,300	128,252	24.79%	773,350	134,307	17.37%
Total Revenue:	4,432,300	1,403,948	31.68%	4,907,320	1,581,952	32.24%
Fiber O&M Expense	4,510,689	1,067,484		4,900,617	1,584,185	
Total Expense:	4,510,689	1,067,484	23.67%	4,900,617	1,584,185	32.33%
Beginning Net Position		(4,472,660)			(4,908,922)	
Net Surplus (Deficit)		336,464			(2,234)	
Ending Net Position		(4,136,196)			(4,911,156)	

740 FIBER CAPITAL FUND

From Fiber Operations	450,000	91,882		578,400	193,112	
Total Transfers In:	450,000	91,882	20.42%	578,400	193,112	33.39%
Fiber Capital Expense	450,000	110,871		2,178,000	297,220	
Total Expense:	450,000	110,871	24.64%	2,178,000	297,220	13.65%
Beginning Net Position		667,071			1,566,044	
Net Surplus (Deficit)		(18,989)			(104,108)	
Ending Net Position		648,083			1,461,936	

795 FIBER DEBT SERVICE

From Fiber Operations				1,105,879	122,875	
Total Transfers In:				1,105,879	122,875	11.11%
Fiber Debt Service				1,105,879	0	
Total Payments:				1,105,879	0	0.00%
Beginning Net Position					0	
Net Surplus (Deficit)					122,875	
Ending Net Position					122,875	

FIBER CASH ON HAND	O&M	\$	(1,036)
(110 days or greater)	Capital	\$	1,617,373
		\$	1,616,337
83 days			

*Fund 640 Ending Fund Balance	(4,136,196)	(4,788,281)
*Fund 740 Ending Fund Balance	648,083	1,461,936
	(3,488,113)	(3,326,344)

Subscriptions			
	FY22-23	FY21-22	YOY Increase %
July	3,513	2,995	17%
August	3,560	3,039	17%
September	3,581	3,087	16%
October	3,624	3,136	16%
November	3,648	3,173	15%
December			
January			
February			
March			
April			
May			
June			
YTD TOTAL	17,926	15,430	
	16.2%		

Inventory on Hand			
	FY22-23	FY21-22	YOY Increase %
July	\$ 1,523,440	\$ 1,379,250	10%
August	\$ 1,596,300	\$ 1,381,182	16%
September	\$ 1,624,706	\$ 1,391,655	17%
October	\$ 1,693,450	\$ 1,403,383	21%
November	\$ 1,706,328	\$ 1,395,733	22%
December			
January			
February			
March			
April			
May			
June			
YTD AVG	\$ 1,628,845	\$ 1,390,241	
	17.2%		

The Fiber Utility fund has a deficit fund balance of (\$3,326,344).
The deficit fund balance is the result of start-up costs incurred to initiate the utility service.
The deficit will be eliminated in future periods through net customer charges.

October 2022

You should expect to see YTD revenue and expenses for October to be 4/12 (or 33%) of Budget.

Water and Electric service revenue may fall ahead or behind budget due to seasonal fluctuations.

We are now reporting each departments net position, which is cash and all other assets
(such as billing receivables and capital assets) less accumulated depreciation and liabilities.

Beginning net positions are updated following the completion of the FY22 audit.

Cash on Hand - 110 days or more of cash on hand based on the recommended 90-120 days to maintain our bond rating (A-).

Water Notes: Capital expenses below budget due to timing of project completion and payments.

US/Admin Notes: The 620 fund is intended to be a zero balance fund and doesn't have any significant stand alone obligations. Any balance or deficit here is timing related or is city services collected from the current month to be transferred in the following month.

Electric Notes: Capital expenses below budget due to timing of project completion and payments.
Debt service payments below budget due to timing of principal and interest payments.

Fiber Notes: Capital expenses below budget due to timing of project completion and payments.
Debt Service transfers are based on a 9 month (1/9) catch-up calculation, or 11%.
Debt service payments below budget due to timing of principal and interest payments.
Depreciation and increase in liability from new debt also impacted the 640 and 740 fund balances.

There was a cash to accrual adjustment in October, moving the 2022A loan proceeds from the capital revenue account to a long term debt liability account, impacting both the 640 and 740 fund balances.

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities
From:
Date: December 12, 2022
Subject: Approval of Minutes of the November 28, 2022 Board of Trustees meeting

Recommendation: Simple motion is in order.

Attachments: 1. 11282022 BOT Minutes



**IMU BOARD OF TRUSTEES OF THE
ELECTRIC, WATER AND COMMUNICATIONS
UTILITIES**

November 28, 2022
5:30 PM
City Hall Council Chambers
Minutes

Call to Order

The Indianola Municipal Utilities Board of Trustees met in regular session at 5:30 p.m. on November 28, 2022, in the City Hall Council Chambers. Chairperson Lori Smith called the meeting to order and on roll call the following members were present: Dom Selgrade, Deb White, Lori Smith, Mike Rozga, Adam Voigts. Absent: None.

Public Comment

There were no public comments offered.

Consent Agenda:

Voigts moved to approve the Consent Agenda and White seconded it. Question was called for and on voice vote the Chairperson declared the motion carried unanimously. The consent agenda was as follows:

- Approval of Claims
- Approval of minutes of the November 14, 2022 Board of Trustees meeting.

Electric Utility Informational Items

Electric Superintendent Mike Metcalf provided an update on the Turbine 8 Controls project and fuel prices. The Board stated fuel should be purchased now.

Water Utility Action Items

Rozga moved to authorize Warren Water District to serve a customer within their territory upon proper notice to IMU since the customer is within 2 miles of the IMU territory, located at 12444 140th Avenue and White seconded it. Question was called for and on voice vote the Chairperson declared the motion carried unanimously.

Water Utility Informational Items

Water Superintendent Lou Elbert discussed plant upgrades being performed as part of the CIP.

Communications Utility Informational Items

Telecommunications Director Kurt Ripperger provided an update on the telecommunications department.

Combined Electric, Water and Communications Informational Items

Robert Endriss, Denman & Co, presented the Fiscal Year 22 audit report.

Other Business

White moved to enter into closed session at 5:55 p.m. in accordance with Iowa Code Section 388.9(1) to discuss marketing and pricing strategies and proprietary information of the telecommunications division whose competitive position will be harmed by public disclosure that is not required of potential or actual competitors and no public purpose is served by such disclosure. Selgrade seconded it. On roll call, the vote was AYES: Selgrade, White, Smith, Rozga, Voigts. NAYS: None. Whereas the Chairperson declared the motion carried unanimously.

Rozga moved and Voigts seconded to exit the closed session at 6:33 p.m. On roll call, the vote was AYES: Selgrade, White, Smith, Rozga, Voigts. NAYS: None. Whereas the Chairperson declared the motion carried unanimously.

Adjourn

The meeting was adjourned at 6:35 p.m. on a motion by Voigts and seconded by Rozga. Question was called for and on voice vote the Chairperson declared the motion carried unanimously.

Lori Smith, Chairperson

ATTEST:

Jackie Raffety, City Clerk

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities

From:

Date: December 12, 2022

Subject: Turbine 8 Control Replacement Project

Recommendation:

Attachments:

1. Turbine 8 Control Volume 1 Specs and Contracts
2. Turbine 8 Control Volume 2
3. Turbine 8 Control Volume 3
4. Resolution adopting plans, specs, form of contract, estm cost, Turbine 8 Control Replacement

INDIANOLA MUNICIPAL UTILITIES

TURBINE 8 CONTROL REPLACEMENT PROJECT VOLUME 1 - CONTRACT DOCUMENTS & SPECIFICATIONS

INDIANOLA MUNICIPAL UTILITIES



ISSUED FOR APPROVAL
OCTOBER 19, 2022

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

INDIANOLA MUNICIPAL UTILITIES TURBINE 8 CONTROL REPLACEMENT PROJECT

INDEX

VOLUME 1 – CONTRACT DOCUMENTS (COVERED BY SEAL ON COVER PAGE)

SECTION	TITLE
00000	Index (This Page)
00005	Appendix Index
00010	Location Maps
00050	Notice of Hearing and Letting
00200	Instructions to Bidders
00410	Bid Form
00430	Bid Bond Form
00520	Form of Agreement
00610	Performance Bond
00615	Payment Bond
00700	Standard General Conditions of the Contract {This is the Standard General Conditions of the Construction Contract published by the Engineers Joint Contract documents Committee (EJCDC) as Document No. C-700 (2018 Edition)}
00800	Supplementary Conditions
13300	Controls - General Provisions
13305	Controls - Testing
13310	Controls – Specific Provisions
Appendix A	Device List
Appendix B	Existing SCADA Points List
Appendix C	Communications Diagram
Appendix D	Nameplate Data

VOLUME 2 – TURBINE DATA (NOT SEALED)

SECTION	TITLE
Appendix E	Turbine Field Devices
Appendix F	Performance Data
Appendix G	Mark V I/O and Alarm Lists

VOLUME 3 – Original Installation Drawings (NOT SEALED)

Appendix H	P & E Turbine Electrical Installation Drawings
Appendix I	East Iowa Substation Single Line Diagrams
Appendix J	Not Used
Appendix K	Original Alstom Mechanical Drawings
Appendix L	Control Cab Diagrams
Appendix M	Exciter Drawings
Appendix N	Generator Protection and Turbine Auxiliary; Schematic Drawings
Appendix O	Control Cab MCC, Connection and Elementary Drawings
Appendix P	Misc Schematics
Appendix Q	Generator Protection Cabinet Terminal Blocks
Appendix R	Control Cab and GAC Interconnection Drawings
Appendix S	Control Cab and GAC Physical Layout Drawings
Appendix T	Generator Switchgear Drawings
Appendix U	Mk V Input/Output Interface Drawings
Appendix V	Turbine Connection and Wiring Diagrams
Appendix W	Generator Connection and Wiring Diagrams
Appendix X	Station Power Fused Switch Drawings
Appendix Y	Water Injection Skid Drawings
Appendix Z	Fire Alarm System Drawings
Appendix ZZ	Water Cooling Skid Drawings

Indianola Municipal Utilities

Turbine 8 Controls
00005 - Appendix Index

Volume 1 - Contract Documents and Specifications		
Appendix A - Device List		
Drawing No.	Description	Elect. Copy
	Device List	E
Appendix B - Existing SCADA Points List		
Drawing No.	Description	Elect. Copy
	Existing SCADA Points List	E
Appendix C - Communications Diagram		
Drawing No.	Description	Elect. Copy
E-78	Communications Diagram	A
Appendix D - Nameplate Data		
Drawing No.	Description	Elect. Copy
	Generator Nameplate	P
	Turbine Fuel Oil Nameplate	P
Volume 2 - Turbine Data		
Appendix E - Turbine Field Devices		
Drawing No.	Description	Elect. Copy
368A6177	Turbine Devices, Identifications and Settings	P
Appendix F - Performance Data		
Drawing No.	Description	Elect. Copy
543HA338	Compressor Inlet Temperature Effects, Base Load, Methane Fuel	E
543HA339	Estimated Performance, at 85 Deg F, 1 atm., Base Load, Methane Fuel	E
543HA340	Compressor Inlet Temperature Effects, Base Load, Distillate Fuel	E
543HA341	Estimated Performance, at 85 Deg F, 1 atm., Base Load, Distillate Fuel	E
543HA360	Compressor Inlet Temperature Effects, Peak Load, Methane Fuel	E
543HA361	Estimated Performance, at 85 Deg F, 1 atm., Peak Load, Methane Fuel	E
543HA362	Compressor Inlet Temperature Effects, Peak Load, Distillate Fuel	E
543HA363	Estimated Performance, at 85 Deg F, 1 atm., Peak Load, Distillate Fuel	E
	Original Generator Test Data	P
	Generator Reactive Capability Curves	P
	Generator No-load and Short-circuit Characteristics	P
	Generator Efficiency vs. Power Factor	P
	Generator Capability vs. Ambient Air	P
	Generator Nameplate Data	P

Elect. Copy Legend:

A = AutoCad; E = Excel; M = MicroStation; N = None; P = PDF; T = .tif file; W = Word

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Indianola Municipal Utilities

Turbine 8 Controls 00005 - Appendix Index

Appendix G - Mark V I/O and Alarm Lists		
Drawing No.	Description	Elect. Copy
	Mark V I/O List	P
	Mark V Alarm List	W
Volume 3 - Original Installation Drawings		
Appendix H - P & E Turbine Electrical Installation Drawings		
Drawing No.	Description	Elect. Copy
E-1	Turbine Generator #8, Conduit Schematic	M
E-11	Turbine Generator No. 8, Electrical Details	M
E-12	Turbine Generator No. 8, Electrical Details	M
E-13	Turbine Generator No. 8, Electrical Details	M
E-14	Turbine Generator No. 8, Electrical Details	M
E-15	Turbine Generator No. 8, Electrical Details, Cntrl Bldg & Switchgear	M
E-16	Turbine Generator No. 8, Electrical Details, Manhole	M
E-17	Turbine Generator No. 8, Station Power Transformer, Installation & Wiring Diagrams	M
E-18	Turbine Generator No. 8, Fuel Forwarding Bldg., Fuel Heater Wiring	M
E-19	Turbine Generator No. 8, Fuel Oil Heater, Schematic	M
E-20	Turbine Generator No. 8, Diesel Start Engine, Day Tank Schematic	M
E-21	Turbine Generator Control Bldg., Physical Layout	M
E-22	Turbine Generator Control Bldg., Physical Elevation & Details	M
E-23	Turbine Generator No. 8, Control Bldg Equipment Plan	M
E-24	Turbine Generator Control Bldg., Equipment Elevations	M
E-30	Turbine Generator No. 8, Station Power One-Line	M
E-35	Turbine Generator Control Bldg., Underground Electrical & Control Conduit Layout	M
E-40	Turbine Generator No. 8, Skid & Control Grounding	M
E-51	Turbine Generator No. 8, Generation Control House, Interconnection Wiring Diagram	M
E-51A	Turbine Generator No. 8, Waste Oil Tank Panel, Interconnection Wiring Diagram	M
E-52	Turbine Generator No. 8, Generation Control House - Panel AC2, Interconnection Wiring Diagram	M
E-53	Turbine Generator No. 8, Generation Control House - Panel DC1, Interconnection Wiring Diagram	M
E-54	Turbine Generator No. 8, Water Cooling Skid, Interconnection Wiring	A
E-55	Turbine Generator No. 8, Fuel Forwarding Building, Interconnection Wiring Diagram	M
E-56	Turbine Generator No. 8, Water Injection Skid, Interconnection Wiring Diagram	M
E-57	Turbine Generator No. 8, Misc. On-Skid Wiring	M
E-58	Turbine Generator No. 8, Generator Aux. Compartment (GAC), Interconnection Wiring	M
E-59	Turbine Generator No. 8, 125VDC MCC/Panel, Interconnection Wiring	M
E-60	Turbine Generator No. 8, 480VAC, 120/240 VAC Panel, Interconnection Wiring	M
E-62	Turbine Generator No. 8, Mark V Control, Interconnection Wiring	M

Elect. Copy Legend:

A = AutoCad; E = Excel; M = MicroStation; N = None; P = PDF; T = .tif file; W = Word

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Indianola Municipal Utilities

Turbine 8 Controls
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Appendix H - P & E Turbine Electrical Installation Drawings cont.		
E-63A	Turbine Generator No. 8, Mark V Control Cabinet, Interconnection Wiring	M
E-63B	Turbine Generator No. 8, Mark V Control Cabinet, Interconnection Wiring	M
E-64A	Turbine Generator No. 8, Mark V Control Cabinet, Interconnection Wiring	M
E-64B	Turbine Generator No. 8, Mark V Control Cabinet, Interconnection Wiring	M
E-66	Turbine Generator No. 8, Generation Control House - Panel AC1, Interconnection Wiring	M
E-67	Turbine Generator No. 8, Generation Control Panel, Interconnection Wiring	M
E-68	Turbine Generator No. 8, GAC- 13kV Switchgear, Interconnection Wiring	M
E-69	Turbine Generator No. 8, Misc. On-Skid Wiring	M
E-69A	Turbine Generator No. 8, Misc. On-Skid Wiring	M
E-70	Turbine Generator No. 8, Fire Alarm Panel Wiring	M
E-71	Turbine Generator No. 8, Fuel Forwarding Bldg., Jockey Pump Control	M
Appendix I - East Iowa Substation Single Line Diagrams		
Drawing No.	Description	Elect. Copy
R-600A	East Iowa Substation, Functional One-Line Diagram, Sheet 1 of 3	M
R-600B	East Iowa Substation, Functional One-Line Diagram, Sheet 2 of 3	M
R-600C	East Iowa Substation, Functional One-Line Diagram, Sheet 3 of 3	M
Appendix J - GE System One-Line Drawings		
Drawing No.	Description	Elect. Copy
	Not Available	
Appendix K - Original Alstom Mechanical Drawings		
Drawing No.	Description	Elect. Copy
91-050-112	Mechanical Outline Drawing	P
91-160-167	Foundation Bolting Details	P
Appendix L - Control Cab Diagrams		
Drawing No.	Description	Elect. Copy
352B9334	Index	P
352B9334 Sect 1-1	Control Cab plan drawing	P
352B9334 Sect 1-2	MK V Layout	P
352B9334 Sect 1-3	MK V Protective Interface Module Layout	P
352B9334 Sect 1-4	GCP Terminal Block Layout	P
352B9334 Sect 1-5	Ex2000 Layout	P
352B9334 Sect 1-6	MCC Layout	P
352B9334 Sect 1-7	MCC Terminal Block Layout	P
352B9334 Sect 1-8	MCC Terminal Block Layout (88QE)	P

Elect. Copy Legend:

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259B5992AA-0C	GE Exciter Drawings, Grounding	A
259B5992AA-0D	GE Exciter Drawings, PMG PWB Card Connections	A
259B5992AA-1A	GE Exciter Drawings, Interconnection Terminal Board	A
259B5992AA-1BC	GE Exciter Drawings, Exciter Field Ground Detector	A
259B5992AA-2A	GE Exciter Drawings, Feedback Sensing	A
259B5992AA-3A	GE Exciter Drawings, Power Input, Bridge & Exciter Field Details	A
259B5992AA-4A	GE Exciter Drawings, Power Supply & Contactor Driver	A
259B5992AA-4B	GE Exciter Drawings, Gate Drive & Dynamic Discharge	A
259B5992AA-5A	GE Exciter Drawings, 3TB/NTB Connections	A
259B5992AA-5B	GE Exciter Drawings, 3TB/NTB Input & Output Connections	A
259B5992AA-6A	GE Exciter Drawings, LTB Input & Output Connections	A
259B5992AA-7A	GE Exciter Drawings, RTBA Input & Output Connections	A
259B5992AA-8A	GE Exciter Drawings, Transducer (TCCB)	A
259B5992AA-9A	GE Exciter Drawings, Exciter Control & Communication (LDCC)	A
259B5992AA-10A	GE Exciter Drawings, Software Regulators	A
259B5992AA-11A	GE Exciter Drawings, Software Alarms & Trips	A
259B5992AA-12A	GE Exciter Drawings, Interconnection Overview	A
259B5992AJ-1	GE Exciter Drawings, Physical Outlines	A
259B5992AJ-2	GE Exciter Drawings, Regulator Frame Details	A
259B5992AP-1	GE Exciter Drawings, Panel Layout Diagram	A
Appendix N - Generator Protection and Turbine Auxiliary; Schematic Drawings		
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304D-01B-0495-B	GE Protection & Turbine Aux. Drawings, Equipment Location Key	A
304D-01B-0495-C	GE Protection & Turbine Aux. Drawings, Customer Notes	A
304D-01B-0495-1	GE Protection & Turbine Aux. Drawings, Contact Assignments	A
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304D-01B-0495-3	GE Protection & Turbine Aux. Drawings, Switches & Relays	A
304D-01B-0495-4	GE Protection & Turbine Aux. Drawings, Switches & Relays	A
304D-01B-0495-5	GE Protection & Turbine Aux. Drawings, SR489	A
304D-01B-0495-6	GE Protection & Turbine Aux. Drawings, SEL-300G	A
304D-01B-0495-200	GE Protection & Turbine Aux. Drawings, Metering & Protection	A
304D-01B-0495-201	GE Protection & Turbine Aux. Drawings, Generator Power Circuit, Metering & Protection	A
304D-01B-0495-202	GE Protection & Turbine Aux. Drawings, Metering & Protection	A
304D-01B-0495-203	GE Protection & Turbine Aux. Drawings, Metering & Protection	A
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304D-01B-0495-302	GE Protection & Turbine Aux. Drawings, 86G1 Trip Circuit	A

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304D-01B-0495-305	GE Protection & Turbine Aux. Drawings, Mark V Synchronize	A
304D-01B-0495-306	GE Protection & Turbine Aux. Drawings, Turbine & Control Panel Interlocks	A
304D-01B-0495-307	GE Protection & Turbine Aux. Drawings, Customer & Control Panel Interlocks	A
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304D-01B-0495-312	GE Protection & Turbine Aux. Drawings, 240/120VAC 1 Ph. MCC Panel Board	A
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304D-01B-0495-315	GE Protection & Turbine Aux. Drawings, 480V 3 Ph. MCC Feeders	A
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Drawing No.	Description	Elect. Copy
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304D-01B-0495-319	GE MCC Drawings, Emergency Lube Oil Pump 88QE-1	A
304D-01B-0495-320	GE MCC Drawings, Diesel Engine Starter Motor 88DS-1	A
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304D-01B-0495-402	GE Protection Cabinet Drawings, GPP Back Panel	A
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304D-01B-0495-403	GE Connection Drawings, Field Ground Detector	A
304D-01B-0495-500	GE Connection Drawings, Ground Detection & EX2000	A
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304D-01B-0495-503	GE Connection Drawings, Power VAC	A
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304D-01B-0495-902	GE Power/VAC Switchgear, Side View	A
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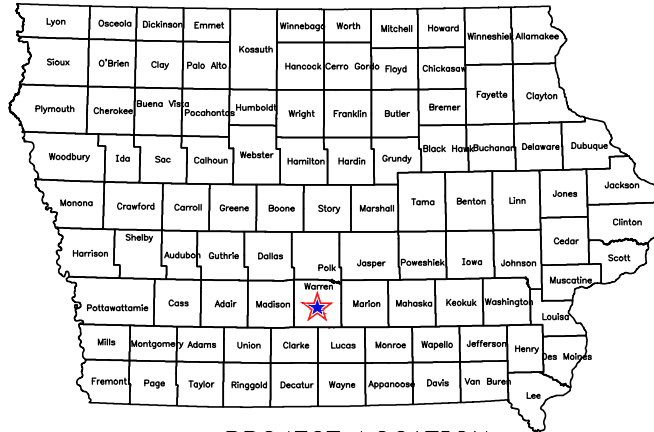
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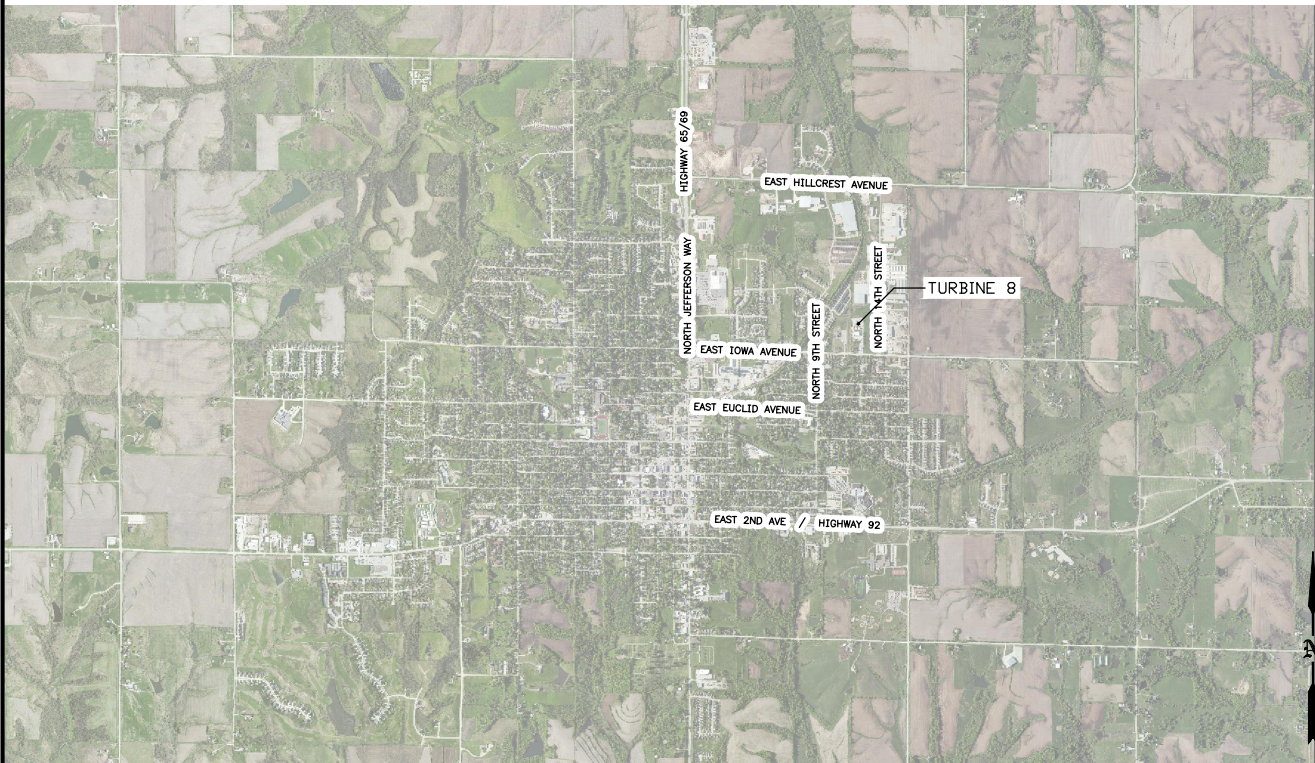
INDIANOLA MUNICIPAL UTILITIES



INDIANOLA MUNICIPAL UTILITIES TURBINE 8 CONTROL REPLACEMENT PROJECT PROJECT VICINITY MAP



PROJECT LOCATION
INDIANOLA IOWA



CITY OF INDIANOLA

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

500 SW 7th Street
Suite 100
Des Moines, IA 50309

Office: 515-989-3083
pe@peengr.com

REV
A
DWG NO
00010-1

INDIANOLA MUNICIPAL UTILITIES



INDIANOLA MUNICIPAL UTILITIES TURBINE 8 CONTROL REPLACEMENT PROJECT SITE VICINITY MAP



P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

500 SW 7th Street
Suite 100
Des Moines, IA 50309

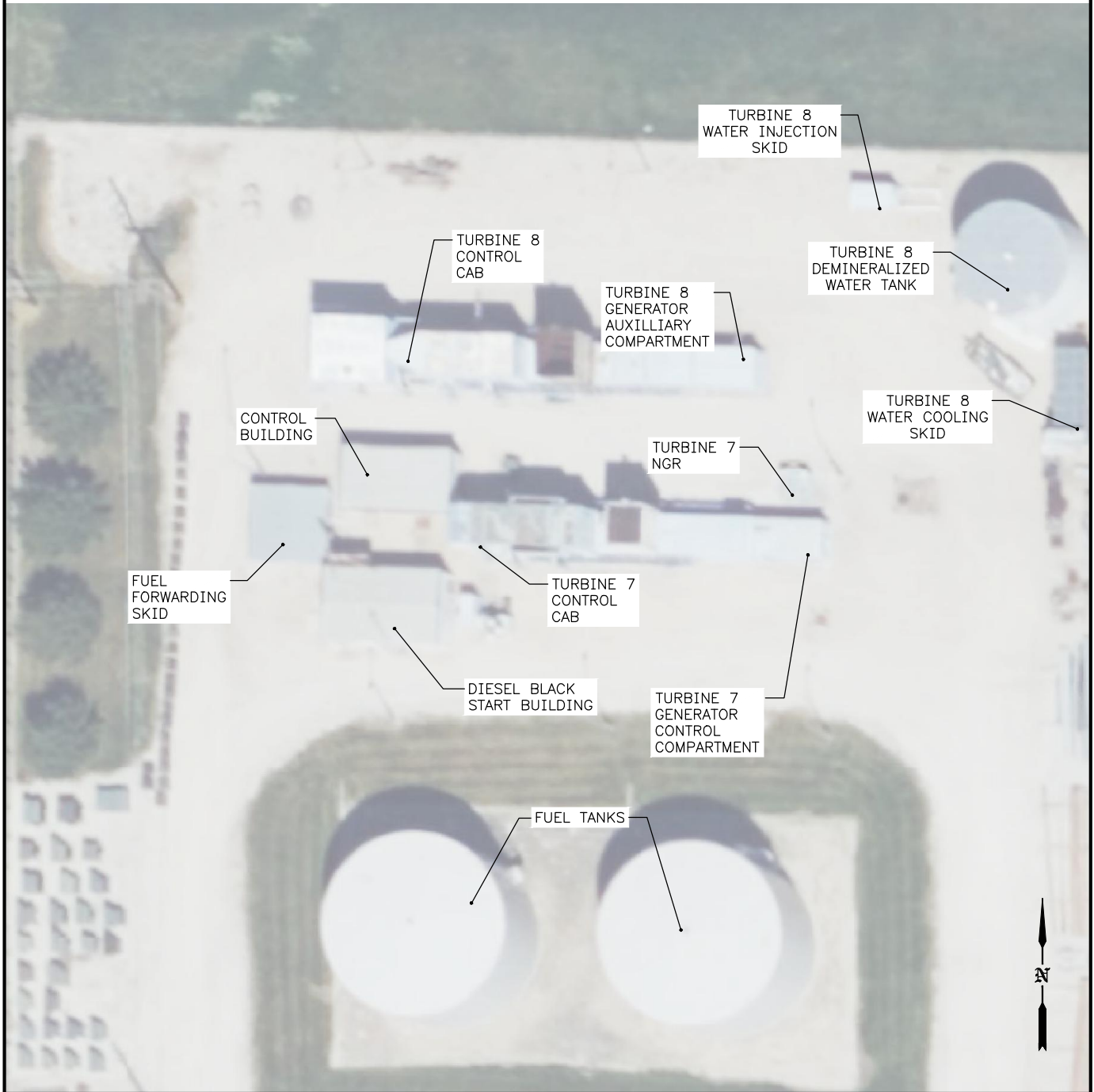
Office: 515-989-3083
pe@peengr.com

REV
A
DWG NO
00010-2

INDIANOLA MUNICIPAL UTILITIES



INDIANOLA MUNICIPAL UTILITIES TURBINE 8 CONTROL REPLACEMENT PROJECT SITE MAP



P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

500 SW 7th Street
Suite 100
Des Moines, IA 50309

Office: 515-989-3083
pe@peengr.com

REV
A
DWG NO
00010-3

NOTICE OF HEARING AND LETTING TURBINE 8 CONTROL REPLACEMENT PROJECT

Sealed proposals will be received by the Board of Trustees of Indianola Municipal Utilities (IMU), Indianola, Iowa, (Owner) at the Indianola City Hall at 110 N. First St., Indianola, Iowa until 2:00 P.M. local time on December 1, 2022 for a project identified as the TURBINE 8 CONTROL REPLACEMENT PROJECT, and as described in detail in the specifications for the project now on file in the office of the City Clerk/CFO. Proposals will be opened in public session at that time. Proposals will be acted upon by the Board of Trustees at a meeting to be held in the Council Chambers of the Indianola City Hall at 110 N. First St, Indianola, Iowa at 5:30 P.M. local time on December 12, 2022 or at such later time and place as may then be fixed. At that time and place a hearing will be held on the proposed plans, specifications, form of contract and estimate of cost for the improvements, and at the hearing any interested person may appear and file objections to the project or to the cost of the improvements.

The Work includes providing and installing a control system, generator excitation system, protective relaying, and SCADA equipment to replace the existing GE SpeedTronic Mark V turbine controls. The equipment will be installed on and adjacent to the turbine skid located at 1300 E. Iowa Ave., Indianola, Iowa.

Each proposal shall be sealed in an envelope marked "BIDS FOR TURBINE 8 CONTROL REPLACEMENT PROJECT". Each bid must be accompanied in a separate envelope by a bid bond, certified check or cashier's check drawn on a State of Iowa or federally chartered bank, or a certified share draft on a State of Iowa or federally chartered credit union, in an amount not less than five per cent (5%) of the total value of the Proposal, and made payable to the Owner as a security that the bidder will enter into a contract for the Work within ten (10) days after the award of the contract to such bidder.

Bidders shall not be permitted to withdraw their bids for a period of sixty (60) days after they are opened.

Payment will be made to the contractor in an amount of 95% of the completed contract value, upon acceptance of the improvements by IMU. The balance of the amount due the successful bidder will be paid not earlier than 31 days from the final acceptance of the improvements by IMU, subject to the conditions and in accordance with the provisions of Chapter 384 and 573 of the Code of Iowa

Payment to the Contractor for completion of the improvements will be made in cash derived from available cash on hand from revenue and such other sources as may be available to IMU. The City of Indianola shall not incur any general obligation for the Improvements. The contract for the furnishing of the improvements shall not constitute a general obligation of the City of Indianola nor be payable in any manner by taxation.

The successful bidder will be required to furnish a performance bond and a payment bond in an amount equal to 100% of the contract price, the bonds to be issued by a responsible surety approved by IMU, and shall guarantee the faithful performance of the contract and the terms and conditions contained in it, and save harmless IMU from claims and damages of any kind caused by the operations of the Contractor.

If the successful bidder fails to enter into a contract with IMU for the Improvements or furnish bonds as required by law, then the certified check or cashier's check deposited by the Contractor shall be cashed, or the bid bond declared forfeited, and proceeds retained by IMU as agreed liquidated damages.

Bidders will be required to complete a Bidder Status Form from the Iowa Department of Labor regarding Bidder's resident status within the State of Iowa and to submit that form with the bid. Failure to submit a fully completed Bidder Status Form with the bid may result in the bid being deemed nonresponsive and rejected.

Work is to commence on or about January 15, 2023 and shall be substantially complete not later than 35 calendar days after the start of the construction outage. The construction outage shall commence not earlier than October 1, 2023 and not later than February 15, 2024. Work shall be completed and ready for final payment not later than 30 days after substantial completion.

Plans and specifications governing the proposed improvements have been prepared by P&E Engineering Co., 500 SW 7th Street, Suite 100, Des Moines, Iowa 50309. The plans and specifications, prior proceedings of IMU referring to and defining the improvements and a proposed contract are hereby made a part of this notice by reference. The proposed contracts shall be executed in accordance with them. Copies of the plans and specifications may be obtained from P & E Engineering Co.

By virtue of statutory authority a preference will be given to products and provisions grown and produced within the State of Iowa and Iowa domestic labor.

IMU reserves the right to reject any or all proposals and to waive informalities. Published upon order of the Board of Trustees Indianola Municipal Utilities, Indianola, Iowa.

JACKIE RAFFETY
City Clerk

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ARTICLE 1—DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders. The Issuing Office for this project will be P & E Engineering Co., 500 SW 7th Street, Suite 100, Des Moines, IA 50309.

ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.
- 2.03 Bidder may register as a plan holder and obtain complete sets of Bidding Documents in printed or electronic (digital) format (compact disk, USB, or direct transmittal) from the Issuing Office. A single copy of the bidding documents may also be obtained at no cost from the Engineer. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.
- 2.04 Plan rooms (including construction information subscription services, and electronic and virtual plan rooms) may distribute the Bidding Documents, or make them available for examination. Those prospective bidders that obtain an electronic (digital) copy of the Bidding Documents from a plan room are encouraged to register as plan holders from the Issuing Office. Owner is not responsible for omissions in Bidding Documents or other documents obtained from plan rooms, or for a Bidder's failure to obtain Addenda from a plan room.
- 2.05 *Electronic Documents*
- A. Bidding Documents will be made available as Electronic Documents in the following manner.
1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf). It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and

reproductions prepared from those versions are identical in every manner to the paper copies.

- B. The Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.
- C. After the Contract is awarded, the Owner will provide or direct the Engineer to provide for the use of the Contractor documents that were developed by Engineer as part of the Project design process, as Electronic Documents in native file formats.
 - 1. Electronic Documents that are available in native file format include:
 - a. See documents marked "A", "E" or "M" in 00005 - Appendix Index.
 - 2. Release of such documents will be solely for the convenience of the Contractor. No such document is a Contract Document.
 - 3. The Contractor shall take appropriate measures to verify that any electronic/digital information provided in Electronic Documents is appropriate and adequate for the Contractor's specific purposes.
 - 4. In no case will the Contractor be entitled to additional compensation or time for completion due to any differences between the actual Contract Documents and any related document in native file format.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within five (5) days of Owner's request, Bidder must submit the following information:
 - A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.
 - B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.
 - C. Bidder's state or other contractor license number, if applicable.
 - D. Subcontractor and Supplier qualification information.
 - E. Other required information regarding qualifications.

- 3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4—PRE-BID CONFERENCE

- 4.01 Each prospective bidder must schedule a mandatory pre-bid conference with the Owner. Prospective bidders must contact Mike Metcalf at 515-961-5305 to make arrangements to visit the project site. Bidders may direct questions to Jared Kline, P & E Engineering Co. at 515-989-3083.
- 4.02 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 Site and Other Areas

- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

5.02 Existing Site Conditions

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

- 1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:
 - a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
 - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.
 - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
- 2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely,

as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 *Other Site-related Documents*

- A. No other Site-related documents are available.

5.04 *Site Visit and Testing by Bidders*

- A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site. Reference is made to Paragraph 4.01.
- B. Bidders visiting the Site are required to arrange their own transportation to the Site.
- C. All access to the Site other than during a regularly scheduled Site visit must be coordinated through Mike Metcalf at 515-961-5305. Bidder must conduct the required Site visit during normal working hours.
- D. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- E. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.
- F. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- G. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Express Representations and Certifications in Bid Form, Agreement*

- A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder’s examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents via email to jakline@peengr.com and must include “Question related to IMU Turbine 8 Controls Replacement” in the subject line. Confirm the email has been received by calling Jared Kline at 515-989-3083.
- 7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.
- 7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **5** percent of Bidder’s maximum Bid price (determined by adding the base bid and all alternates) and in the form prescribed in the NOTICE TO BIDDERS AND NOTICE OF PUBLIC HEARING.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid

security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

ARTICLE 9—CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.

ARTICLE 10—SUBSTITUTE AND “OR EQUAL” ITEMS

- 10.01 The Contract for the Work, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or “or-equal” items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or “or-equal” item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.
- 10.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder's sole risk.

ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 11.01 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for any portion of the Work within five days after Bid opening:
- 11.02 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute.
- 11.03 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid

security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 12—PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents.

- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
- B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”

12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.

12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

12.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.

12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.

12.06 A Bid by an individual must show the Bidder’s name and official address.

12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

12.08 All names must be printed in ink below the signatures.

12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.

12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.

- 12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.
- 12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.
- 12.13 Bidder shall submit a completed copy of the Bidder Status form from the Iowa Department of labor with the bid.

ARTICLE 13—BASIS OF BID

13.01 *Base Bid with Alternates*

- A. Bidders must submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.
- B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.

ARTICLE 14—SUBMITTAL OF BID

- 14.01 Paper copies of the Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form. See Paragraph 12.02 for Bid Documents that are received as Electronic Documents
- 14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, and the name and address of Bidder. This package shall be plainly labeled "BID ENCLOSED." The package must contain two sealed opaque envelopes, one for the Bid and other required documents and one for the Bid Security.
- 14.03 The sealed envelope containing the Bid and all required documents (except for the bid security) must be plainly marked with the notation "BID ENCLOSED".
- 14.04 The sealed envelope containing the bid security must be plainly marked with the notation "BID SECURITY ENCLOSED".
- 14.05 A Bid sent by mail shall be addressed to:

Jackie Raffety
City of Indianola
110 N. 1st Street
PO Box 299
Indianola, IA 50125

- 14.06 A bid sent by delivery service or hand delivered shall be delivered to:

City of Indianola
110 N. 1st Street
Indianola, IA 50125
Attention: Jackie Raffety
Phone: 515-961-9410

- 14.07 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

- 15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 15.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

ARTICLE 16—OPENING OF BIDS

- 16.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

- 18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.
- 18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.
- 18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.
- 18.04 Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder.
- 18.05 If Owner awards the contract for the Work, such award will be to the responsible Bidder whose bid is considered to be in the best interest of the Owner.
- 18.06 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 18.07 *Evaluation of Bids*
- A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
 - B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
 - C. The written Bid will be evaluated by Owner through analysis of information derived from the proposals, Owner's records, and other relevant sources and information, all to determine which Proposal is most beneficial to the Owner. If deemed necessary by Owner, written and/or oral discussions may be conducted with those Bidders whose Bids are found to be potentially acceptable.
 - D. Owner will consider all materials submitted by Bidder to determine whether the Bid is responsive to the requirements of this RFP.
 - E. The following considerations may impact Owner's determination of the responsiveness of a Bid or fitness of a Bidder to undertake the Work:
 - 1. Experience of the Bidder and successful completion of similar control project on GE Frame 5 turbines using SpeedTronic Mark V control systems.
 - 2. Ability, capacity, and skill of Bidder to complete the work.
 - 3. Quality and timeliness of performance by the Bidder on previous contracts with other municipal utilities or local governments, including, but not limited to, the relative costs,

burdens, time and effort expended by such entities in securing satisfactory performance and resolving claims;.

4. Previous and existing compliance by the Bidder with laws relating to public bidding, contracts, and services.
5. History of the Bidder in filing claims and litigation on prior public projects.
6. Such other information as may be secured having bearing on the decision to award the Contract, including but not limited to, prior safety violations and lawsuits.

- 18.08 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 18.09 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.
- 18.10 If requested by Owner, Bidders shall furnish evidence of the Bidder's ability to perform, such as commitments by Subcontractors, equipment, supplies and facilities, and Bidders ability to marshal the necessary personnel. Refusal to provide such information may cause the Bid to be deemed nonresponsive and rejected.
- 18.11 Bidders may be invited to make presentations in Indianola, IA. Bidders will be asked to present their qualifications, personnel and implementation approach to Owner. In addition, Owner may interview references and review other materials to evaluate Bidder's capability to deliver the control system.
- 18.12 Due to the confidential nature of the information and materials which will be accessible to the successful bidder, Owner may conduct a reference check on the proposed Subcontractors, Partners, and Proposers staff to be used to provide the Work. Owner reserves the right in its sole discretion to reject any proposed Subcontractor, Partner, or Bidder's Staff as a result of information produced by such reference check.

ARTICLE 19—BONDS AND INSURANCE

- 19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.
- 19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 20—SIGNING OF AGREEMENT

- 20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance

documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and/or electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21—SALES AND USE TAXES

21.01 Owner is subject to state and local sales and use taxes on materials and equipment to be incorporated in the Work. Said taxes shall be included in the Bid. Refer to Paragraph SC-7.10 of the Supplementary Conditions for additional information.

ARTICLE 22—CONTRACTS TO BE ASSIGNED

22.01 This Article is not used.



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The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to:

Indianola Municipal Utilities
110 North 1st Street
Indianola, Iowa, 50125

The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

- A. Required Bid security;
- B. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
- C. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
- D. A completed Iowa Department of Labor Bidder Status Form (309-6001) regarding the Contractor's resident status within the State of Iowa.
- E. Bidder shall provide an Executive Summary with the bid that concisely summarizes, in two double-spaced pages or less, the qualifications of the Bidder and the functionality, key benefits, and capability to be provided by the Bidder. Include a history of the Bidder's organization and the number of years of involvement with turbine controls. Provide a list of recent projects involving control work or mechanical upgrades or modifications on GE Frame 5 turbines, including references. Pricing shall NOT be included in the Executive Summary.

Name of Bidder _____



ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 *Lump Sum Bids*

A. Bidder (_____) will complete the Work in accordance with the Contract Documents for the following lump sum (stipulated) price(s),

1. Lump Sum Price (Base Bid and Alternates)

Lump Sum Bid Price for Base Bid	\$
Alternate 1- Replace and upgrade flame sensors in accordance with Section 13310 Part 7 [Add]	\$
Alternate 2- Provide NOx control algorithm in accordance with Section 13310 Part 7 [Add]	\$
Alternate 3- Retain third party testing contractor to perform stack testing in accordance with Section 13310 Part 7 [Add]	\$

ARTICLE 4—TIME OF COMPLETION

4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

4.02 The Contract includes Liquidated Damages in accordance with Part 1, Paragraph 1.2A of Section 13300.

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 *Instructions to Bidders*

A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date



ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site, if any, that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the---- Bidding Documents.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.



11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
 - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
 - d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

Name of Bidder _____



BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

Address for giving notices:

Bidder's Contact:

Name:

(typed or printed)

Title:

(typed or printed)

Phone:

Email:

Address:

Bidder's Contractor License No.: (if applicable) _____

BID BOND (PENAL SUM FORM)

Bidder Name: Address <i>(principal place of business)</i> :	Surety Name: Address <i>(principal place of business)</i> :
Owner Name: INDIANOLA MUNICIPAL UTILITIES Address <i>(principal place of business)</i> : 210 WEST 2ND AVE INDIANOLA, IA 50125	Bid Project <i>(name and location)</i> : INDIANOLA MUNICIPAL UTILITIES TURBINE 8 CONTROL REPLACEMENT PROJECT Bid Due Date: DECEMBER 1, 2022
Bond Penal Sum: Date of Bond:	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder	Surety
_____ <i>(Full formal name of Bidder)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature) (Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.	

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

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This Agreement is by and between Indianola Municipal Utilities (“Owner”) and

_____ (“Contractor”).

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

- 1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Provide and install turbine control system, including control hardware and software, HMI, exciter system, protective relays, operator console, and associated equipment.

ARTICLE 2—THE PROJECT

- 2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows:

INDIANOLA MUNICIPAL UTILITIES TURBINE 8 CONTROL REPLACEMENT PROJECT

ARTICLE 3—ENGINEER

- 3.01 The Owner has retained P & E Engineering Co. (“Engineer”) to act as Owner’s representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.
- 3.02 The part of the Project that pertains to the Work has been designed by Engineer.

ARTICLE 4—CONTRACT TIMES

- 4.01 *Time is of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Dates*

- A. The Work will be substantially completed no later than 35 calendar days after the start of the outage as provided in Paragraph 15.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions no later than 30 calendar days after substantial completion.

4.04 *Milestones*

- A. Parts of the Work must be substantially completed on or before the following Milestone(s):
 - 1. The outage to install the controls shall begin no earlier than October 1, 2023 and not later than February 15, 2024. The outage shall last no longer than 35 calendar days at which point the unit shall be fully commissioned and ready for stack testing, if necessary, or normal service.

4.05 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):
 - 1. *Substantial Completion:* Contractor shall pay Owner \$1200 for each day that expires after May 30, 2024 (without adjustment unless Owner furnished speed switches arrive after February 28, 2024), until the Work is substantially complete.
- B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

ARTICLE 5—CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:
 - A. For all Work, a lump sum of \$ _____.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on the basis of Contractor's Applications for Payment, which is to be submitted on or about the 1st day of each month during performance of the Work, as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
 - 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold in accordance with the Contract.
 - a. 95 percent of the value of the Work completed (with the balance being retainage).
 - b. 95 percent of cost of materials and equipment stored on site but not yet incorporated in the Work (with the balance being retainage).
- B. Following Substantial Completion, partial payment of retainage may be made in accordance with the Contract Documents and applicable State Law.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *Consent of Surety*

- A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 *Interest*

- A. All amounts not paid when due will bear interest at the rate of 6% percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

- A. The Contract Documents consist of all of the following:
 - 1. This Agreement.
 - 2. Bonds:
 - a. Performance bond (together with power of attorney).
 - b. Payment bond (together with power of attorney).
 - 3. General Conditions, Section 00700.

4. Supplementary Conditions, Section 00800.
5. General Requirements, section 13300.
6. Specifications as listed in the table of contents of the project manual.
7. Drawings as listed in the table of contents of the project manual.
8. Addenda (numbers ____ to ____, inclusive).
9. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid
10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
- B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 Contractor's Representations

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
 1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions (if any), with respect to the Technical Data in such reports and drawings.

5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

8.03 *Standard General Conditions*

- A. Owner stipulates the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee (Section 00700 of the Contract), and that all modifications to the standard wording of such published document are shown in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____, _____ (which is the Effective Date of the Contract).

Owner:

Indianola Municipal Utilities

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

(typed or printed)

Title:

(typed or printed)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

210 West 2nd Avenue

Indianola, IA 50125

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

Contractor:

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

(typed or printed)

Title:

(typed or printed)

(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

PERFORMANCE BOND

Contractor Name: Address <i>(principal place of business)</i> :	Surety Name: Address <i>(principal place of business)</i> :
Owner Name: INDIANOLA MUNICIPAL UTILITIES Mailing address <i>(principal place of business)</i> : 210 WEST 2ND AVE INDIANOLA, IA 50125	Contract Description <i>(name and location)</i> : INDIANOLA MUNICIPAL UTILITIES TURBINE 8 CONTROL REPLACEMENT PROJECT Contract Price: Effective Date of Contract:
Bond Bond Amount: Date of Bond: <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: ☒ None ☐ See Paragraph 16	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature)(Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
 - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
 - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
 - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
 - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

- 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
- 6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
- 7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
- 8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
- 9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
- 10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
- 11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
- 12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
- 13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

- 14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
 - 14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
 - 14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: **NONE**

PAYMENT BOND

Contractor Name: Address <i>(principal place of business)</i> :	Surety Name: Address <i>(principal place of business)</i> :
Owner Name: INDIANOLA MUNICIPAL UTILITIES Mailing address <i>(principal place of business)</i> : 210 WEST 2ND AVE INDIANOLA, IA 50125	Contract Description <i>(name and location)</i> : INDIANOLA MUNICIPAL UTILITIES TURBINE 8 CONTROL REPLACEMENT PROJECT Contract Price: Effective Date of Contract:
Bond Bond Amount: Date of Bond: <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: ☒ None ☐ See Paragraph 18	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature)(Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
 - 5.1. Claimants who do not have a direct contract with the Contractor
 - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2. Pay or arrange for payment of any undisputed amounts.
 - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. Definitions
 - 16.1. *Claim*—A written statement by the Claimant including at a minimum:
 - 16.1.1. The name of the Claimant;
 - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
 - 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 - 16.1.7. The total amount of previous payments received by the Claimant; and
 - 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
18. Modifications to this Bond are as follows: **NONE**

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By



Endorsed By



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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*

- a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.
 - b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. A demand for money or services by a third party is not a Claim.
11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.
22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
- a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.
36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers'

instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion of such Work.
43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
46. *Technical Data*
 - a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water,

other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

48. *Unit Price Work*—Work to be paid for on the basis of unit prices.

49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives*: The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day*: The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective*: The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - 1. does not conform to the Contract Documents;
 - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - 3. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word “furnish,” when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word “install,” when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.
4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.

G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or

progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

A. *Standards Specifications, Codes, Laws and Regulations*

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error,

ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings,

Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.

- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - 2. Abnormal weather conditions;
 - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.
- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
 - 1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 - 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 - 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent

areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
 - D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
2. is of such a nature as to require a change in the Drawings or Specifications;

3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
 1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

- c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
- 2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
 - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
- 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
- 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
 - 1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 - 2. complying with applicable state and local utility damage prevention Laws and Regulations;
 - 3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 - 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in

Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures

- of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

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- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.
- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.
- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
 - 4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and

5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);
 4. not seek contribution from insurance maintained by the additional insured; and
 5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will

provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

- E. *Insurance of Other Property; Additional Insurance:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.
 - 1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
 - 2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
 - 1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out

of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

- C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to

(1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.
- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 “Or Equals”

- A. *Contractor’s Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or equal” item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an “or equal” item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
 - b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor’s Expense:* Contractor shall provide all data in support of any proposed “or equal” item at Contractor’s expense.
- C. *Engineer’s Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each “or-equal” request. Engineer may require Contractor to furnish additional data about the proposed “or-equal” item. Engineer will be the sole judge of acceptability. No “or-equal” item will be ordered, furnished, installed, or utilized until Engineer’s review is complete and Engineer determines that the proposed item is an “or-equal,” which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer’s Determination:* Neither approval nor denial of an “or-equal” request will result in any change in Contract Price. The Engineer’s denial of an “or-equal” request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an “or-equal” item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 Substitutes

- A. *Contractor’s Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
 3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
 - a. will certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design;
 - 2) be similar in substance to the item specified; and
 - 3) be suited to the same use as the item specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.

- d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.

- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

- C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.
3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

- B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.
 2. *Samples*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.
 5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.
 - d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.

- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 Contractor's General Warranty and Guarantee

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
 - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
 - 1. Observations by Engineer;
 - 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. Use or occupancy of the Work or any part thereof by Owner;
 - 5. Any review and approval of a Shop Drawing or Sample submittal;
 - 6. The issuance of a notice of acceptability by Engineer;
 - 7. The end of the correction period established in Paragraph 15.08;
 - 8. Any inspection, test, or approval by others; or
 - 9. Any correction of defective Work by Owner.

- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or

alter others' work with the written consent of Engineer and the others whose work will be affected.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. An itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price

will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
 - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
 - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

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- 9.03 *Furnish Data*
- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.
- 9.04 *Pay When Due*
- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.
- 9.05 *Lands and Easements; Reports, Tests, and Drawings*
- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.
- 9.06 *Insurance*
- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.
- 9.07 *Change Orders*
- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.
- 9.08 *Inspections, Tests, and Approvals*
- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.
- 9.09 *Limitations on Owner's Responsibilities*
- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- 9.10 *Undisclosed Hazardous Environmental Condition*
- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.
- 9.11 *Evidence of Financial Arrangements*
- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).
- 9.12 *Safety Programs*
- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.
- E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 - 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
 - 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.
- B. If Owner has issued a Work Change Directive and:
 - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
 - 1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 - 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
 - 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will be determined as follows:
 - 1. A mutually acceptable fixed fee; or
 - 2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
 - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;

- d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
- e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
- f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.
- B. *Change Proposal Procedures*
 - 1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
 - 2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

- b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

- 3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
- 4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
- 5. *Binding Decision:* Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion:* Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 Notification to Surety

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS

12.01 *Claims*

- A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 Cost of the Work

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 - 2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
 - 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers'

compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
5. Other costs consisting of the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.
 - c. *Construction Equipment Rental*
 - 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment,

machinery, or parts must cease when the use thereof is no longer necessary for the Work.

- 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
 - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.
- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.
 - g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded*: The term Cost of the Work does not include any of the following items:
1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered

by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. The cost of purchasing, renting, or furnishing small tools and hand tools.
3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
6. Expenses incurred in preparing and advancing Claims.
7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. Contractor's Fee

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

E. Documentation and Audit: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances*: Contractor agrees that:
 - 1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the

costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work

completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. Payment Becomes Due

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. Reductions in Payment by Owner

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
 - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the

amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work,

property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
 - 2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
 2. The final Application for Payment must be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
 - d. a list of all duly pending Change Proposals and Claims; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
 3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

- C. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim, appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
 1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
 - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and

2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
 2. agree with the other party to submit the dispute to another dispute resolution process; or
 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to

Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT



Endorsed By



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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018), Section 00700 of this Contract. The General Conditions remain in full force and effect except as amended.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added—for example, "Paragraph SC-4.05."

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

SC-1.01 Add the following

Owner: Indianola Municipal Utilities, Indianola, Iowa

Engineer: P & E Engineering Co., Des Moines, Iowa

ARTICLE 2—PRELIMINARY MATTERS

SC-2.02 *Copies of Documents*

SC-2.02 Revise Paragraph 2.02.A to read as follows:

- A. Owner shall furnish to Contractor one printed copy of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

SC-2.06 *Electronic Transmittals*

SC-2.06 Delete Paragraphs 2.06.B and 2.06.C in their entirety and insert the following in their place:

- B. *Electronic Documents Protocol:* The parties shall conform to the following provisions in Paragraphs 2.06.B and 2.06.C, together referred to as the Electronic Documents Protocol ("EDP" or "Protocol") for exchange of electronic transmittals.

1. *Basic Requirements*

- a. To the fullest extent practical, the parties agree to and will transmit and accept Electronic Documents in an electronic or digital format using the procedures described in this Protocol. Use of the Electronic Documents and any information contained therein is subject to the requirements of this Protocol and other provisions of the Contract.
- b. The contents of the information in any Electronic Document will be the responsibility of the transmitting party.

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- c. Electronic Documents as exchanged by this Protocol may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.
- d. Except as otherwise explicitly stated herein, the terms of this Protocol will be incorporated into any other agreement or subcontract between a party and any third party for any portion of the Work on the Project, or any Project-related services, where that third party is, either directly or indirectly, required to exchange Electronic Documents with a party or with Engineer. Nothing herein will modify the requirements of the Contract regarding communications between and among the parties and their subcontractors and consultants.
- e. When transmitting Electronic Documents, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the receiving party's use of software application packages, operating systems, or computer hardware differing from those established in this Protocol.
- f. Nothing herein negates any obligation 1) in the Contract to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations; 2) to comply with any applicable Law or Regulation governing the signing and sealing of design documents or the signing and electronic transmission of any other documents; or 3) to comply with the notice requirements of Paragraph 18.01 of the General Conditions.

2. *System Infrastructure for Electronic Document Exchange*

- a. Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost and sufficient for complying with the EDP requirements. With the exception of minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.
 - 1) The maximum size of an email attachment for exchange of Electronic Documents under this EDP is 10.0 MB. Attachments larger than that may be exchanged using large file transfer functions or physical media.
 - 2) Each Party assumes full and complete responsibility for any and all of its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software, for use with respect to this EDP.
- b. Each party is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with the party's individual(s) or entity responsible for managing its

System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.

- c. Each party will operate and maintain industry-standard, industry-accepted, ISO-standard, commercial-grade security software and systems that are intended to protect the other party from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. To the extent that a party maintains and operates such security software and systems, it shall not be liable to the other party for any breach of system security.
- d. In the case of disputes, conflicts, or modifications to the EDP required to address issues affecting System Infrastructure, the parties shall cooperatively resolve the issues; but, failing resolution, the Owner is authorized to make and require reasonable and necessary changes to the EDP to effectuate its original intent. If the changes cause additional cost or time to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in price or time under the appropriate process in the Contract.
- e. Each party is responsible for its own back-up and archive of documents sent and received during the term of the contract under this EDP, unless this EDP establishes a Project document archive, either as part of a mandatory Project website or other communications protocol, upon which the parties may rely for document archiving during the specified term of operation of such Project document archive. Further, each party remains solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract, or after termination of the Project document archive, if one is established, for as long as required by the Contract and as each party deems necessary for its own purposes.
- f. If a receiving party receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission.
- g. The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.

C. Software Requirements for Electronic Document Exchange; Limitations

- 1. Each party will acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the software formats required in this section of the EDP.
 - a. Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first

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notify and receive concurrence from the other party for use of the updated version or adjust its transmission to comply with this EDP.

2. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.
3. Software and data formats for exchange of Electronic Documents will conform to the requirements set forth in Exhibit A to this EDP, including software versions, if listed.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.06 Drawings

SC-3.06 Add the following new paragraph immediately after Paragraph 3.05:

3.06 Drawings

- A. Drawings or data may hereafter be furnished and issued by Engineer to explain portions of the work covered by these Specifications in more detail.
- B. The Drawings, in general, are to scale, but figured dimensions shall always be followed and Drawings shall not be scaled.
- C. Engineer will give Contractor reasonable assistance in interpreting the Drawings and Specifications, but such assistance shall not relieve Contractor from any responsibility for his work.
- D. Drawings for all equipment to be installed by Contractor in the progress of the Work shall be provided by Contractor.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.02 Starting the Work

SC-4.02 Add the following paragraphs immediately after Paragraph 4.02.A.

- B. The Contractor shall notify Owner and Engineer 24 hours before starting operations under this Contract, both initially and after any lapse of work lasting more than seven (7) consecutive calendar days.
- C. Contractor shall notify Owner each day in a manner set by Owner regarding when and where Contractor is working on Owner's properties. At no time shall Contractor be on Owner's property or working on or around Owner's system without Owner's knowledge of said fact.
- D. Construction outage shall be scheduled a minimum sixty (60) calendar days in advance.

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ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

5.03 *Subsurface and Physical Conditions*

SC-5.03 Delete Paragraphs 5.03.A, 5.03.B, 5.03C, and 5.03D and insert the following:

- A. No reports of explorations or tests of subsurface conditions at or contiguous to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site are known to Owner.

5.05 *Underground Facilities*

SC-5.05.A Delete Paragraph 5.05.A.3 and insert the following in its place:

- 3. verifying the actual location of those Underground Facilities that are shown or indicated in the Contract Documents and other such facilities that are identified by the utility locates required by Paragraph 5.05.G as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction.

5.06 *Hazardous Environmental Conditions*

SC-5.06 Delete Paragraphs 5.06.A and 5.06.B and insert the following in its place:

- A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.
- B. Not Used.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.A:

- 1. Contractor shall provide performance and payment bonds. Bonds may be submitted on the forms provided with this Contract or may be provided on the standard forms utilized by the Surety.

6.02 *Insurance—General Provisions*

SC-6.02 Add the following paragraph immediately after Paragraph 6.02.B:

- 1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

6.03 *Contractor's Insurance*

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SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

- D. Not Used
- E. *Workers' Compensation and Employer's Liability*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	Policy limits of not less than:
Workers' Compensation	
State	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
Employer's Liability	
Each accident	\$1,000,000
Each employee	\$1,000,000
Policy limit	\$1,000,000

- F. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:
- damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
 - damages insured by reasonably available personal injury liability coverage, and
 - damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- G. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:
- Products and completed operations coverage.
 - Such insurance must be maintained for three years after final payment.
 - Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 - Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

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3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
 4. Underground, explosion, and collapse coverage.
 5. Personal injury coverage.
 6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 2010 and CG 20 37 (together), editions 10/01, 07/04, or 04/13.
 7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 “Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured” or its equivalent.
- H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:
1. Any modification of the standard definition of “insured contract” (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
 2. Any exclusion for water intrusion or water damage.
 3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
 4. Any exclusion of coverage relating to earth subsidence or movement.
 5. Any exclusion for the insured’s vicarious liability, strict liability, or statutory liability (other than worker’s compensation).
 6. Any limitation or exclusion based on the nature of Contractor’s work.
 7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.
- I. *Commercial General Liability—Minimum Policy Limits*

Commercial General Liability	Policy limits of not less than:
General Aggregate	\$2,000,000
Products—Completed Operations Aggregate	\$2,000,000
Personal and Advertising Injury	\$1,000,000
Bodily Injury and Property Damage—Each Occurrence	\$1,000,000

- J. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy must be written on an occurrence basis.

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Person	\$500,000
Each Accident	\$1,000,000
Property Damage	
Each Accident	\$1,000,000
Or	
Combined Single Limit	
Combined Single Limit (Bodily Injury and Property Damage)	\$2,000,000

- K. *Umbrella or Excess Liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

Excess or Umbrella Liability	Policy limits of not less than:
Each Occurrence	\$4,000,000
General Aggregate	\$4,000,000

- L. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:* Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein. If such umbrella or excess liability policy was required under this Contract, at a specified minimum policy limit, such umbrella or excess policy must retain a minimum limit of \$3,000,000 after accounting for partial attribution of its limits to underlying policies, as allowed above.
- M. *Contractor's Pollution Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.

Contractor's Pollution Liability	Policy limits of not less than:
Each Occurrence/Claim	\$1,000,000
General Aggregate	\$1,000,000

- N. *Unmanned Aerial Vehicle Liability Insurance:* If Contractor uses unmanned aerial vehicles (UAV—commonly referred to as drones) at the Site or in support of any aspect of the Work, Contractor shall obtain UAV liability insurance in the amounts stated; name Owner, and Engineer as additional insureds; and provide a certificate to Owner confirming Contractor's

compliance with this requirement. Such insurance will provide coverage for property damage, bodily injury or death, and invasion of privacy.

Unmanned Aerial Vehicle Liability Insurance	Policy limits of not less than:
Each Claim	\$1,000,000
General Aggregate	\$1,000,000

- P. All policies must name the following as additional insured, in accordance with Paragraph 6.03.C of the General Conditions
- Indianola Municipal Utilities (Owner)
 - P & E Engineering Co. (Engineer)

6.04 *Builder's Risk and Other Property Insurance*

SC-6.04.D Delete Paragraph 6.04.D and insert the following in its place:

D. All portions of the Work are subject to Partial Use or Utilization as soon as the wires, cable, equipment, and other materials are installed and commissioned by the Contractor to the extent that Contractor agrees that any such use will not be detrimental to the Work.

SC-6.04.F Supplement Paragraph 6.04 of the General Conditions with the following provisions:

- F. *Builder's Risk Requirements:* The builder's risk insurance must:
- be written on a builder's risk "all risk" policy form that at a minimum includes insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment stored and in transit, and must not exclude the coverage of the following risks: fire; windstorm; hail; flood; earthquake, volcanic activity, and other earth movement; lightning; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; and water damage (other than that caused by flood).
 - Such policy will include an exception that results in coverage for ensuing losses from physical damage or loss with respect to any defective workmanship, methods, design, or materials exclusions.
 - If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake, volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance will be provided through other insurance policies acceptable to Owner and Contractor.
 - cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar

nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

3. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of contractors, engineers, and architects).
4. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
5. extend to cover damage or loss to insured property while in transit.
6. allow for the waiver of the insurer's subrogation rights, as set forth in this Contract.
7. allow for partial use by Owner by endorsement, and without cancellation or lapse of coverage.
8. include performance/hot testing and start-up, if applicable.
9. be maintained in effect until the Work is complete, as set forth in Paragraph 15.06.D of the General Conditions, or until written confirmation of Owner's procurement of property insurance following Substantial Completion, whichever occurs first.
10. include as named insureds the Owner, Contractor, Subcontractors (of every tier), and any other individuals or entities required by this Contract to be insured under such builder's risk policy. For purposes of Paragraphs 6.04, 6.05, and 6.06 of the General Conditions, and this and all other corresponding Supplementary Conditions, the parties required to be insured will be referred to collectively as "insureds."
11. include, in addition to the Contract Price amount, the value of the following equipment and materials to be installed by the Contractor but furnished by the Owner or third parties:
 - a. Items identified in Bill of Material as being supplied by Owner \$2200.

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:

- G. *Builder's Risk and Other Property Insurance Deductibles:* The purchaser of any required builder's risk, installation floater, or other property insurance will be responsible for costs not covered because of the application of a policy deductible.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.03 Labor; Working Hours

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SC-7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C:

1. Regular working hours will be 6:30 AM to 3:30 PM, Monday through Friday. Owner will provide Contractor with a key to access the site 7 days per week during the construction outage. Contractor shall keep the gate closed at all times. Contractor shall limit work that may subject neighboring properties to objectionable noise levels to between the hours of 6:30AM and 9:00PM.

SC-7.03 Add the following new paragraph immediately after Paragraph 7.03.C:

- D. Owner shall be responsible for the cost of any overtime pay or other expense incurred by the Owner, Engineer, Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day.

7.10 Taxes

SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A:

- B. The Owner is not exempt from State of Iowa Sales and Use tax for materials that are incorporated into an electric utility project. Contractor shall include all applicable taxes in the bid amount.

7.16 Submittals

SC-7.16 Add the following new paragraphs immediately after Paragraph 7.16F:

- G. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.
- H. In the event that Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of Contractor.

7.17 Warranty

SC-7.17 Add the following new paragraphs immediately after Paragraph 7.17F

- G. Contractor will be responsible for (1) the implementation and customization of all Software and Custom Software, (2) the integration of the hardware and Software, and (3) guaranteed functionality of the integrated System. This provision will constitute an express warranty on the part of the Contractor pursuant to the Specifications set forth in the Sections 13300, 13305, and 13310.
- H. Functionality shall mean that the System configuration and implementation as specified Sections 13300, 13305 and 13310 shall operate together efficiently in light of industry standards, so long as the System is maintained in accordance with the manufacturer's Specifications.

- I. System integration means the installation and operation of all hardware, Custom Software and Software so that they function in an operational environment and in conjunction with each other. By executing this Contract, the Contractor acknowledges its commitment to successful integration of hardware and Software and warrants successful integration.
- J. The Contractor shall coordinate the resolution of integration problems with any hardware, Custom Software or Software supplied under this Contract, which may arise upon delivery or at any time during the warranty or support periods contained in this Contract or other agreements between the parties. Problems shall be resolved by the Contractor to Owner's satisfaction and in accordance with the Specifications.
- K. Other Warranties:
 - 1. Contractor represents and warrants to Owner that it has full power and authority to grant to Owner the rights described in this Contract without violating any rights of any third party and that there is currently no actual or threatened suit by any such third party based on an alleged violation of such rights by the Contractor. Contractor further represents and warrants that the person executing this Contract for the Contractor has actual authority to bind the Contractor to each and every term, condition and obligation to this Contract, and that all requirements of the Contractor have been fulfilled to provide such actual authority.
 - 2. Contractor warrants to Owner that use of the hardware, Software, Custom Software and services, will not in any way constitute an infringement, misappropriation or other violation of any copyright, trade secret, trademark, patent, invention, proprietary information, nondisclosure or other right of any third party.
 - 3. Contractor warrants to Owner that the integrated System will be free of defects in materials and workmanship under normal use for one (1) year (Warranty Period) from the date of completion and approval by Owner of the Availability Test. During the one (1) year period, Contractor will correct any defects without charge to Owner.
 - 4. Contractor warrants to Owner that any Software or Custom Software provided by the Contractor to Owner under this Contract shall contain no Harmful Code. Contractor shall, at its sole expense, immediately repair or replace any such Harmful Code upon recognition by the Contractor of its existence or receipt of notice from Owner and repair any damage to the System, in whole or in part, from such Harmful Code. Contractor shall indemnify, defend and hold Owner harmless against any loss, liability, cost, expense, or damages arising out of any breach of this warranty.
 - 5. The Contractor warrants functionality and represents that the configuration identified in the Contract has been specifically selected and designed for Owner as being an operationally efficient integration of hardware, Software, Custom Software and services.

I. Warranty Service

During the Warranty Period, Contractor shall provide services as described in Sections 13300, 13305, and 13310 and in this Section to correct Deficiencies in the System and

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maintain the System in accordance with the Specifications, and to transition control over the System to Owner and the Support Services Agreement. Contractor's Warranty service responsibilities shall include but not be limited to the following while assisting the Owner in maintaining the System:

1. Promptly repair or replace the System or any portion thereof, that has Deficiencies;
2. Maintain the System in accordance with the Specifications and terms of this Contract;
3. Respond to questions relating to the System hardware, Software and any Custom Software, including without limitation isolating problems to the System hardware, Software and Custom Software;
4. Develop, on a best efforts basis, of a temporary solution to or an emergency bypass of a Deficiency;
5. Correct and repair errors, problems or Deficiencies with the Hardware, System hardware, Software and Custom Software, to the extent technically feasible; and
6. Contractor shall dispatch trained and qualified Staff to Owner's work site in the event that; previous efforts as described above do not resolve Deficiencies or problems related to Owner's inquiries; the System is non-operational; and Owner requests additional assistance. If the System is non-operational, such Contractor Staff shall remain at the site on a 24-hour, seven-days-a-week basis repairing the System until it operates in accordance with its Specifications.
7. Deficiency Incident Report

Contractor shall furnish Owner with a Deficiency incident report upon completion of each visit by such Staff and upon resolution of each inquiry. Owner will maintain a log at the Owner facility as a place for these reports to reside. The report shall include, as a minimum, the following:

- Date and time notified;
- Date and time of arrival or inquiry response;
- Time spent for resolution of Deficiencies;
- Description of Deficiency;
- and Description of Deficiency resolution.

J. Service After Warranty Period

Following the Warranty Period, Contractor shall provide Support Services under terms of a Support Agreement to be negotiated between Owner and Contractor.

ARTICLE 8—OTHER WORK AT THE SITE

8.02 Coordination

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SC-8.02 Add the following new Paragraph 8.02.C immediately after Paragraph 8.02.B:

- C. Owner intends to contract with others for the performance of other work at or adjacent to the Site.
 - 1. As detailed in Section 13300, Owner will retain the services of contractors to test the protective relays and RTU equipment. Owner will coordinate these activities; however, Contractor shall provide reasonable assistance in scheduling these activities.

ARTICLE 9—OWNER’S RESPONSIBILITIES

9.13 *Owner’s Site Representative*

SC-9.13 Add the following new paragraph immediately after Paragraph 9.12 of the General Conditions:

9.13 *Owner’s Site Representative*

- A. The Owner’s Site Representative will be an employee of the Owner and will be identified prior to the start of construction. The Owner’s Site Representative is not Engineer’s consultant, agent, or employee. The Owner’s Site Representative will:
 - 1. Be the primary day to day contact for the Contractor’s on-site project manager
 - 2. Coordinate the interaction between Contractor’s work and the Owner’s system
 - 3. Review and approve all proposed switching operations on the Owner’s system
 - 4. Review Contractor’s Work and notify Engineer of any concerns regarding the acceptability of the Work.
 - 5. Provide information to Engineer on the progress of the work as needed for Engineer to review Applications for Payment
 - 6. Authorize minor deviations from the Contract Documents or substitution of materials or equipment (including “or-equal” items) that will not change the Contract Price or Contract Times.
- D. The Owner’s Site Representative will not:
 - 1. Authorize any deviation from the Contract Documents.
 - 3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers; nor of Engineer (except as specifically listed above).
 - 4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.
 - 5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
 - 6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

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7. Provide any tools, equipment, or labor that is included in the Contractor's scope of responsibility.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

There are no Supplementary Conditions referring to this Article.

ARTICLE 11—CHANGES TO THE CONTRACT

There are no Supplementary Conditions referring to this Article.

ARTICLE 12—CLAIMS

There are no Supplementary Conditions referring to this Article.

ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

13.01 Cost of the Work

SC-13.01 Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:

When Contractor's compensation (including the value of Extra Work) is determined in whole or in part by the hourly cost of equipment, the hourly rate shall not exceed the greater of the rate shown in the most current edition of the Rental Rate Blue Book for Construction Equipment, and the AED Green Book: Rental Rates & Specifications for Construction Equipment.

SC-13.01 Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

- a. For purposes of this paragraph, "small tools and hand tools" means any tool or equipment whose current price if it were purchased new at retail would be less than \$500.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

There are no Supplementary Conditions referring to this Article.

ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

15.01 Progress Payments

SC-15.01 Amend Paragraph 15.01.D.1 to read as follows:

Thirty days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

15.04 *Partial Use or Occupancy*

SC-15.04 Delete Paragraph 15.04 and insert the following in its place:

15.04 *Partial Use or Occupancy*

A. The Contractor acknowledges the intent of the Owner that all portions of the system are subject to partial use as soon as they are fully commissioned by the Contractor and the construction outage has ended, so long as such partial utilization will not damage or hinder the Contractor's Work.

B. Contractor is fully responsible for protecting the integrity of the portion of the system that is being modified by this Contract, including damage from any cause commencing when on-site work begins on the project and continuing until substantial completion for each section of the project.

C. The Contractor's responsibility for protecting the integrity of that specific portion of the system will cease immediately upon approval by the Owner of the Certificate of Substantial Completion. This does not relieve the Contractor of other obligations related to final completion or warranty of Work. Contractor is responsible for coordinating insurance coverage in accordance with Paragraph 6.04 of the General Conditions.

15.06 *Final Payment*

SC-15.06.A Add the following new Paragraph 15.06.A.2.f:

f. A list of any and all third party claims that the Contractor has received or is otherwise aware of that relate in any manner to the work performed under the Contract (including claims described in Paragraph 5.02.A.2 or 7.13.D of the General Conditions), the status of each claim, and the potential liability related to any claims that have not been settled. Documentation must be provided to verify the resolution of each claim that has been settled.

SC-15.06.E Delete Paragraph 15.06.E and insert the following in its place:

E. The balance of the amount due, less any sum to which Owner is entitled, including but not limited to set-offs allowed under the provisions of this Contract, and less the potential liability associated with any unresolved third party claims as described in Paragraph SC-15.06.A.2.f, will be paid no earlier than 31 days from final acceptance of the improvements by Owner, subject to the conditions and in accordance with the provisions of Chapter 384 and 573 of the Code of Iowa.

F. If an amount is withheld from the final payment to cover the potential liability associated with third party claims as described in Paragraph SC-15.06.A.2.f, this amount will be paid

within 30 days of Contractor providing evidence satisfactory to Owner and Engineer that all of the claim(s) have been resolved.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

There are no Supplementary Conditions referring to this Article.

ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES

17.02 Arbitration

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

17.02 Arbitration

- A. All matters subject to final resolution under this Article will be settled by arbitration administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules (subject to the conditions and limitations of this Paragraph SC-17.02). Any controversy or claim in the amount of \$100,000 or less will be settled in accordance with the American Arbitration Association's supplemental rules for Fixed Time and Cost Construction Arbitration. This agreement to arbitrate will be specifically enforceable under the prevailing law of any court having jurisdiction.
- B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitration administrator, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in Article 17, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event will any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.
- C. The arbitrator(s) must be licensed engineers, contractors, attorneys, or construction managers. Hearings will take place pursuant to the standard procedures of the Construction Arbitration Rules that contemplate in-person hearings. The arbitrators will have no authority to award punitive or other damages not measured by the prevailing party's actual damages, except as may be required by statute or the Contract. Any award in an arbitration initiated under this clause will be limited to monetary damages and include no injunction or direction to any party other than the direction to pay a monetary amount.
- D. The Arbitrators will have the authority to allocate the costs of the arbitration process among the parties, but will only have the authority to allocate attorneys' fees if a specific Law or Regulation or this Contract permits them to do so.
- E. The award of the arbitrators must be accompanied by a reasoned written opinion and a concise breakdown of the award. The written opinion will cite the Contract provisions deemed applicable and relied on in making the award.
- F. The parties agree that failure or refusal of a party to pay its required share of the deposits for arbitrator compensation or administrative charges will constitute a waiver by that party

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to present evidence or cross-examine witness. In such event, the other party shall be required to present evidence and legal argument as the arbitrator(s) may require for the making of an award. Such waiver will not allow for a default judgment against the non-paying party in the absence of evidence presented as provided for above.

- G. No arbitration arising out of or relating to the Contract will include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:
 - 1. the inclusion of such other individual or entity will allow complete relief to be afforded among those who are already parties to the arbitration;
 - 2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration, and which will arise in such proceedings;
 - 3. such other individual or entity is subject to arbitration under a contract with either Owner or Contractor, or consents to being joined in the arbitration; and
 - 4. the consolidation or joinder is in compliance with the arbitration administrator's procedural rules.
- H. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.
- I. Except as may be required by Laws or Regulations, neither party nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior written consent of both parties, with the exception of any disclosure required by Laws and Regulations or the Contract. To the extent any disclosure is allowed pursuant to the exception, the disclosure must be strictly and narrowly limited to maintain confidentiality to the extent possible.

17.03 Attorneys' Fees

SC-17.03 Add the following new paragraph immediately after Paragraph 17.02.

17.03 Attorneys' Fees

- A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

ARTICLE 18—MISCELLANEOUS

There are no Supplementary Conditions referring to this Article.

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EXHIBIT A—SOFTWARE REQUIREMENTS FOR ELECTRONIC DOCUMENT EXCHANGE

Item	Electronic Documents	Transmittal Means	Data Format	Note (1)
a.1	General communications, transmittal covers, meeting notices and responses to general information requests for which there is no specific prescribed form.	Email	Email	
a.2	Meeting agendas, meeting minutes, RFI's and responses to RFI's, and Contract forms.	Email w/ Attachment	PDF	(2)
a.3	Contactors Submittals (Shop Drawings, "or equal" requests, substitution requests, documentation accompanying Sample submittals and other submittals) to Owner and Engineer, and Owner's and Engineer's responses to Contractor's Submittals, Shop Drawings, correspondence, and Applications for Payment.	Email w/ Attachment	PDF	
a.4	Correspondence; milestone and final version Submittals of reports, layouts, Drawings, maps, calculations and spreadsheets, Specifications, Drawings and other Submittals from Contractor to Owner or Engineer and for responses from Engineer and Owner to Contractor regarding Submittals.	Email w/ Attachment or LFE	PDF	
a.5	Correspondence, reports and Specifications to be submitted to Owner for future word processing use and modification.	Email w/ Attachment or LFE	DOC	
a.6	Spreadsheets and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	EXC	
Notes				
(1)	All exchanges and uses of transmitted data are subject to the appropriate provisions of Contract Documents.			
(2)	Transmittal of written notices is governed by Paragraph 18.01 of the General Conditions.			
Key				
Email	Standard Email formats (.htm, .rtf, or .txt). Do not use stationery formatting or other features that impair legibility of content on screen or in printed copies			
LFE	Agreed upon Large File Exchange method (FTP, CD, DVD, hard drive)			
PDF	Portable Document Format Version 2.0			
DOC	Microsoft® Word .docx format Version 2021			
EXC	Microsoft® Excel .xls or .xml format Version 2021			

SECTION 13300 TURBINE 8 CONTROLS - GENERAL PROVISIONS

PART 1 - GENERAL

1.0 GENERAL INFORMATION

- A. Indianola Municipal Utilities (IMU or Owner) serves approximately 7200 customers in and around the City of Indianola, Iowa. System peak load is approximately 35MW. Owner is governed by a Board of Trustees consisting of five members appointed by the Mayor of Indianola.
- B. Owner's electric system includes 69kV transmission and 13.2kV and 4.16kV distribution. IMU owns and operates four substations, one engine-generator, and two combustion turbine generators (Turbines 7 and 8 and Generator 9, all located adjacent to the East Iowa Substation).
- C. Turbine 8 is a Alsthom/GE Frame 5 unit (Model MS-5001P, Type PG5341). The unit is equipped for dual fuel operation but currently operates on fuel oil only. No natural gas fuel source is currently available. The turbine was originally manufactured in 1977 and sold to the Kingdom of Saudi Arabia. It was rebuilt by General Electric and sold to Indianola in 2000. The turbine nameplate rating is 19.88 MW at 85 Deg. F and 955 ft ASL, with an exhaust temperature of 913 deg F (base). The turbine currently carries serial number 00T143. The fuel oil nameplate is included in Appendix D. Additional data and performance curves are included in Appendix F.
- D. The generator is rated at 27.471 MVA continuous. The generator nameplate is included in Appendix D.
- E. The turbine/generator control system is the SpeedTronic Mark V that was installed when the unit was rebuilt by General Electric prior to sale to Indianola. The governor control, excitation system, and protective relays were also replaced by General Electric prior to sale to Indianola. All of the existing protective relaying and controls (except for the field ground relay) are located on the turbine skid in the Control Cab.
- F. The generator is equipped with a brushless exciter located between the generator compartment and generator auxiliary (GAC) compartment. The excitation power for the brushless exciter is supplied by a GE DS200AXC exciter with EX2000BR voltage regulator. Power supply for the DS200AXC is supplied by a small dry type PPT located in the exciter cabinet in the turbine control cab. The PPT is supplied by a circuit from the turbine 480V MCC. A 125VDC supply is also provided by the turbine MCC. See drawings in the Appendices.
- G. The existing protective relays are digital and electromechanical and consist of individual and multifunction panel mounted relays as shown in the drawings in the Appendices.
- H. The existing metering consists of digital meters as shown in the drawings in the Appendices.

- I. Remote metering and control is currently accomplished through hard wired digital and analog connections to a SCADA RTU that is located in a control building adjacent to the turbine.
- J. The generator is connected by a approximately 700 ft long underground cable to a 69/13.8 kV transformer (CK6T3) located in the East Iowa Substation located south of the turbine site. CK6T3 is dedicated to Turbine 8. The generator circuit breaker is located in a GE PowerVac switchgear located in the GAC compartment on the turbine skid. CK6T3 is normally energized continuously. The turbine is normally operated in parallel with the utility source as a base loaded unit with power factor control, but may also be operated as an isolated unit to directly serve distribution system load in isochronous mode with voltage control or in droop mode while sharing load with Turbine 7.
- K. The turbine is started using a Detroit Diesel engine that operates on fuel oil. The diesel engine is started using a DC motor supplied by the turbine DC MCC. The turbine is capable of starting under blackstart conditions.

1.1 Contract Times

- A. The times for Substantial Completion and readiness for final payment are identified in this Article and will be an integral part of the Agreement. It will be necessary for the apparent Successful Bidder to satisfy Owner that it will be able to achieve Substantial Completion by the specified date.
- B. All time limits for Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.
- C. The outage to install the controls shall begin no earlier than October 1, 2023 and not later than February 15, 2024. The outage shall last no longer than 35 calendar days at which point the unit shall be fully commissioned and ready for stack testing, if necessary, or normal service. The Work will be substantially completed no later than 35 calendar days after the start of the outage as provided in Paragraph 15.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions no later than 30 calendar days after substantial completion. Owner prefers, but does not require, that the construction outage take place in 2023 due to the likelihood of warmer temperatures during commissioning.
- D. Note that Owner may restrict operation of the turbine if temperatures are below or are forecasted to fall below 15 degrees F within the next 8 hours. Contractor's sole remedy shall be a day for day contract extension.
- E. Outage schedule must be confirmed with Owner a minimum of 10 days in advance.
- F. Owner has ordered two Dynalco SST7004D speed switches that will be provided to Contractor for incorporation into the project. They are currently expected to ship on February 12, 2024.

1.2 Liquidated Damages

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 1.1.B above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 1.1.C above, plus any extensions thereof allowed in accordance with Article 11 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$1200 for each day that expires after May 30, 2024 (without adjustment unless Owner furnished speed switches arrive after February 28, 2024) until the Work is substantially complete.
- B. The parties anticipate and acknowledge that delays may be caused by or arise from any number of events during the course of the Contract. Such delays or events and their potential impacts on performance by the Contractor are specifically contemplated and acknowledged by the parties in entering into this Contract, and shall not extend the time specified in Paragraph 1.1.C above for Substantial Completion, except and unless the time for Substantial Completion is changed in accordance with Article 11 of the General Conditions

1.3 Incentive Payments

- A. Incentive payments will not be made for early completion of the Work.

1.4 SCOPE OF WORK

- A. A single Control System Vendor (Contractor) shall furnish all materials, equipment, labor and services, except for those services and materials specifically noted, that are required to achieve a fully integrated and operational replacement control system per the project requirements. The Scope of Work includes, but is not limited to, the following:
 - 1. Complete design including selection of all equipment and materials; preparation of mechanical, installation, schematic, and wiring diagrams (for both removal and new installation); complete bills of material, development of operator screens, and construction specifications.
 - 2. Provide all hardware and software necessary to complete the installation as designed.
 - 3. Perform factory and field testing, startup and commissioning, and training of IMU staff as defined herein.
 - 4. Provide full and complete documentation covering all operations and maintenance functions.
 - 5. Provide project management, quality assurance and other labor functions associated with the design and delivering of the control system defined herein.
 - 6. Furnish a one year system warranty as defined herein. Warranty period will begin when final payment for the control system is issued to Contractor.

- B. The specific requirements for the replacement control system are described in Section 13310.
- C. Project Requirements is used throughout the documents to mean the furnishing of all labor, materials, and specialty services necessary for the Contractor to install a complete and operable control system. Requirements are specified herein, in other Specification Sections, detailed in the Request for Proposal (RFP), and/or defined in the Technical Memoranda associated with this project.
- D. The Contractor shall arrange their project schedule to accommodate the requirements of the Owner. The exact timing of the project will be determined jointly by the Owner and Contractor. The Contractor shall include all necessary costs to accommodate the following minimum time slots in their overall project schedule. All time allotments shall exclude any legal holidays, or days lost due to delays caused by the Contractor.
 - 1. Meeting attendance: Meetings shall be arranged by the Contractor to cover initial project kick-off, review of design documents, construction coordination, and final inspections.
 - 2. Submittal reviews: The Contractor will allot a minimum of two weeks review time by the Owner for each submittal or resubmittal. The review time will start upon receipt of the submittal by the Owner.
 - 3. Factory Testing: Contractor will provide a minimum of three weeks notice prior to any factory testing activity that requires or anticipates Owner participation.
- E. All equipment shall satisfy applicable Federal, State and local codes.
- F. The Contractor shall use the tagging scheme and device numbering associated with the existing equipment, except as modified during the design review meetings. The Contractor shall not deviate from or modify the agreed upon numbering scheme without the Owner's approval.

1.5 RELATED WORK

- A. Testing requirements are specified in Section 13305.
- B. Specific hardware and software requirements are included in Section 13310

1.6 SUBMITTALS

- A. General submittal requirements include:
 - 1. Shop drawings shall demonstrate that the equipment and services to be furnished comply with the provisions of these specifications and shall provide a complete record of the equipment as manufactured and delivered.

2. Submittals shall be in electronic Adobe PDF format with an index and sectional dividers, with all drawings at B size (11 inch by 17 inch) or D size (22 inch by 34 inch). Hardcopy submittals will not be allowed unless specifically agreed to by the Owner. All drawings shall use fonts of sufficient size to be easily legible in hardcopy form when the drawing is printed on 11x17 paper.
3. The submittal drawing title blocks shall include, at minimum, the Contractor's registered business name and address, project name, drawing name and number, revision level, and personnel responsible for the content of the drawing. All drawing shall be numbered in a logical pattern with sequential numbers within each group or category. The drawing numbering scheme must be part of the initial Project Plan and Schedule submittal.
4. Exceptions to the Specifications or Drawings shall be clearly defined by the Contractor in a separate section of each submittal package. The submittal shall contain the reason for exception, the exact nature of the exception and the proposed substitution so that the Owner may make a proper evaluation. The acceptability of any device or methodology submitted as an "or equal" or "exception" to the specifications shall be at the sole discretion of the Owner.
5. The Contractor shall submit all submittals in accordance with this Section. Incomplete or partial submittals not complying with the submittal arrangements outlined in this Section will not be reviewed.
6. Separate submittals shall be made as follows:
 - a. Project Plan and Schedule Submittal
 - b. Hardware BOM, Plan, and Panel Drawings
 - c. Exciter one line and control schematic drawings
 - d. Control schematic drawings and PLC I/O list
 - e. Wiring diagrams with complete panel and component layouts and complete BOM
 - f. Operator display screens
 - g. Testing Plans
 - 1) Preliminary Test Procedure Submittal
 - 2) Final Test Procedure Submittal
 - 3) Test Documentation Submittal.
 - h. Final System Documentation
 - 1) Final As-Built versions of all previously submitted drawings
 - 2) Operations and Maintenance Manual Submittal

B. Project Plan and Schedule

1. The Project Plan and Schedule shall be submitted and favorably reviewed before any further submittals will be accepted. The Project Plan shall, at minimum, include the following:
 - a. Overview of the proposed control system in clear text format describing the Contractor understanding of the project work, proposed system architecture (hardware and software), general description of interfaces to other systems, schedule, startup, and coordination.
 - b. A clear description of the redundant control functions that are being proposed, including a description of how the redundant hardware will be integrated with the automatic control equipment.
 - c. Approach to work in clear text format describing how the Contractor intends to execute the work, including investigation and confirmation of all existing conditions, design and equipment fabrication, factory testing, field installation, and commissioning.
 - d. Preliminary software and hardware submittal information solely to determine compliance with the project requirements prior to the Contractor development of control programs and full system layouts. Favorable review of software and hardware systems as part of this Project Plan stage shall not relieve the Contractor of meeting all the functional and performance requirements of the system as defined in the project requirements.
 - e. Project personnel and organization including the Contractor project manager and lead project engineers and technicians. Include resumes and project experience of key individuals and specify in writing their commitment to this project. Project experience of on-site personnel must be included.
 - f. Drawing numbering plan, including a general description of the groups or categories of drawings to be prepared and the information to be presented. Sample drawings from a similar project should be included to illustrate the proposed approach and presentation.
 - g. Preliminary coordination meeting schedule and agendas.
 - h. Preliminary testing plan.
 - i. Preliminary training plan.

C. Hardware BOM, Plan, and Panel Drawings

1. Shop drawings shall be submitted to identify all major hardware components, including but not limited to all PLC components and accessories, HMI, protective relays, SCADA equipment, exciter system, control switches and meters.
2. Preliminary plan drawings showing the proposed location of all major equipment, including but not limited to PLC hardware, control panels, and exciter components.

3. Preliminary control panel layout drawings showing control switches, meters, HMI panel, protective relays, and SCADA equipment.
- D. Exciter one line and control schematic drawings
1. Shop drawings shall be submitted to fully describe the proposed exciter and voltage regulator installation, including placement and installation of all components.
 2. Complete exciter control schematics including the interface to control switches and displays, and to the control PLC.
 3. Complete power schematic and wiring diagram.
 4. Outline drawing and installation requirements for the new PPT.
- E. Control schematic drawings and PLC I/O list
1. Complete AC and DC schematic drawings showing all control and power supply wiring with interface to all existing turbine components and equipment, generator circuit breaker trip and close circuits, protective relaying equipment, and exciter equipment.
 2. Where the proposed control circuits interface with existing turbine equipment and circuits, the schematic drawings must show the complete configuration of the existing equipment using the existing GE designations for components, contacts, devices, wiring, connectors, and terminals.
 3. Complete I/O list for the PLC
 - a. The GE designation for each turbine device being connected to.
 - b. A plain text description of each I/O function
 - c. A description of the interface (digital input, digital output, analog, etc.)
 - d. Voltage level of the interface (dry contact, voltage sensing level, analog voltage or current range, excitation requirements, etc).
 - e. State definition for digital points.
 - f. Scaling factor for analog points.
- F. Wiring diagrams with complete panel and component layouts and complete BOM
1. Complete wiring diagrams showing all equipment, components, and terminals, including all new panels and equipment and all connections to existing GE equipment and terminals. Existing GE drawings can be referenced where appropriate, but any drawings so referenced must be modified to show the final configuration and included in the submittal and final drawing sets.
 2. Complete equipment layout and installation drawings, including plan, elevation, and panel layout drawings.
 3. Complete Bill of Material for the entire project.

G. Operator display screens

1. Sample of each proposed operator screen, with complete plain text description of the proposed purpose, function, displayed data, and control actions.
2. Plain text overall description of the organization of the screens and the operator interactions.

H. Testing Plan

1. Test Procedure Submittals: Submit the procedures proposed to be followed for each test. Procedures shall include test descriptions, forms, and checklists to be used to control and document the required tests. Include sign-off forms for each testing phase with sign-off areas for the Contractor and Owner.
2. Test Documentation: Upon completion of each required test, document the test by submitting a copy of the signed off test procedures. Testing shall not be considered complete until the signed-off test procedures have been submitted and favorably reviewed by Owner.
3. Refer to Section 13305 for specific testing requirements.

I. Final System Documentation

1. Final as-built copies of all drawings and installation documentation shall be prepared and presented to the Owner.
 - a. All documentation shall be supplied in both native and PDF format.
 - b. Three full sets of all drawings shall be provided in full size bound sets, in addition to the copies included in the maintenance manuals.
 - c. All drawings shall be transmitted in the latest version of AutoCad. Text and tabular data shall be in the latest version of Microsoft Office.
2. All wiring connections and schematic drawings shall be confirmed during final check-out of the controls. This shall be an independent review after all final wiring changes and check-outs have been completed.
3. Contractor shall annotate provide an annotated copy of Section 00005 - Appendix List clearly noting which drawings are now obsolete, superseded by a new drawing, modified to show the new configuration, or still applicable without modification.
4. The operations and maintenance manuals shall be provided in electronic and hardcopy form.
 - a. Electronic form shall use Adobe PDF searchable format. Supplied files shall be indexed in a Table of Contents and shall permit key-word searches. Each section shall have a uniquely identified binder tab divider.
 - b. Two (2) sets of printed hardcopies of each manual shall be provided. Manuals shall be bound in Heavy Duty ring binders, maximum 3 inch. Manuals shall

each have a Table of Contents identical to the electronic files. Each section shall have a uniquely identified binder tab divider.

5. The maintenance manuals shall, at a minimum, include the following:
 - a. A Table of Contents for the entire manual with the specific contents of each volume clearly listed.
 - b. Manufacturer's literature and complete documentation of all PLC, protective relays, meters, control switches, and other components utilized in the system.
 - c. All mechanical, layout, schematic, and wiring diagrams. Drawings shall depict all components and electrical connections.
 - d. Complete software documentation.
 - e. Special maintenance requirements particular to this system shall be clearly defined, along with special calibration and test procedures.
 - f. Original software flash drives, portable hard drives, CD-ROMs or DVDs of all software provided under this Contract. Submit license agreement information including serial numbers, license agreements, User Registration Numbers, etc. All software provided under this Contract shall be licensed to the Owner.
6. The Operator's Manuals for the system operators shall be separately bound and shall contain all information necessary for the operation of the system. The manuals shall be written in non-technical terms and shall be organized for quick access to each detailed description of the operator's procedure. Manuals shall contain, but not be limited to, the following information:
 - a. A simple overview of the entire system indicating the function and purpose of each piece of equipment.
 - b. A detailed description of the operation of the HMIs including all appropriate displays.
 - c. Step-by-step procedures for starting up and shutting down the turbine.
 - d. Operational description for operating HMI computer equipment and peripherals including printers, removable bulk storage devices, etc. Description shall include procedures for typical maintenance and troubleshooting tasks.
 - e. A listing of all data base point names with their respective English language point descriptions and HMI graphic screen cross reference where the points can be found.
 - f. A complete glossary of terms.
 - g. Complete, step-by-step procedures for performing complete system or selected file backup and restoration.

7. The Contractor's final documentation shall be new documentation written specifically for this project, but may include standard and modified standard documentation.
8. The manuals shall contain all illustrations, detailed drawings, wiring diagrams and instructions necessary for installing, operating and maintaining the equipment. The illustrated parts shall be numbered for identification. All information shall apply specifically to the equipment furnished and shall only include instructions that are applicable.
9. If the Contractor transmits any documentation or other technical information which is considered proprietary, such information shall be designated. Documentation or technical information which is designated as being proprietary will be used only for the design, construction, operation, or maintenance of the system and, to the extent permitted by law, will not be published or otherwise disclosed.
10. Retrofit Documentation: The Contractor shall investigate, diagnose, repair, update and distribute all pertaining documentation of deficiencies that become evident during the warranty period. All such documentation shall be submitted to the Owner within 30 days of resolving the problem or issue.

1.7 COORDINATION MEETINGS

- A. The Contractor shall schedule a kickoff meeting at a time and date agreed upon by Owner and Contractor, a second meeting during the factory test, project review and construction coordination, and final inspection meetings as described herein.
 1. A project kickoff meeting shall be held within one week after submitting the Project Plan and Schedule. The kickoff meeting will cover topics related to project management and system development, including discussion of the Contractor's Project Plan and Schedule Submittal; summarize the Contractor's understanding of the project; discuss any proposed substitutions or alternatives; schedule testing and delivery deadline dates; provide a forum to coordinate hardware and software related issues; and request any additional information required from the Owner. The Contractor shall prepare and distribute an agenda for this meeting a minimum of two days before the scheduled meeting date. The meeting will be held at the Owner's facilities and will last no longer than one (1) business day.
 2. A meeting shall be held following the factory test to discuss project status, schedule for on-site work, factory test results, Owner activities to support Project Schedule, and other topics as necessary. The Contractor shall prepare and distribute an agenda for this meeting a minimum of two days before the scheduled meeting date.
 3. Regular project review and coordination meetings will be held during the period of construction and testing. These will generally be held at the project site.
 4. A final inspection meeting will be held prior to issuing a Certificate of Substantial Completion.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Contractor will be responsible for shipping or delivering all components to the turbine site. Contractor shall coordinate delivery and unloading with Owner.
- B. Contractor is responsible for any shipping damage.
- C. Outdoor storage space is available near the turbine site and limited indoor storage is available in the IMU warehouse adjacent to the turbine site and in the control and blackstart buildings located at the turbine site. Contractor shall keep storage areas clean, organized, and free of rubbish.

1.9 NOMENCLATURE AND IDENTIFICATION

A. Panel Nameplates

- 1. All panels shall be supplied with suitable nameplates that identify the panel and individual devices as required.
- 2. Nameplates shall be a 3/32-inch thick, black and white, laminated Bakelite or Lamicaid with engraved inscriptions. The letters shall be white against a black background. Edges of the nameplates shall be beveled and smooth. Nameplates with chipped or rough edges will not be acceptable.
- 3. Orient nameplates to facilitate reading the device identifier from a cursory inspection. Do not mount nameplates behind or under equipment.

1.10 WARRANTY AND MAINTENANCE

- A. Contractor shall provide a one year warranty of all hardware and software products furnished on this project. The cost of warranty and maintenance will be included in the contract price.
- B. Contractor will provide software updates throughout the 1-year warranty period. Contractor shall provide latest official released version for all software provided under this Contract. Owner shall have the latest software releases at the end of the one-year warranty period.
- C. The Contractor shall provide the capability of delivering extended warranty and maintenance support, as well as after-hours support. The Contractor shall identify the length of the available warranty, availability and cost of extended support, and type of customer support provided (dedicated department or handled by programming staff or distributor, telephone hours, Email & Web support, FTP download area, Knowledge Base, bulletin board service, field service, etc.) with the Proposal.
- D. Twenty-four (24) hour, seven (7) day a week support must be available from the Contractor..
- E. Software Improvements and "Bug" Fixes

1. The Contractor shall provide software patch management in accordance with NERC CIP standards. All Contractor software patches will be tested against all software applications provided in this proposal, on a comparable hardware platform, and the results of those test made available to the Owner within 30 days of patch release. The Contractor shall provide a mechanism to install software improvements and bug fixes without the need for uninstalling or reinstalling the software application – only the changed components need to be replaced or upgraded. The Contractor shall also provide an easy mechanism for upgrading and installing software improvements and for allowing a user to quickly ascertain what improvements have been installed

1.11 PROJECT/SITE REQUIREMENTS

A. Temperature

1. All equipment shall be suitable for operation in a 0 to 104 deg F ambient.
2. Storage temperatures may range from 0 to 120 deg F ambient.

B. Relative Humidity

1. All equipment shall be suitable for 0 to 100 percent relative, condensing humidity. Cabinet heaters shall be provided as needed for humidity control.

PART 2 - EXECUTION

3.0 GENERAL INSTALLATION

- A. Equipment shall be installed in accordance with the manufacturer's instructions, the project design drawings, and generally accepted good practices.

3.1 TESTING

- A. Refer to Section 13305.

3.2 TRAINING

- A. The cost of training programs to be conducted with Owner employees shall be included in the Contract price. The training and instruction shall be directly related to the system being supplied. The Contractor is responsible for training associated with all hardware, and software. Contractor shall recommend class topics and durations.
- B. The following concepts must be addressed by training classes. Contractor shall cover any other topics that pertain to successful continued operation and maintenance of the System by Owner.
 1. HMI software configuration including displays, reports, logging, alarms, and trending.

2. HMI hardware and networks including operating system administration requirements, new users, security levels, virus protection, backups, archives, and routine maintenance.
- C. The Contractor shall provide detailed manuals to supplement the training courses. The manuals shall include specific details of equipment supplied and operations specific to the project.
- D. The Contractor shall make use of teaching aids, manuals, slide/video presentations, etc. After the training services, such materials shall be delivered to Owner.
- E. The training program shall represent a comprehensive program covering all aspects of the operation and maintenance of the system.
- F. All training schedules shall be coordinated with, and at the convenience of the Owner.
- G. All training will take place on Owner's premises. Contractor should plan for five to seven participants.
- H. Classes shall stress operations and maintenance, including routine operations, use of the HMI display screens, troubleshooting, repair, calibration, and other technical aspects of the system.
- I. Training classes may be filmed or otherwise recorded by Owner for future employee training.
- J. The training classes shall be scheduled a minimum of 2 weeks in advance of when they are to be given. Proposed training material, including a detailed outline of each lesson, shall be submitted to the Owner at least 30 days in advance of when the lesson is to be given. The Owner shall review the submitted data for suitability and provide comments that shall be incorporated into the course.

END OF SECTION

SECTION 13305 TURBINE 8 CONTROLS – TESTING

1.0 TESTING

A. General

1. It is the responsibility of the Contractor to provide confirmation of a fully operational system by satisfactorily completing test procedures as specified in this Section. The Contractor shall provide factory testing prior to shipment of the equipment and also testing of the equipment after it is installed.
2. All tests shall be conducted in accordance with prior Owner-approved procedures, forms and checklists, as submitted by the Contractor.
3. Copies of the signed test procedures, forms and checklists will constitute the required test documentation. The test result forms shall be submitted to the Owner for approval at the completion of each test.
4. Provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment and data, the Contractor will provide suitable means of simulation subject to Owner's approval. The simulation techniques and procedures must be included in the test procedures.
5. The Contractor shall coordinate all required testing with the Owner.
6. The Contractor shall furnish the services of Field Service Engineers, all special calibration and test equipment, and all labor to perform the field tests.
7. The Owner reserves the right to test or retest all specified functions, whether or not explicitly stated on the Test Procedures, as required to determine compliance with the functional requirements of the overall system. Such testing required to demonstrate compliance with the specified requirements shall be performed at no additional cost to the Owner. The Owner's decision shall be final regarding the acceptability and completeness of all testing.
8. No equipment shall be shipped until the Owner has received and approved all test results and agrees the system is ready for shipment.

B. Factory Testing

1. The entire system must be tested prior to shipment (except for field devices), with the complete system interconnected and tested to ensure the system will operate as specified. Field devices may be simulated in software or hardware.
2. Tests to be performed shall include but not be limited to the following. Each of these tests shall be specifically addressed in the Test Procedure submittal.
 - a. Test and verification of all I/O points and functions.

- b. Demonstrate functionality of all control sequences. Simulate operating conditions to verify the performance of the monitoring and control functions.
 - c. Demonstrate all graphical user interfaces (hardware and software, monitoring and control functions).
 - d. Demonstrate system recovery from failure scenarios including power loss, cold boot, warm boot, and communication loss.
 - e. Demonstrate emergency trip functions, including failure of the PLC.
3. Owner will witness the final factory acceptance tests. Owner will be responsible for all expenses incurred by the Owner to witness the tests.
 4. The Contractor shall notify the Owner in writing that the system is ready for the Factory Acceptance Test and allow the Owner to schedule a test date

C. Field Testing

1. All equipment, connections, functions, and field devices must be thoroughly tested and confirmed prior to initial start-up of the turbine. Special attention must be given to confirmation that all protective circuits and interlocks are properly wired and functional.
2. Protective relays (including circuit breaker trip and close circuits), panel meters, and SCADA components will be tested by the Owner after installation is completed by Contractor.
3. Contractor will be responsible for the initial start-up of the turbine in cooperation with IMU operating personnel. IMU personnel will be responsible for all general turbine equipment and functions, except for those components and systems that are modified or replaced by Contractor.
4. Contractor shall present a commissioning plan that completes all commissioning activities in 15 or fewer starts, excluding starts required for emissions compliance (stack) testing. The diesel starting engine may not be started more frequently than once per hour. No fewer than 30 minutes must elapse between engine shutdown and engine start commands.
5. Initial testing must demonstrate and confirm proper response to all protective circuit operations, critical alarms and other conditions that initiate an emergency stop.
6. Initial testing must demonstrate and confirm the proper operation of all redundant safety systems, including failure of the PLC.
7. Contractor will be required to demonstrate satisfactory operation of all control functions and sequences.
8. Contractor will be required to demonstrate satisfactory operation of all data logging and alarm functions, including simulation of all alarm conditions during normal operation of the turbine.

9. Tests shall be implemented using Owner-approved forms and checklists. These form shall include detailed procedures and performance criteria, and spaces for sign off by Owner and Contractor
10. Certification of Installation: Following successful completion of the field test, the Contractor shall provide a Certification of Installation to the Owner. The Certification shall be on Contractor corporate letterhead and signed by an officer of the firm. The Certification shall state that the control system has been completed in conformance with project requirements.

D. Stack Testing

1. If required, Contractor shall retain a third-party testing contractor with relevant experience to confirm correct operation of the NOx control system and compliance with the permit from the Iowa Department of Natural Resources by measuring emissions at the turbine stack. Testing contractor must submit a testing plan to the Iowa Department of Natural Resources prior to beginning testing. Pollutants tested shall include NOx and particulate matter. (See Bid Alternate 3.)

END OF SECTION

SECTION 13310 TURBINE 8 CONTROLS – SPECIFIC PROVISIONS

PART 1 - GENERAL

1.0 SCOPE OF WORK

- A. Equipment, materials, and services shall be supplied in accordance with the general requirements defined in Section 13300.
- B. The Control Package shall be assembled and supported by a single entity regularly engaged in the design, supply, configuration, customization, installation, and maintenance of combustion turbine control systems for the electric power industry.
- C. The Contractor shall furnish a complete installed system as described by these specifications.
- D. The Contractor shall furnish startup, commissioning, and training services.
- E. Omission of a specific item from these specifications that is obviously necessary for the proper functioning of the system shall not relieve the Contractor of the responsibility of furnishing and installing the item at no additional cost to the Owner.
- F. All equipment and installations shall satisfy applicable Federal, State, and local codes.
- G. Each server, workstation, and programmable device furnished under this agreement shall be backed up after completion of the final acceptance tests. These backups shall be turned over to the Owner.
- H. All software packages provided shall be licensed under the Owner's name and address. The Contractor shall coordinate licensing with the Owner.
- I. Unless specifically noted otherwise, all new required control and communications cables shall be provided and installed by Contractor in Owner supplied conduits. Contractor shall communicate conduit requirements to Owner by June 1, 2023 so that they can be installed between June 15, 2023 and September 15, 2023.

1.2 SPARE PARTS

- A. The Contractor shall provide a recommendation to the Owner of spare parts to be kept available for system maintenance and repairs, prior to scheduling of the final acceptance test.
- B. The acquisition of spare parts may be added to the Contract by Change Order.
- C. All spare parts provided by the Contractor shall be packaged so as to prevent damage during long term storage. All packages shall be legibly and properly identified with indelible markings on the exterior as to contents.

- D. Complete ordering information including manufacturer, part number, part name, and equipment for which the part is to be used shall be provided in the project documentation.

PART 2 - PRODUCTS

2.0 GENERAL

- A. Materials and equipment used shall be UL listed or recognized wherever such equipment and materials are available.
- B. The System shall be designed and constructed to withstand the demands of real time turbine operation and control.
- C. All equipment furnished shall be designed and constructed so that in the event of power interruption the equipment will execute an orderly shutdown with no loss of memory and will resume normal operation without manually resetting when power is restored.
- D. The new control system shall perform the same or similar monitoring and control functions as the current system and in accordance with these specifications. Monitoring and control functions are generally defined in the project requirements; however, the Contractor is required to fully investigate the existing system and confirm with the Owner all necessary requirements.
- E. All software licenses required to achieve the functionality described in the Specifications shall be provided.

2.1 COMPUTER SYSTEM HARDWARE

- A. The control computer (PLC) shall be standard Allen Bradley Rockwell Automation ControlLogix processor with associated I/O and accessories.
- B. All control computer equipment shall be powered from the turbine 125 Volt battery.
- C. The control computer is to be installed in the turbine control cab utilizing the existing relay and control cabinets. Detailed plans must be developed by the Contractor and included in the drawing submittals to identify those terminal blocks, relays, fuses, and other components that will be removed and those that will be re-used. Emphasis will be placed on creating a 'clean' system that will be convenient to trouble shoot and maintain.
- D. The Contractor is fully responsible for selecting the required hardware and software for implementing the control computer, following the manufacturer's recommendations for equipment selection. No systems or components shall be used that have been identified by the manufacturer as being or are projected to become obsolete.
- E. A fully redundant system is not required, but specific critical functions must be duplicated in redundant hardware that is independent of the main control computer, including at a minimum the following functions.

- Failure of primary control computer
- Excessive exhaust temperature
- Overspeed
- Unit trip for critical faults
- Fuel shut-off
- Emergency Stop
- Fire alarm shut-down
- Alarm if water injection system is out of compliance with permit requirements

2.2 COMPUTER SYSTEM SOFTWARE

- A. The control software must fully replicate all existing control, sequencing, monitoring, alarm, and protective functions currently embedded in the SpeedTronics Mark V control. The specifications in this section should be considered as general guidelines, but the Contractor is required to thoroughly analyze the existing system and carefully consider all aspects of the turbine and the control system in designing the new system. Each specific item listed below must be considered and the recommendation (either to implement as described or some alternate arrangement) explained with the initial control description submittal.
- B. All program must be created using Allen Bradley Rockwell Automation development software.

2.3 HMI REQUIREMENTS

- A. Two operator stations shall be provided. Each station must provide full monitoring and control capability through identical display and control screens.
 1. One operator station shall be located in the turbine control cab, utilizing an Allen Bradley Rockwell PanelView display mounted in the front panel of either the relay or control cabinet, and powered from the turbine 125 volt battery.
 2. One operator station shall be located in the SCADA room in the IMU office building located to the south of the turbine site. The following are minimum requirements for this station but the Contractor shall provide equipment that is best suited for the application. This will be connected to the turbine controls using Owner's ethernet network.
 - a. Processor: 11th or 12th generation Intel® Core™ i7 or i9 processor with sufficient power to support all client software
 - b. Memory: Sufficient quantity to support Operating System and client software (16 GB minimum)
 - c. Operating System: To meet Contractor's requirements
 - d. Hard Drive: 500GB minimum
 - e. Video: Must support 2x DisplayPort monitors with a minimum output resolution of 1920x1080 each
 - f. Internal Optical Drive: DVD+/-RW, SATA, Internal (only required if Contractor provides project documentation, deliverables, or backups on DVDs)

- g. Power Supply: Sufficient power to support system plus one additional hard drive
- h. Monitor: Two, minimum 24", each with minimum 1920x1080 resolution
- i. Keyboard
- j. Mouse
- k. Form Factor: Mini tower, micro tower, mini desktop, or micro desktop
- l. System Documentation: Electronic System Documentation
- m. Hardware Support Services: 3 Year On-site Service
- n. Station operator console PC will be supplied from an existing 120 VAC receptacle, with existing UPS backup.
- o. Provide one fiber SFP module for Owner's existing network switch in the generator control building.

B. Logging and Alarm Functions

1. The System shall collect, store, and display data on electrical and mechanical operating parameters, control operations, and alarm conditions. All data shall be readily accessible to enhance system functionality and must include both tabular and graphical presentation. Details of the functions, capability, and displays will be developed during the initial project reviews. Sufficient memory and capability must be provided to log all functions at one minute intervals for a 24 hour period.
2. The System will support multiple levels of Alarm priorities.
3. The System will log all Setpoint changes and Control operations, including the operator interface from which the operation originated.
4. The System must log and make available in a separate display screen and report all status changes for all turbine sensors and auxiliary contacts monitored by the controls.
5. Logged data shall include user definable point list and logging interval (with option to log on status change or data value).
6. The System shall utilize a Select Before Operate (SBO) procedure that is fully compliant with IEEE Standard C37.1-2007, Annex D.1 "Select before operate". Any failure to properly execute a command shall set an alarm point.
7. The System shall be capable of detecting alarm conditions based on the states and values of the various sensed variables. Alarms must be capable of being filtered based upon priority and other user-selectable criteria. When a new alarm is detected, all operator control stations must immediately see the new alarm. If the alarm is acknowledged on one station then all station displays must show that it was acknowledged.
8. The System shall provide counters to document and display the number, type, and priority of alarms. The System shall also provide Alarm Occurrence Counters to determine transitions in alarms between Acknowledgements.
9. A time stamp shall be included with every alarm or message. Time stamping shall be supported from the local computer time or process hardware's clock.

10. Alarm Summary Display

- a. The System must include an alarm summary display showing a list of the active alarms in the System. As new alarms are detected, entries are made to the list. As the alarm conditions clear, the entries are removed from the list.
- b. Alarms can be acknowledged from the alarm summary display either individually (by clicking on an alarm acknowledgment field) or for all alarms in the queue.
- c. The alarm summary display must provide sorting and filtering capabilities. The user shall be able to filter on acknowledge status, node name, alarm area(s), alarm status and alarm priority. The user shall be able to sort on time, point, alarm area, alarm priority and alarm status.

C. DOCUMENTATION

1. The System shall provide complete user documentation for use of the operator stations, including examples of how to operate the various screens and functions within the System. Refer to Section 13300 for addition information and requirements.

D. DATA INTEGRITY

1. The System shall provide pre-emptive multitasking to ensure that common operating system actions do not interfere with I/O communications, processing of data, alarming, and the integrity of the real-time and historical data. These common operating system actions include moving a window with a mouse, opening a file, accessing the hard disk, or printing a graphic display.

E. GRAPHIC CAPABILITIES

1. Contractor shall create display screens as required to fully describe and control the turbine operation, including all devices monitored and controlled by the system. Screens shall include, but not be limited to, the following:
 - a. Unit start and stop sequences
 - b. Generator sequences.
 - c. Start permissives
 - d. Normal operation.
 - e. Fuel flow and speed governor functions
 - f. Exciter data and operation
 - g. Exhaust temperature
 - h. Vibration sensors
 - i. Turbine overview showing critical sensor and operational data
 - j. Ratchet status, operation, pending operations, and historical data
 - k. System 24 hour log including selectable monitor points.
 - l. Summary page showing alarm status in annunciator panel arrangement, MW, MVar, generator volts, bus volts, and turbine control parameters.
 - m. Protective relay status

- n. Turbine sensor status showing all sensors and auxiliary contacts monitored by the control
- o. Water injection system operation including fuel consumption rate, water injection rate and water/fuel ratios.

2. Tile & Cascade

- a. Graphic screens must support tiling and cascading. Tiling shall have horizontal and vertical support and no overlapping when the graphic screens are viewed in this manner. The only limit on the number of graphic screens opened at one time is by the amount of RAM in the PC. Cascading is defined as a method to stagger screens so each can be selected from its title bar.

3. Graphic Sizing

- a. Size will be based on logical units; not pixels and any logical unit may be used. Graphic screen design at one resolution shall be able to run at a different resolution. A full screen option as well as the ability to add sizing borders to any graphic screen shall be supported. Also graphic screens shall have an option to enable the screen to always be on top and a title bar enabled / disabled option.

F. SECURITY MANAGEMENT

- 1. The System shall provide a user-based security system. The security system must allow for the creation of users with certain rights and/or privileges. These rights must include the ability to run any combination or all of the applications in the system. The ability to allow or disallow user's access to change values, such as set points on an individual point basis shall be supported.
- 2. The ability to prevent non-authorized users from modifying the value or set point of a data point shall be part of the database design and shall not require any scripting.
- 3. Groups of users, such as Operators or Supervisors, can be created and granted rights. All users assigned to a group obtain the rights of the group, although they are still tracked by the System by their individual ID. Individual members of a group may also be assigned additional rights.
- 4. Limiting Login Time
 - a. The System shall allow for a login timeout setting for each user account. This setting will logout an operator when the time interval expires.

G. ARCHIVING

- 1. Provide capability to acquire, store, retrieve, and archive data as defined by this section. This must include provisions for automatically collecting, storing and recalling data. Recalled data must be made available to both a trend display program and a report generation program.
- 2. Data Configuration

- a. The data to be collected and stored will be identified through an interactive, menu-based configurator. The user will enter the point name, collection rate. Collection Rates shall be adjustable from 1 second to 30 minutes.
- b. The task will allow the collection of groups of points to be turned on and off automatically based on a defined alarm condition.

3. Displaying Stored Data

- a. The operator shall be able to recall stored digital and analog data for display in tabular and graphic trending format.
- b. The display of stored data shall be user-configurable.
- c. The trend object must allow for bi-directional trending and scrolling.
- d. A movable, vertical line will act as a time cursor on the display. This cursor can be moved by dragging it with the mouse. The date, time, and values of the trends corresponding to that time will be displayed in the bottom portion of the screen.
- e. The grid of the trend object shall be scrollable.
- f. The user shall be able to "zoom" in on any section of the trend display by "cutting" that section with a mouse. The software will automatically re-scale both the y-axis and time axis and will fetch the appropriate data for the time period selected.
- g. The trend object shall have a refresh rate for current data selectable in 0.1 second increments from a minimum of 0.10 seconds to a maximum of 1800 seconds.

4. Reports

- a. Provide 15 minute, hourly, daily, monthly, and annual reports in Microsoft Excel format showing run time, maximum generation level, station power energy consumption, fuel consumed, total energy generated, fuel consumption rate, water injection rate, fuel/water ratio, NOx produced and other data to be specified by Owner. Provide 3 automated reports in a format to be specified by Owner.

H. DATA ARCHIVE

1. General Requirements

- a. The System shall store historical data according to the information in this Specification.
- b. The System shall provide a user-executable function to create an annual archive of historical data. Data from the current calendar year and the prior calendar year will reside on the System. At the end of each calendar year, data from the year prior to the year coming to an end will be archived.
- c. Contractor shall include storage medium with sufficient capacity to store five archive files with full data from 240 hours of run time in each file.
- d. Contractor shall provide a user-executable function to access any archive file.

I. REMOTE SUPPORT

1. Provide necessary software and, if necessary, hardware to provide remote support for the control PLC and operator console. Provide information on remote support plans and single use costs with the bid.

PART 3 – SPECIFIC HARDWARE REQUIREMENTS

1.0 Control Cab Equipment

- A. Except as specifically identified below (or as determined during initial system design and shown on approved drawings), all existing SpeedTronic Mark V control components, protective relays, control switches, meters, static exciter components, load regulator components, annunciator, and SCADA interface components shall be removed from the existing control cabinets. The two existing relay and control cabinets shall be utilized for the new control equipment. New doors or new full face panels on the existing door shall be installed on each cabinet. Each specific item listed below must be considered and the recommendation (either to implement as described or some alternate arrangement) explained with the control description submittal. Layout shall match the existing Turbine 7 panels as closely as practicable.
- B. The following must be installed in the outer door of the control and/or relay cabinets.
 1. New generator protection relays (SEL-700G1+)
 2. New lockout relays
 3. SCADA gateway (SEL-3620)
 4. SCADA I/O (SEL-2440 DPAC)
 5. SEL-735 meter
 6. Other related control switches
 7. Control operator station (HMI)
 8. Emergency stop push button
 9. 50BF/52G relay (SEL-751)
 10. Test switches for all AC potential and current connections and for all inputs and outputs and trip contacts associated with all protective relays, lockout relays, exciter controls, and generator control devices. Test switches shall be ABB style FT-1. Test switch functions, configuration, mounting position, and labels will be finalized during the design reviews. Provide an engraved black lamicaid nameplate, 3/32-inch thick, with white letters and smooth beveled edges above each test switch. Each test switch blade shall be labeled with function. Test switches shall be numbered and labeled on drawings so that the appropriate test switch blade can be readily identified.
- C. The following must be installed in the existing control and/or relay cabinets.
 1. The new PLC hardware, including processor, I/O, power supply, and all related equipment
 2. All new relays or other devices required to interface between the new control equipment and turbine sensors, hardware, and devices.
 3. Suitable terminal blocks for all wiring interfaces between the control equipment and the turbine sensors and hardware. Existing terminal blocks may be reused if included in the approved drawings.

4. New generator and exciter field ground detection relays (these may also be installed in the existing cabinet in the generator auxiliary compartment).
- D. The following must be installed in new or existing enclosures external to the control and/or generator cabinets.
1. New water flow preamplifiers (transducers) shall be located in the existing enclosures in the water injection skid or, if the existing enclosures are too small, in a new enclosure supplied by Contractor. Alternatively, Contractor may propose alternative locations or components to replicate the existing functionality.

2.0 Control Wiring

- A. Wherever practical, wiring shall be terminated with ring lug compression terminals. Suitable ferrules shall be used when stranded wire must be terminated in mechanical lug connectors or terminals.
- B. All wire ends shall be marked with printed sleeves. The wire numbering and marking scheme shall be included in the initial design submittal.
- C. All existing wiring between the control cabinet terminal blocks and turbine sensors and hardware must be checked and tested in conjunction with the initial control set-up and check out.
- D. Proposed wire size, stranding, and insulation type shall be included in the initial design submittal.

3.0 Control Inputs

- A. All existing inputs to the SpeedTronic Mark V control must be reconnected to the new controls and utilized in conjunction with new inputs as required to implement existing and enhanced control and alarm functions. Specific requirements follow, but this is not intended to be a complete and exhaustive list.
 1. All inputs to the SpeedTronics Mark V interface cards shown on GE drawings 304D-01B-0495, Sheets 500 through 509.
 2. All inputs to the SpeedTronics Mark V interface cards shown on the GE I/O Report.
 3. All devices listed in Appendix A: Device List. Note: Appendix A should not be considered a complete list of all devices that interface with the existing control system. Contractor shall be responsible for verifying the accuracy and completeness of this list and incorporating all required control inputs regardless of whether it appears in Appendix A. Contractor shall be responsible for replacing or incorporating into the new control system any devices marked as “replace” unless specifically noted that the device is to be replaced by others.
 4. Control inputs to the turbine control system shall be provided for all RTDs and thermocouples.
 5. Contractor shall replace the 24VDC power supply and water flow meter preamplifiers labeled 77WN-1A and 77WN-1B show on FlowTronex drawing E-22739-02. Contractor shall confirm correct operation of the meter and magnetic

pickup coils. Provided operation of the meter and magnetic pickup coils is correct, only power supply and preamplifiers need to be replaced. Contractor may also present options that incorporate the function of the preamplifiers into the new turbine control system. Replacement of the water flow meter or magnetic pickups, if necessary, will be considered extra work.

6. Vibration sensors 39V-1, 39V-2 and 39V-3 shown on GE drawing 352B9322 section 3 sheet 19 and 352B9397 Section 1 Sheet 9 shall be replaced with new units with equivalent functionality.
7. The existing diesel starting engine tachometer 65DE shall be replaced. If a separate power supply is required for the new tachometer, the existing power supply shall be replaced as well.
8. All control circuits shall be monitored for loss of voltage using control inputs or auxiliary relays. Alarms shall be provided in the control system.
9. Compressor discharge pressure transducer 96CD shall be replaced.
10. Diesel engine water temperature, oil pressure, and accumulated hour gauge located in the existing enclosure on top of the turbine gauge panel shall be replaced in a new enclosure. New gauges shall provide input to the PLC. Options will be reviewed during the design reviews.

B. A connection to the Turbine 8 RTU may be used to provide limited non-critical data such as alarms and relay targets to the turbine control system. Available protocols are DNP and SEL. No data critical to the operation of the turbine shall be obtained using this connection. Contractor shall provide a list of required points for Owner's review.

C. If the SEL-700G generator relays are used to provide auto-synchronizing, all inputs from the autosynchronizer shall be provided by discrete connections. Serial or ethernet connections or connections to the turbine 8 RTU shall not be used for commands to or from the autosynchronizer.

4.0 Control outputs

A. All existing output contacts, relay drivers, and analog outputs provided from the SpeedTronics Mark V control must be duplicated in the new control, except for functions that are replaced with logical signals. Specific requirements follow, but this is not intended to be a complete and exhaustive list of required functions.

1. All generator exciter functions shall be replaced with logic interfaces to the new excitation system.
2. Suitable output must be provided to drive the existing water control valve (96WN) shown on Flowtronex drawing P-22739-01.
3. Outputs must be provided to operate all retained control relays, solenoids, valves, contactors, etc.
4. All devices listed in Appendix A: Device List. Note: Appendix A should not be considered a complete list of all devices that interface with the existing control system. Contractor shall be responsible for verifying the accuracy and completeness of this list and incorporating all required control inputs regardless of whether it appears in Appendix A. Contractor shall be responsible for replacing or incorporating into the new control system any devices marked as "replace" unless specifically noted that the device is to be replaced by others.
5. All existing stop valves shall be controlled by the PLC.

- B. If the SEL-700G generator relays are used to provide auto-synchronizing, all outputs to the autosynchronizer shall be provided by discrete connections. Serial or ethernet connections or connections to the turbine 8 RTU shall not be used for commands to or from the autosynchronizer.

5.0 Control relays

- A. Except for specific functions identified in these specifications, existing control relays shall be replaced to the greatest extent possible. The redundant trip functions described in Paragraph 2.1.E may be implemented using existing or new relays and other components.
- B. Where control relays are used to multiply contacts (for example relays 52GX-1 shown on GE drawing 304D-01B-0495 sheet 303) the functions shall be incorporated into the control logic to the extent possible to eliminate the need for the multiple relays.
- C. The following relays are expected to be replaced with control outputs or, if necessary, relays, and controlled by the control PLC The Contractor is to thoroughly investigate all options and provide appropriate recommendations.
 - 1. Master control-turbine and accessory compartment cooling fan 4BTZ
 - 2. Master control-diesel engine starter 4DS
 - 3. Master control-turbine cooling water fan #1 4FCZ1
 - 4. Master control-turbine cooling water fan #2 4FCZ2
 - 5. Master control-fuel forwarding pump #1 4FD-1
 - 6. Master control-fuel forwarding pump #2 4FD-2
 - 7. Master control-hydraulic ratchet pump motor 4HR
 - 8. Master control-cooling lube oil pump 4QC
 - 9. Master control-emergency lube oil pump 4QEZ
 - 10. Master control-load gear compartment cooling fan 4VG
 - 11. Master control-turbine cooling water pump #1 4WCZ1
 - 12. Master control-turbine cooling water pump #2 4WCZ2
 - 13. Turbine overspeed trip 12HA-1 (Note: Owner has ordered two Dynalco SST7400D speed switches that will be provided to Contractor for incorporation into control system.)
 - 14. Protective interface module R3-Load gear compartment cooling fan shutdown 45PRX-1
 - 15. All devices listed in Appendix A: Device List. Note: Appendix A should not be considered a complete list of all devices that interface with the existing control system. Contractor shall be responsible for verifying the accuracy and completeness of this list and incorporating all required control inputs regardless of whether it appears in Appendix A. Contractor shall be responsible for replacing or incorporating into the new control system any devices marked as "replace" unless specifically noted that the device is to be replaced by others.
- D. No control outputs shall utilize the connection to the turbine 8 RTU.
- E. Use of discrete timer relays shall be minimized to the extent practical. All timer relays shall be incorporated into PLC logic to the greatest extent practical.

6.0 Ignitors

- A. The existing ignitors and ignition transformers shall be retained.

7.0 Annunciator functions

- A. A separate annunciator is not required. Displays shall be provided that display alarms in a tiled fashion similar to an annunciator.

8.0 Power Supply

- A. A new power supply shall be provided to supply power to the new control system.

9.0 Generator Exciter and Voltage Regulator

- A. Except as specifically identified, all existing exciter and voltage regulator hardware must be replaced.
 - 1. A new Basler DECS-250N Digital Exciter and automatic voltage regulating system shall be installed as an integral part of the new control system, including the following components.
 - a. Excitation control and rectifying assembly mounted in a new NEMA 1 cabinet, provided by Basler to replace the existing exciter for the brushless exciter.
 - b. Power Potential Transformer (PPT), 6.8 kVA, 480V input, 240 volt output, mounted in the exciter cabinet. Primary connections to the PPT will be supplied and installed by Contractor.
 - c. A separate exciter HMI is not required, however; the DECS-250N must be mounted in the door of the control cab, exciter or relay cabinet such that the LCD display is visible without
 - d. The voltage regulator shall be fully integrated into the control software and display screens to allow manual and automatic voltage, var, and power factor control, with all monitoring and alarm functions accessed and displayed through the turbine control system.
 - e. Provide hardware and controls necessary to supply excitation current during black start conditions.

10.0 SCADA monitor and control

- A. The existing SCADA cabinet located in the control building adjacent to the turbine skid shall be retained.
- B. Furnish and install the following. No substitutions will be allowed for the equipment listed below. Catalog numbers provided below are general. Detailed catalog numbers shall be determined by Contractor and submitted to Owner for approval. See block diagram of the required SCADA and metering equipment in Appendix C.
 - 1. Provide one SEL-3620 Ethernet Security Gateway to provide an interface between the existing SEL-2240 for interface to existing SEL-2240 (Axion) in the Turbine 8 RTU. Provide a minimum of one spare copper Ethernet port and two spare RS232 serial ports for future connections. Provide RS232 to turbine control system, and generator voltage regulator. Provide RS232 copper or fiber serial connections to each SEL-700G1+ generator relay, SEL-2440, SEL-751 generator breaker failure relay, and generator SEL-735 meter. Any serial

connection to a device in a different building or requiring a cable more than 60 ft in length shall be made via fiber optic cable using SEL fiber transceivers.

2. Provide one SEL-2440 (DPAC) for collection of digital inputs and to provide remote control from the Owner's SCADA. Provide a minimum of 16 spare inputs and 8 spare outputs for Owner's use, over and above whatever I/O (if any) that is utilized for the control system SCADA interface. Provide RS232 or fiber serial connection to SEL-3620. Connect a relay failure alarm contact to the Axion.
3. Owner will provide and install all cables, connectors, and interface hardware required to connect the Axion to the Owner's SCADA system.
4. Provide one SEL-2243 power coupler module with two 100BASE-FX multimode fiber ports for the existing SEL-2240 (Axion) in the existing Turbine 8 RTU.

C. Owner will be responsible for programming the Axion, SEL-3620 and DPAC units, and for integrating these units into the Owner's existing SCADA master station. All information needed to access data from the control system will be provided by Contractor.

D. The existing SCADA point list included in Appendix B shall be used as a guide for the initial design. This list will be revised, developed, and finalized during the initial design phase of the project. All alarms that are displayed on the control screens are to be included in the final SCADA point list.

E. All indication and control points must be verified as part of the final system testing.

F. Contractor shall supply and install a multimode fiber cable between the control building and the turbine control panel in the control cab in Owner supplied conduits. Contractor shall supply two fiber patch panels, one each in the control building and the turbine control panel in the control cab. Fiber cable shall have minimum of 6 spare fibers beyond what is required for the relay, control, and SCADA systems. Contractor shall terminate fiber cable and provide necessary patch cables and splicing materials.

11.0 Protective relaying and metering

A. All existing electromechanical and digital relays, meters and transducers shall be removed and replaced.

B. Furnish and install the following. No substitutions will be allowed for the equipment listed below. Catalog numbers provided below are general. Detailed catalog numbers shall be determined by Contractor and submitted to Owner for approval.

1. Provide two SEL-700G1+ relays (11GP and 11GS) to provide primary and secondary generator protection including but not limited to, overexcitation, sync check, reverse power, loss of excitation, negative phase sequence, neutral overcurrent, voltage controlled overcurrent, step distance, over/under voltage, zero sequence overvoltage, over/under frequency, and differential protection. Provide an RS232 copper or fiber serial connection between each relay and the SEL-3620. Connect a normally closed relay failure alarm contact from each relay to an input on the SEL-2440 DPAC. Connect one output contact from each relay to SEL-751 (50BFG) to serve as a breaker failure initiate.

2. Provide two generator lockout relays, Electroschwitch series 24 manual reset LOR with lighted nameplates. Provide a minimum of one complete spare contact deck beyond what is necessary for tripping the generator, trip coil monitoring, and status inputs to the generator control system, Owner's SCADA system (one trip contact), excitation system, and protective relays (one trip contact). Provide one white (trip coil intact) and one red (trip present) LED. Connect trip coil monitor alarm in series with a reset contact to an input on the SEL-2440 DPAC.
3. Provide one SEL-751 relay to replace the existing 59BN relay and provide breaker failure protection for breaker 52G.
4. Provide one generator breaker failure lockout relay, Electroschwitch series 24 manual reset LOR with lighted nameplates. Provide a minimum of one complete spare contact deck beyond what is necessary for tripping breaker CK613, trip coil monitoring, and status inputs to the generator control system, Owner's SCADA system (one trip contact), and protective relays (one trip contact). Provide one white (trip coil intact) and one red (trip present) LED. Connect trip coil monitor alarm in series with a reset contact to an input on the SEL-2440 DPAC.
5. Provide two SEL-2664 field ground modules. One each for the brushless exciter field winding and one for the generator field winding.

C. All protective relay settings will be determined, applied, and tested by Owner.

D. Drawings showing modifications to the CK613 trip and close circuit, wiring between terminal blocks located in the generator control panel in the turbine control cab and the East Iowa substation control building, and associated testing will be performed by Owner.

12.0 Control building equipment

A. A wall or floor mounted control panel shall be provided and installed in the control building adjacent to the turbine skid including the following equipment and functions. Control cables shall be installed in Owner provided conduits between the skid and the control building to implement all required functions on the control panel, including potential, current, and control circuits. In so far as practical, layout, functionality, and devices used shall follow the existing Turbine 7 control panel.

1. Manual control switches as follows
 - a. Provide breaker control switch for generator breaker. Breaker control switch shall be Electroschwitch series 74 with lighted nameplate. Provide one red (breaker closed) and one green (breaker open) LED (52CS).
 - b. The following shall be Electroschwitch control switches series 24 (non-lighted nameplate), series 74 (lighted nameplate), or push button as applicable. Status of discrete control switches shall be provided to an input on the SEL-2440 DPAC.
 - 1) Turbine manual start/stop (1, Master Control)
 - 2) Turbine operation selector (off, crank, fire, panel, rem) (43)
 - 3) Load raise/lower (90GL/90GR)
 - 4) Voltage raise/lower (90RL/90RR)
 - 5) Voltage regulator mode (Volt, droop, react) (43R)
 - 6) Governor mode (Isochronous, droop, power) (43G)
 - 7) Synchronizing (man, off/rem, auto) (43S)

c. Provide an emergency stop switch for the turbine

2. Meters

- a. Bitronics M350 digital voltmeters for generator and bus voltages
- b. Bitronics M350 digital ammeter
- c. Bitronics digital 2 ½ or 3 element MW/MVAR meter
- d. Weschler Crompton Model 007 analog switchboard sync scope
- e. Weschler Crompton Model 007 analog switchboard frequency meter
- f. Sync indicating lamps.

13.0 Synchronizing

- A. Automatic synchronizing may be provided in the SEL-700G, the turbine control PLC, or another discrete device. Options will be reviewed during design. Provide all necessary control interfaces.
- B. Provisions for manual synchronization shall be provided using the control switches located on the operator control panel in paragraph 12.0A

14.0 Fuel system

- A. Contractor shall replace the existing fuel meter located in the fuel forwarding building with a meter capable of reporting fuel consumption to the turbine control system. Meter readings shall be reported to the turbine control system and displayed. Contractor shall evaluate options and present a recommendation to Owner.
- B. The unit is currently equipped for dual fuel operation; however, a natural gas fuel source is not available. Contractor shall reconnect the existing natural gas fuel equipment; however, control logic and screens do not need to be provided for natural gas operation and the natural gas fuel system cannot be commissioned at this time.

PART 4 – FIRE SUPPRESSION EQUIPMENT

1.0 Existing fire suppression equipment will be retained.

PART 5 – EMISSIONS CONTROL EQUIPMENT (WATER INJECTION)

1.0 The turbine is equipped with a demineralized water injection system for NOx control. Contractor shall implement the existing control strategy in the new PLC control. See Bid alternates 3 and 4.

PART 6 – WATER COOLING SKID JUCTION BOX

1.0 Contractor shall provide labor and materials to replace the water cooling skid main junction box with a new junction box identical in size and layout to the existing junction box. New enclosure shall be NEMA 4X, designed for installation outdoors. Enclosure shall be stainless steel or aluminum. Cabinet shall be 42" tall, 36" wide, and 8" deep. Door shall have a continuous hinge and screw clamps. Supply stainless steel or aluminum removable back panel and divider. Provide eight 8 pole control terminal blocks, 30A with washer head screws for use with ring lugs. Provide six three pole

power terminal blocks with sufficient ampacity for existing power circuits. Layout and wiring shall match the existing enclosure.

PART 7 – BID ALTERNATES

1.0 Bid Alternate 1

- A. Replace and upgrade the existing UV Flame sensors. Bidder shall recommend an appropriate replacement for the existing sensors. Options may include replacing the sensors with a current product or eliminating the sensors and utilizing thermocouple data or other software options to sense and confirm flame status.

1.1 Bid Alternate 2

- A. Retain the services of a qualified engineer to provide a new NOx control algorithm utilizing the existing water injection equipment and provide Owner with data required to file the required Iowa Department of Natural Resources permits. Algorithm shall be compliant with Iowa DNR and EPA regulations and applicable industry standards.

1.2 Bid Alternate 3

- A. Retain a third-party testing contractor with relevant experience to confirm correct operation of the NOx control system and compliance with the permit from the Iowa Department of Natural Resources by measuring emissions at the turbine stack. Testing contractor must submit a testing plan to the Iowa Department of Natural Resources prior to beginning testing.

1.3 Bid Form

- A. Include the total cost adder to implement each Bid Alternate on the Bid Form. If more than one implementation of a Bid Alternate item is suggested for Owner consideration, provide a separate sheet with the Bid Form that includes a description and the total cost to implement each of the suggested implementations.

PART 6 – REFERENCE DRAWINGS

- 1.0 The following drawings and documents are included for reference. A detailed list of all appendices appears immediately after the table of contents in Volume 1.

- A. A list of devices that interface with the Mark V control is provided in Appendix A. This list should not be considered exhaustive. Contractor shall accommodate all existing and required devices regardless of whether they appear in Appendix A. Contractor shall be responsible for replacing or incorporating into the new control system any devices marked as “replace” unless specifically noted that the device is to be replaced by others.
- B. The existing SCADA point list is included in Appendix B.
- C. The turbine fuel oil and generator nameplates are included in Appendix D.
- D. Turbine data and operating parameters is included in Appendix F
- E. The existing Mark V I/O report and alarm lists are included in Appendix G.
- F. Appendices H through ZZ are original installation drawings from GE, vendors, and P&E. Note that the RTU has been replaced. Drawings for the new RTU are not available. Accuracy of existing drawings cannot be guaranteed. Contractor shall be responsible for confirming the accuracy of

- any drawings, details, or data that are incorporated into the new control system or any drawings generated by Contractor for the new control system.
- G. The existing Mark V logic is available and will be provided to the successful bidder if needed.

Appendix	Description
A	Device list
B	Existing SCADA points list
C	Communications diagram
D	Nameplate data
E	Turbine Field Devices
F	Performance data
G	Mark V I/O and alarm lists
H	P & E turbine electrical installation drawings
I	East Iowa Substation single line diagrams
J	GE System one-line drawings
K	Original Alstom mechanical drawings
L	Control cab diagrams
M	Exciter drawings
N	Generator protection and turbine auxiliary; schematic drawings
O	Control cab MCC, connection and elementary drawings
P	Misc schematics
Q	Generator protection cabinet terminal blocks
R	SCADA and Metering Diagram
S	Control cab and GAC physical layout drawings
T	Generator switchgear drawings
U	Mark V input/output interface drawings
V	Turbine connection and wiring diagrams
W	Generator connection and wiring diagrams
X	Station power fused switch drawings
Y	Water injection skid drawings
Z	Fire alarm system drawings
ZZ	Water cooling skid drawings

END OF SECTION

Indianola Municipal Utilities
Turbine 8 Control Replacement
Appendix A: Device List

Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
4BTZ	Master control-turbine and accessory compartment cooling fan	304D-01B-0495 329	Replace	
4DS	Master control-diesel engine starter	304D-01B-0495 320	Replace	
4FCZ1	Master control-turbine cooling water fan #1	304D-01B-0495 331	Replace	
4FCZ2	Master control-turbine cooling water fan #2	304D-01B-0495 332	Replace	
4FD-1	Master control-fuel forwarding pump #1	304D-01B-0495 327	Replace	
4FD-2	Master control-fuel forwarding pump #2	304D-01B-0495 328	Replace	
4HR	Master control-hydraulic ratchet pump motor	304D-01B-0495 318	Replace	
4HR_E	Emergency lube oil pump motor ratcheting	304D-01B-0495 319	Replace	
4QC	Master control-cooling lube oil pump	304D-01B-0495 323	Replace	
4QEZ	Master control-emergency lube oil pump	304D-01B-0495 319	Replace	
4VG	Master control-load gear compartment cooling fan	304D-01B-0495 324	Replace	
4WCZ1	Master control-turbine cooling water pump #1	304D-01B-0495 333	Replace	
4WCZ2	Master control-turbine cooling water pump #2	304D-01B-0495 334	Replace	
12A (12HA-1)	Turbine overspeed trip	352B9322 3-16	Replace	IMU has ordered two Dynalco SST7400D speed switches
20AA-1	Atomizing air bypass valve solenoid valve	352B9322 3-11	Retain	
20CB	Compressor bleed solenoid valve	352B9322 3-11	Retain	
20CF	Fuel clutch solenoid valve	352B9322 3-11	Retain	
20CS	Starting clutch solenoid valve	352B9322 3-11	Retain	
20DA	Diesel engine accelerating solenoid valve	352B9322 3-11	Retain	
20DT	Diesel engine emergency trip solenoid (valve)	352B9322 3-11	Retain	
20DV	Diesel engine stop valve solenoid (valve)	352B9322 3-11	Retain	
20EF	Generator field ground brush test solenoid	3529397 1-5	Retain	
20FG	Fuel gas stop valve solenoid	352B9322 3-11	Retain	
20FL	Liquid fuel stop valve solenoid	352B9322 3-11	Retain	
20PG-1,2	(DV) Gas fuel purge solenoid valve	352B9322 3-24	Retain	
20PL	Liquid fuel system purge solenoid (valve)	352B9322 3-11	Retain	

Indianola Municipal Utilities
Turbine 8 Control Replacement
Appendix A: Device List

Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
20TU	Torque converter unloading (drain) solenoid valve	352B9322 3-11	Retain	
20TV	Turbine compressor inlet guide vane solenoid valve	352B9322 3-11	Retain	
20VG-2	Gas fuel vent solenoid valve	352B9322 3-24	Retain	
20WN-1	Stop valve solenoid, water injection skid	E-22739-02	Retain	
23FC-1	Fan motor #1 space heater-water cooling skid	331B2212	Retain	
23FC-2	Fan motor #1 space heater-water cooling skid	331B2212	Retain	
23HA-1	Space heater, accessory compartment	352B9322 2-2, 3-21	Retain	
23HG-1,2	Generator compartment space heater	352B9397 1-4	Retain	
23HT-1,2	Space heater, turbine compartment	352B9322 2-2, 3-21	Retain	
23QT-1,2,3,4	Immersion heater-lube oil tank	352B9322 2-2, 3-21	Retain	
23WC-1	Pump motor #1 space heater-water cooling skid	331B2212	Retain	
23WC-2	Pump motor #2 space heater-water cooling skid	331B2212	Retain	
23WN-1	Pump motor #1 space heater-water injection skid	P-22739-01	Retain	
25	Auto synchronizer	304D-01B-0495-300	Replace	Can be incorporated into SEL-700G generator relay, turbine control, or another device. Provide provisions for manual sync in operator control panel as well.
25P	Auto synch permissive	304D-01B-0495-300	Replace	
25X	Sync check	304D-01B-0495-300	Replace	Replaced by SEL-700G generator relays, include sync check in both primary and secondary relays.
26AA-1	Atomizing air temperature	352B9322 3-10	Retain	
26BA-1	Turbine compartment temperature-alarm	352B9322 3-10	Retain	
26BA-2	Turbine compartment temperature-normal	352B9322 3-10	Retain	
26EH	Temperature switch-exciter housing-fire	352B9397 1-4	Retain	
26GH	Temperature switch-generator compartment-fire	352B9397 1-6	Retain	

Indianola Municipal Utilities
Turbine 8 Control Replacement
Appendix A: Device List

Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
26GL	Motor operated louver-generator air inlet temperature	352B9397 1-5	Retain	
26HA	Accessory compartment thermostat	352B9322 3-21	Retain	
26HG	Temperature switch-generator space heater	352B9397 1-5	Retain	
26HT	Turbine compartment thermostat	352B9322 3-21	Retain	
26QA	Lube oil header-high temperature alarm	352B9322 3-10	Retain	
26QL	Lube oil tank temperature-low	352B9322 3-10	Retain	
26QM	Lube oil tank temperature-moderate	352B9322 3-10	Retain	
26QN	Lube oil tank temperature-normal	352B9322 3-10	Retain	
26QT	Lube oil tank temperature-trip	352B9322 3-10	Retain	
26WR-2	Low temperature alarm-water injection skid	E-22739-02	Retain	
27BS-1,2	Bus synchronizing undervoltage relay	304D-01B-0495-207, 306	Replace	Replaced by SEL-751 breaker failure relay, include status input to primary SEL-700G, status input to turbine control , and include in breaker close circuit if applicable.
27QE	Emergency lube oil pump undervoltage relay	304D-01B-0495 319	Retain	
28FD-7	#7 Flame detector- combustion chamber #7	352B9322 3-16		See bid alternate #1
28FD-8	#8 Flame detector- combustion chamber #8	352B9322 3-16		See bid alternate #1
33CB-3,4	Compressor bypass valve limit switch	352B9322 3-12	Retain	
33CS	Starting clutch limit switch	352B9322 3-12	Retain	
33FL	Liquid fuel stop valve limit switch	352B9322 3-12	Retain	
33HR	Hydraulic ratchet limit switch	352B9322 3-12	Retain	
33PG-1,2,3,4	(DV) Gas fuel system purge valve limit switch	352B9322 3-24	Retain	
33SC	SSS Clutch (proximeter switch)	352B9397 1-5	Retain	
33TV	Turbine compressor inlet guide vanes limit switch	352B9322 3-12	Retain	
39FC-1	Vibration switch-Fan motor #1-water cooling skid	331B2212	Retain	
39FC-2	Vibration switch-Fan motor #2-water cooling skid	331B2212	Retain	
39V-1	Vibration #1 Sensor bearing cap	352B9322 3-19	Replace	
39V-2	Vibration #2 sensor compressor	352B9322 3-19	Replace	

Indianola Municipal Utilities
Turbine 8 Control Replacement
Appendix A: Device List

Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
39V-3	Vibration detector-generator pedestal bearing	352B9397 1-9	Replace	Sensor has history of providing alarms that IMU believes to be spurious
43DE	Diesel engine-control switch (test)	352B9322 3-16	Retain	
43HR	Hydraulic ratchet-control (jog)	352B9322 3-16	Retain	
43DBC	Dead bus closure control switch	304D-01B-0495-300	Remove	Function will be incorporated into auto synchronizer and sync check logic
43S/CS	Synchronizing control switch	304D-01B-0495-300, 304, 306	Replace	Install new switch on operator control station
43WN	Pump hand/off/auto switch-water injection skid	E-22739-02	Retain	
45CP	Fire system trip-Chemtron	247B1619PI 04A	Retain	
45FA1-1A	Fire detector, accessory compartment	352B9322 3-15	Retain	
45FA2-2A	Fire detector, accessory compartment	352B9322 3-15	Retain	
45FE	Exciter compartment-Fire sensor temp switch	352B9397 1-6	Retain	
45FG	Generator compartment-Fire sensor temp switch	352B9397 1-6	Retain	
45FT-1A, 2A	Fire detector, turbine compartment (fwd)	352B9322 3-15	Retain	
45FT-3A	Fire detector, turbine compartment (ovhd)	352B9322 3-15	Retain	
45FT-4A, 5A	Fire detector, turbine compartment (aft)	352B9322 3-15	Retain	
45FT-6A	Fire detector, load gear compartment	352B9322 3-15	Retain	
45PRX-1	Protective interface module R3-Load gear compartment cooling fan shutdown	304D-01B-0495 324	Replace	
49BA-X	Turbine and accessory compartment cooling air fan overload relay	304D-01B-0495 329	Retain	
49FD1-X	Fuel forwarding pump #1 overload relay	304D-01B-0495 327	Retain	
49FD2-X	Fuel forwarding pump #2 overload relay	304D-01B-0495 328	Retain	
49FC1-X	Water cooling fan #1 overload relay	304D-01B-0495 331	Retain	
49FC2-X	Water cooling fan #2 overload relay	304D-01B-0495 332	Retain	
49HA-1	Accessory compartment space heater overtemperature	352B9322 2-2, 3-21	Retain	
49HA-X	Accessory compartment space heater overload relay	304D-01B-0495 325	Retain	

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Appendix A: Device List

Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
49HG-X	Generator compartment heater overload relay	304D-01B-0495 321	Retain	
49HR-1	Hydraulic ratchet motor overload relay	304D-01B-0495 318	Retain	
49-HT-1,2	Turbine compartment space heater overtemperature	352B9322 2-2, 3-21	Retain	
49HT-X	Turbine compartment space heater overload relay	304D-01B-0495 326	Retain	
49QC-X	Cooling lube oil pump overload relay	304D-01B-0495 323	Retain	
49QE	Emergency lube oil pump motor overload relay	304D-01B-0495 319	Retain	
49QT-X	Lube oil heater overload relay	304D-01B-0495 322	Retain	
49VG-X	Load gear compartment cooling fan overload relay	304D-01B-0495 324	Retain	
49WC-1-X	Turbine cooling water pump #1 overload relay	304D-01B-0495 333	Retain	
49WC-2-X	Turbine cooling water pump #2 overload relay	304D-01B-0495 334	Retain	
50RE	Reverse energization relay	304D-01B-0495-200, 302	Replace	Replaced by SEL-700G generator relays
52BA	Turbine and accessory compartment cooling air fan run relay	304D-01B-0495 329	Retain	
52CB-1	Fuel forwarding pump #1 circuit breaker status	304D-01B-0495 327	Retain	
52CB-2	Fuel forwarding pump #2 circuit breaker status	304D-01B-0495 328	Retain	
52CB-1	Water cooling pump #1 circuit breaker status	304D-01B-0495 333	Retain	
52CB-2	Water cooling pump #2 circuit breaker status	304D-01B-0495 334	Retain	
52FC-1	Water cooling fan #1 run relay	304D-01B-095 331	Retain	
52FC-2	Water cooling fan #2 run relay	304D-01B-095 332	Retain	
52FD-1	Fuel forwarding pump #1 run relay	304D-01B-0495 327	Retain	
52FD-2	Fuel forwarding pump #2 run relay	304D-01B-0495 328	Retain	
52G	Generator circuit breaker close, trip & breaker internal circuits	304D-01B-0495-204, 300, 301, 309	Retain	
52HA	Accessory compartment heater run relay	304D-01B-0495 325	Retain	
52HG	Generator compartment heater run relay	304D-01B-0495 321	Retain	
52HT	Turbine compartment heater run relay	304D-01B-0495 326	Retain	

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Appendix A: Device List

Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
52G/CS	Generator circuit breaker control switch	304D-01B-0495-300, 301, 306	Replace	Install new switch on operator control station
52GX-1	Aux relay to 52G	304D-01B-0495-303, 304, 306, 307, 309	Replace	Incorporate into control system
52WC-1	Turbine cooling water pump #1 run relay	304D-01B-0495 333	Retain	
52WC-2	Turbine cooling water pump #2 run relay	304D-01B-0495 334	Retain	
52WN	Pump starter-water injection skid	E22739-02	Retain	
52QC	Cooling lube oil pump run relay	304D-01B-0495 323	Retain	
52QT	Lube oil immersion heater run contact	304D-01B-0495 322	Retain	
52VG	Load gear compartment cooling fan run relay	304D-01B-0495 324	Retain	
59BN	Generator bus ground protection	304D-01B-0495-205, 307	Replace	Replaced by SEL-751 breaker failure relay
63AD-1	Atomizing air pressure differential	352B9322 3-13	Retain	
63DM	diesel engine-minimum speed	352B9322 3-13	Retain	
63FG	Gas fuel pressure (upstream)	352B9322 3-13	Retain	
63FL-2	Liquid fuel pressure (upstream)	352B9322 3-13	Retain	
63GF	Pressure switch-generator air inlet filter differential	352B9397 1-6	Retain	
63HG-1	Hydraulic trip circuit pressure -gas fuel	352B9322 3-14	Retain	
63HL-1	Hydraulic trip circuit pressure -liquid fuel system	352B9322 3-14	Retain	
63HQ	Low hydraulic supply pressure-Auxiliary hydraulic pump start	352B9322 3-13	Retain	
63PG-1	Fuel gas system pressure switch	352B9322 3-24	Retain	
63QA	Low lube oil pressure-alarm	352B9322 3-13	Retain	
63QD	Diesel engine lube oil pressure	352B9322 3-13	Retain	
63QL	Low lube oil emergency pump start	352B9322 3-13	Retain	
63QN	Normal lube oil pressure-emergency pump stop	352B9322 3-13	Retain	
63QT	Pressure switch-low lube oil pressure	352B9397 1-5	Retain	
63WC-1	Pressure switch-water cooling skid	331B2212	Retain	
63WN	Pressure switch-water injection skid	E-22739-02	Retain	

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Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
65DE	Tachometer generator-diesel engine	352B9322 3-19	Replace	
65FP	Liquid fuel pump servo valve	352B9322 3-18	Retain	
65GC	Gas control valve servo valve	352B9322 3-20	Retain	No natural gas fuel source available
70R4/CS	Motor operated fine speed rehostat control switch	304D-01B-0495-306	Replace	Install new switch on operator control station
71QH	High lube oil level	352B9322 3-15	Retain	
71QL	Low lube oil level	352B9322 3-15	Retain	
71WL-1	Liquid level switch-water cooling skid	331B2212	Retain	
72HR	Hydraulic ratchet pump contactor	304D-01B-495 318	Retain	
72QEX	Emergency lube oil pump auxiliary relay	304D-01B-0495 319	Retain	
74-1,2,3, 4,5,6	DC tripping blow fuse monitor relay	304D-01B-0495-300, 301, 302, 306, 307, 309, 310	Replace	
77FD-1,2	Flow divider magnetic speed pickup	352B9322 3-19	Retain	
77GR	Magnetic speed pickup-zero speed detector	352B9397 1-9	Retain	
77HC-1,2 (77NH-1,2)	High pressure set magnetic pickup (speed control)	352B9322 3-19	Retain	
77HT-1 (77NH-3)	High pressure set magnetic pickup (overspeed)	352B9322 3-19	Retain	
77HT-4 (spare)	High pressure set magnetic pickup (overspeed)	352B9322 3-19	Retain	Connect to second Dynalco speed switch
77WN-1A	Magnetic pickup and preamp #1-water flow meter-water injection skid	E-22739-02	Replace	Confirm correct operation of existing flow meter & pickup coils. Provided operation is correct, only pre-amp needs to be replaced.
77WN-1B	Magnetic pickup and preamp #2-water flow meter-water injection skid	E-22739-02	Replace	Confirm correct operation of existing flow meter & pickup coils. Provided operation is correct, only pre-amp needs to be replaced.

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Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
86G-1	Generator differential lockout relay	304D-01B-0495-300, 301, 302, 303, 306, 307	Replace	Replace with two lockout relays
88BA	Cooling air fan turbine & accessory compartment motor	352B9322 2-1, 3-8	Retain	
88CA	Control air compressor	352B9322 2-2, 3-8		No longer used
88DS	Diesel (starter) engine starter	352B9322 2-1, 3-8	Retain	
88FC-1	Fan motor #1-water cooling skid	331B2212	Retain	
88FC-2	Fan motor #1-water cooling skid	331B2212	Retain	
88FD-1	Fuel forwarding pump #1	304D-01B-0495-327	Retain	
88FD-2	Fuel forwarding pump #2	304D-01B-0495-328	Retain	
88HA-1	Accessory compartment spare heater-blower motor	352B9322 2-3, 2-21	Retain	
88HR	Hydraulic ratchet pump motor	352B9322 2-3, 1-8	Retain	
88HT-1,2	Turbine compartment space heater-blower motor	352B9322 2-2, 3-21	Retain	
88QC	Cooldown lube oil pump motor	352B9322 2-1, 3-8	Retain	
88QE	Emergency lube oil pump motor	352B9322 2-1, 3-8	Retain	
88TL-1,2	Turbine compartment motor operated CO2 Louvers	352B9322 3-17	Retain	
88VG	Ventilation fan-generator load gear compartment	352B9397 1-4	Retain	
88WC-1	Pump motor #1-water cooling skid	331B2212	Retain	
88WC-2	Pump motor #2-water cooling skid	331B2212	Retain	
88WN-1	Pump motor #1-Water injection skid	E-22739-02	Retain	
90R4/CS	Auto regulator voltage adjustment control switch	304D-01B-0495-303, 306	Replace	Install new switch on operator control station
90SR	Stop/speed (pressure) ratio valve	352B9322 3-20	Retain	
94QEZ	Emergency lube oil pump	304D-01B-0495 319	Replace	
95SP-1	Spark plug for combustion chamber #1	352B9322 3-2	Retain	

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Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
95SP-2	Spark plug for combustion chamber #2	352B9322 3-2	Retain	
95TR-1	ignition transformer for 95SP-1	352B9322 3-2	Retain	
95TR-2	ignition transformer for 95SP-2	352B9322 3-2	Retain	
96CD	Compressor discharge pressure transducer	352B9322 3-18	Replace	
96FG	Fuel gas pressure transmitter	352B9322 3-20	Retain	
96GBV-1	Bus voltage transducer	304D-01B-0495-207, 311	Replace	Provided that this is not critical to the operation of the turbine, this can be replaced by a digital connection between the SEL-735, RTU, and turbine controls. If this is critical, provide 4-20mA connections, or separate transducer
96GC-1,2	Fuel gas control valve LVDT	352B9322 3-20	Retain	
96GG-1	Generator Watt/VAR transducer	304D-01B-0495-204, 207, 311	Replace	Replaced by SEL-735 revenue meter. Provide 4-20mA connection to turbine controls
96GG-2	Generator Watt/VAR transducer	304D-01B-0495-311	Replace	Replaced by SEL-735 revenue meter. Provide 4-20mA connection to turbine controls
96GG-3	Generator VAR transducer	304D-01B-0495-204, 207, 311	Replace	Replaced by SEL-735 revenue meter. Provide 4-20mA connection to turbine controls
96GV/GF	Generator voltage/frequency transducer	304D-01B-0495-311	Replace	Replaced by SEL-735 revenue meter. Provide 4-20mA connection to turbine controls
96SR	Stop/speed ratio valve LVDT	352B9322 3-20	Retain	
96WN	Water control valve-water injection skid	P-22739-01	Retain	Confirm correct operation
96WN-2	Water flow meter-water injection skid	P-22739-10	Retain	Confirm correct operation
AUXVT-5	Auxiliary voltage transformer	304D-01B-0495-205	Remove	SEL-735 can provide this mathematically
AUXVT-6	Auxiliary voltage transformer	304D-01B-0495-205	Remove	SEL-735 can provide this mathematically
AUXVT-7	Auxiliary voltage transformer	304D-01B-0495-205	Remove	SEL-735 can provide this mathematically

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Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
AUXVT-8	Auxiliary voltage transformer	304D-01B-0495-202	Retain	Contractor to relocate
C1, C2	Cold air (inlet) thermocouple	352B9397 1-8	Retain	
C5, C6, C7, C8	Hot air (exhaust) thermocouple	352B9397 1-8	Retain	
C21, C22, C23, C31, C32, C33	Stator thermocouple	352B9397 1-8	Retain	
C40	Load gear pedestal	352B9397 1-8	Retain	
CT-DA-2	Compressor temperature-discharge annulus (left)	352B9322 3-17	Retain	
CT-DA-3	Compressor temperature-discharge annulus (right)	352B9322 3-17	Retain	
DGPA	Digital generator protection relay (SR-489)	304D-01B-0495-200, 202, 204, 301, 302, 306, 309	Replace	Replaced by SEL-700G
DGPB	Digital generator protection relay (SEL-300)	304D-01B-0495-200, 202, 204, 301, 302, 306, 309	Replace	Replaced by SEL-700G
EX2K	EX2000 running aux relay	304D-01B-0495-304, 309	Replace	Incorporate into new exciter control system
	FIELD GROUND DETECTION RELAY	304D-01B-0495	Replace	Install device in existing cabinet in GAC compartment, extend fiber optic cable to primary SEL-700G.
FW1-1	Filter pressure drop-water injection skid	P-22739-01	Retain	
PS1	Diesel tachometer power supply	352B9322 3-19	Replace	
SH-1	Space heater contactor-water injection skid	E-22739-01	Retain	
TACH		340D-01B-0495-335	Replace	
TACH SWITCH	Tachometer switch	352B9322 3-5	Replace	
TCMV	Thermostat control-motor operated louver control	352B9397 1-5	Retain	
TT-WS1AO-2	Turbine temperature-wheelspace 1st stage aft outer	352B9322 3-6	Retain	

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Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
TT-WS1AO-3	Turbine temperature-wheelspace 1st stage aft outer	352B9322 3-6	Retain	
TT-WS1FO-2	Turbine temperature-wheelspace 1st stage fwd outer	352B9322 3-16	Retain	
TT-WS1FO-3	Turbine temperature-wheelspace 1st stage fwd outer	352B9322 3-16	Retain	
TT-WS2AO-1	Turbine temperature-wheelspace 2nd stage aft outer	352B9322 3-22	Retain	
TT-WS2AO-2	Turbine temperature-wheelspace 2nd stage aft outer	352B9322 3-23	Retain	
TT-WS2FO-2	Turbine temperature-wheelspace 2nd stage fwd outer	352B9322 3-6	Retain	
TT-WS2FO-3	Turbine temperature-wheelspace 2nd stage fwd outer	352B9322 3-6	Retain	
TT-XD-1	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-2	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-3	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-4	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-5	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-6	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-7	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-8	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-9	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-10	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-11	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TT-XD-12	Turbine temperature-exhaust duct	352B9322 3-22	Retain	
TVM	Transformer-generator air inlet shutter control	352B9397 1-5	Retain	
Notes: 1) This is not an exhaustive list of all turbine components. Numerous miscellaneous devices have not been included. Contractor shall				

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Device	Description	Drawing reference	Retain/ Replace/ Remove	Notes
	ensure that control system has sufficient I/O to accommodate all existing and new devices necessary to replicate all existing control functions.			
	2) No signals critical to the operation of the turbine control system shall be passed using the connection between the turbine control and RTU.			
	3) Existing generator thermocouples and RTDs shall be connected to the turbine control system.			

TURBINE 8 RTU POINTS LISTS

	SETTING	VALUE
COMMUNICATIONS		
	SERVER IP	20000
	PROTOCOL	TCP
DATE-TIME		
	UTC OFFSET	0
	DST ENABLED	TRUE
DNP		
	SERVER DNP ADDRESS	1
	CLIENT DNP ADDRESS	0
	ALLOW ANONYMOUS DNP IP CLIENTS	
	CLIENT IP ADDRESSES	
	ALLOW UNSOLICITED MESSAGES	TRUE
	UNSOLICITED MESSAGING RETRIES	3
	MAP NAME	OSI_DNO_MAP_DNP

BINARY INPUTS

ENABLE	TAG NAME	POINT NUMBER	TAG TYPE	TAG ALIAS	STATUS VALUE	VAR OBJ 1 DEFAULT	VAR OBJ 2 DEFAULT	EVENT CLASS	COMMENT
TRUE	OSI_DNP_MAP_DNP.BI_00000	0	SPS	OSI_I1	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00001	1	SPS	OSI_I2	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00002	2	SPS	OSI_VAR_MODE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00003	3	SPS	OSI_VOLT_MODE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00004	4	SPS	OSI_PF_MODE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00005	5	SPS	OSI_I6	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00006	6	SPS	OSI_I7	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00007	7	SPS	OSI_I8	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00008	8	SPS	OSI_TURB_IN_STOP	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00009	9	SPS	OSI_COOLDOWN	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00010	10	SPS	OSI_PRE_SEL_LD	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00011	11	SPS	OSI_BASE_PEAK_IND	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00012	12	SPS	OSI_FUEL_SEL_IND	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00013	13	SPS	OSI_ISOC_DROOP_IND	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00014	14	SPS	OSI_EXCITER_AM_IND	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00015	15	SPS	OSI_ESTOP_RESET	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00016	16	SPS	OSI_EI2_FIRE_ALARM	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00017	17	SPS	OSI_I18	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00018	18	SPS	OSI_I19	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00019	19	SPS	OSI_DIESEL_H2O_TEMP_HI	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00020	20	SPS	OSI_DIESEL_DAYTANK_LO	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00021	21	SPS	OSI_I22	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00022	22	SPS	OSI_RATCHET_CLUTCH	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00023	23	SPS	OSI_I24	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00024	24	SPS	OSI_GAS_FUEL_SEL	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00025	25	SPS	OSI_I26	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00026	26	SPS	OSI_UNIT7_FIRE_SYS_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00027	27	SPS	OSI_UNIT7_FIRE_ALARM	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00028	28	SPS	OSI_I29_TUB7_FIRE_VALVE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00029	29	SPS	OSI_I30	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00030	30	SPS	OSI_83B_BASE_LOAD_SEL	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00031	31	SPS	OSI_I32	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00032	32	SPS	OSI_4DS_DIESEL_CRANKING	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00033	33	SPS	OSI_4DE_DIESEL_RUNNING	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00034	34	SPS	OSI_I35	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00035	35	SPS	OSI_2DWZ_DESL_BRK_FAIL	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00036	36	SPS	OSI_4DEY_DESL_FAIL_STOP	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00037	37	SPS	OSI_I38	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00038	38	SPS	OSI_DESL_LUBEOIL_PRESS_LOW	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00039	39	SPS	OSI_I40	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00040	40	SPS	OSI_30X_ALARM	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00041	41	SPS	OSI_I42	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00042	42	SPS	OSI_I43	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00043	43	SPS	OSI_27DZ_BAT_UNDER_VOLT	FALSE	2	2	1	

BINARY INPUTS

ENABLE	TAG NAME	POINT NUMBER	TAG TYPE	TAG ALIAS	STATUS VALUE	VAR OBJ 1 DEFAULT	VAR OBJ 2 DEFAULT	EVENT CLASS	COMMENT
TRUE	OSI_DNP_MAP_DNP.BI_00044	44	SPS	OSI_BATT_CHARGER_ALM	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00045	45	SPS	OSI_I46	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00046	46	SPS	OSI_LOSS_OF_DC_VOLT	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00047	47	SPS	OSI_I48	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00048	48	SPS	OSI_DC_OIL_PUMP	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00049	49	SPS	OSI_I50	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00050	50	SPS	OSI_I51	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00051	51	SPS	OSI_MAX_IND_IN_CARD	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00052	52	SPS	OSI_I53	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00053	53	SPS	OSI_I54	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00054	54	SPS	OSI_I55	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00055	55	SPS	OSI_I56	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00056	56	SPS	OSI_I57	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00057	57	SPS	OSI_I58	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00058	58	SPS	OSI_I59	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00059	59	SPS	OSI_I60	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00060	60	SPS	OSI_I61	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00061	61	SPS	OSI_I62	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00062	62	SPS	OSI_I63	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00063	63	SPS	OSI_I64	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00064	64	SPS	OSI_READY_TO_START	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00065	65	SPS	OSI_I66	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00066	66	SPS	OSI_AC_AUX_LUBEOIL_RUNNING	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00067	67	SPS	OSI_28FDX_FLAME_DETECT	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00068	68	SPS	OSI_ALARM_LIGHT	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00069	69	SPS	OSI_ALARM_HORN	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00070	70	SPS	OSI_ALARM_RESET	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00071	71	SPS	OSI_1ZCOOLDOWN_MODE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00072	72	SPS	OSI_WATER_PUMP	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00073	73	SPS	OSI_I74	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00074	74	SPS	OSI_I75	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00075	75	SPS	OSI_I76	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00076	76	SPS	OSI_I77	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00077	77	SPS	OSI_SMOKE_DETECTOR	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00078	78	SPS	OSI_45FTX_FIRE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00079	79	SPS	OSI_ON_TEMP_CONTROL	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00080	80	SPS	OSI_I81	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00081	81	SPS	OSI_AUTO_REG_LOWER	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00082	82	SPS	OSI_AUTO_REG_RAISE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00083	83	SPS	OSI_REMOTE_CONT_SEL	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00084	84	SPS	OSI_I85	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00085	85	SPS	OSI_I86	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00086	86	SPS	OSI_I87	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00087	87	SPS	OSI_REM_SPEED_LOWER	FALSE	2	2	1	

BINARY INPUTS

ENABLE	TAG NAME	POINT NUMBER	TAG TYPE	TAG ALIAS	STATUS VALUE	VAR OBJ 1 DEFAULT	VAR OBJ 2 DEFAULT	EVENT CLASS	COMMENT
TRUE	OSI_DNP_MAP_DNP.BI_00088	88	SPS	OSI_REM_SPEED_RAISE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00089	89	SPS	OSI_I90	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00090	90	SPS	OSI_I91	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00091	91	SPS	OSI_HIGH_VIBRATION_ALM	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00092	92	SPS	OSI_I93	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00093	93	SPS	OSI_I94	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00094	94	SPS	OSI_CNT_SPD_SIGNAL_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00095	95	SPS	OSI_PRT_SPD_SIGNAL_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00096	96	SPS	OSI_FAILURE_TO_IGNITE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00097	97	SPS	OSI_AIR_INLET_TROUBLE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00098	98	SPS	OSI_I99	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00099	99	SPS	OSI_LUBEOIL_PRESS_LOW_TRIP	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00100	100	SPS	OSI_HYD_SUP_PRESS_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00101	101	SPS	OSI_HYD_PROTECTIVE_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00102	102	SPS	OSI_FUEL_HYD_TRIP_PRESS_LOW	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00103	103	SPS	OSI_I104	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00104	104	SPS	OSI_I105	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00105	105	SPS	OSI_I106	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00106	106	SPS	OSI_30HR_RATCHET_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00107	107	SPS	OSI_30CD_COOLDOWN_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00108	108	SPS	OSI_86GV_IGV_TROUBLE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00109	109	SPS	OSI_EXH_TEMP_TROUBLE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00110	110	SPS	OSI_COMBUSTION_TROUBLE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00111	111	SPS	OSI_LIQUID_FUEL_TROUBLE	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00112	112	SPS	OSI_FIRE_PRO_SYS_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00113	113	SPS	OSI_EXCESSIVE_COMB_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00114	114	SPS	OSI_I115	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00115	115	SPS	OSI_WATER_INJ_FLOW_TROB	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00116	116	SPS	OSI_GEN_BREAKER_STATUS	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00117	117	SPS	OSI_I118	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00118	118	SPS	OSI_STA_PWR_XFER_SWCH	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00119	119	SPS	OSI_CNT_ROOM_DOOR_ALARM	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00120	120	SPS	OSI_TURB8_DOOR_ALARM	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00121	121	SPS	OSI_WASTE_OIL_HIGH_LVL	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00122	122	SPS	OSI_WASTE_OIL_TANK_LEAK	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00123	123	SPS	OSI_I124	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00124	124	SPS	OSI_LOWTEMP_WTR_INJ_SKID	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00125	125	SPS	OSI_I126	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00126	126	SPS	OSI_I127	FALSE	2	2	1	
TRUE	OSI_DNP_MAP_DNP.BI_00127	127	SPS	OSI_I128	FALSE	2	2	1	

ENABLE	TAG NAME	POINT NUMBER	TAG TYPE	TAG ALIAS	VAR OBJ 10 DEFAULT	EVENT CLASS	STATUS VALUE	CONTROL MODEL	NUMBER OF PULSES	ON PULSE DURATION	OFF PULSE DURATION	COMMENT
TRUE	OSI_DNP_MAP_DNP.BO_00000.status	0	SPS	OSI_BO_VAR_CNRL_MODE.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00000.operPulse	0	operSPC	OSI_BO_VAR_CNRL_MODE.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00000.operLatchOn	0	operSPC	OSI_BO_VAR_CNRL_MODE.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00000.operLatchOff	0	operSPC	OSI_BO_VAR_CNRL_MODE.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00000.operTrip	0	operSPC	OSI_BO_VAR_CNRL_MODE.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00000.operClose	0	operSPC	OSI_BO_VAR_CNRL_MODE.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00001.status	1	SPS	OSI_BO_VOLT_CNRL_MODE.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00001.operPulse	1	operSPC	OSI_BO_VOLT_CNRL_MODE.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00001.operLatchOn	1	operSPC	OSI_BO_VOLT_CNRL_MODE.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00001.operLatchOff	1	operSPC	OSI_BO_VOLT_CNRL_MODE.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00001.operTrip	1	operSPC	OSI_BO_VOLT_CNRL_MODE.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00001.operClose	1	operSPC	OSI_BO_VOLT_CNRL_MODE.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00002.status	2	SPS	OSI_BO_PF_CNRL_MODE.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00002.operPulse	2	operSPC	OSI_BO_PF_CNRL_MODE.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00002.operLatchOn	2	operSPC	OSI_BO_PF_CNRL_MODE.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00002.operLatchOff	2	operSPC	OSI_BO_PF_CNRL_MODE.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00002.operTrip	2	operSPC	OSI_BO_PF_CNRL_MODE.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00002.operClose	2	operSPC	OSI_BO_PF_CNRL_MODE.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00003.status	3	SPS	OSI_BO_START_STOP.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00003.operPulse	3	operSPC	OSI_BO_START_STOP.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00003.operLatchOn	3	operSPC	OSI_BO_START_STOP.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00003.operLatchOff	3	operSPC	OSI_BO_START_STOP.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00003.operTrip	3	operSPC	OSI_BO_START_STOP.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00003.operClose	3	operSPC	OSI_BO_START_STOP.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00004.status	4	SPS	OSI_BO_SEL_COOLDOWN_MODE.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00004.operPulse	4	operSPC	OSI_BO_SEL_COOLDOWN_MODE.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00004.operLatchOn	4	operSPC	OSI_BO_SEL_COOLDOWN_MODE.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00004.operLatchOff	4	operSPC	OSI_BO_SEL_COOLDOWN_MODE.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00004.operTrip	4	operSPC	OSI_BO_SEL_COOLDOWN_MODE.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00004.operClose	4	operSPC	OSI_BO_SEL_COOLDOWN_MODE.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00005.status	5	SPS	OSI_BO_PRE_SELECT_LD.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00005.operPulse	5	operSPC	OSI_BO_PRE_SELECT_LD.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00005.operLatchOn	5	operSPC	OSI_BO_PRE_SELECT_LD.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00005.operLatchOff	5	operSPC	OSI_BO_PRE_SELECT_LD.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00005.operTrip	5	operSPC	OSI_BO_PRE_SELECT_LD.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00005.operClose	5	operSPC	OSI_BO_PRE_SELECT_LD.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00006.status	6	SPS	OSI_BO_BASE_PEAK_LD.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00006.operPulse	6	operSPC	OSI_BO_BASE_PEAK_LD.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00006.operLatchOn	6	operSPC	OSI_BO_BASE_PEAK_LD.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00006.operLatchOff	6	operSPC	OSI_BO_BASE_PEAK_LD.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00006.operTrip	6	operSPC	OSI_BO_BASE_PEAK_LD.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00006.operClose	6	operSPC	OSI_BO_BASE_PEAK_LD.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00007.status	7	SPS	OSI_BO_FUEL_SELECT.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00007.operPulse	7	operSPC	OSI_BO_FUEL_SELECT.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00007.operLatchOn	7	operSPC	OSI_BO_FUEL_SELECT.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00007.operLatchOff	7	operSPC	OSI_BO_FUEL_SELECT.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00007.operTrip	7	operSPC	OSI_BO_FUEL_SELECT.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00007.operClose	7	operSPC	OSI_BO_FUEL_SELECT.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00008.status	8	SPS	OSI_BO_ISOC_DROOP.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00008.operPulse	8	operSPC	OSI_BO_ISOC_DROOP.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00008.operLatchOn	8	operSPC	OSI_BO_ISOC_DROOP.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00008.operLatchOff	8	operSPC	OSI_BO_ISOC_DROOP.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00008.operTrip	8	operSPC	OSI_BO_ISOC_DROOP.operTrip				Pulse	1	2000	2000	

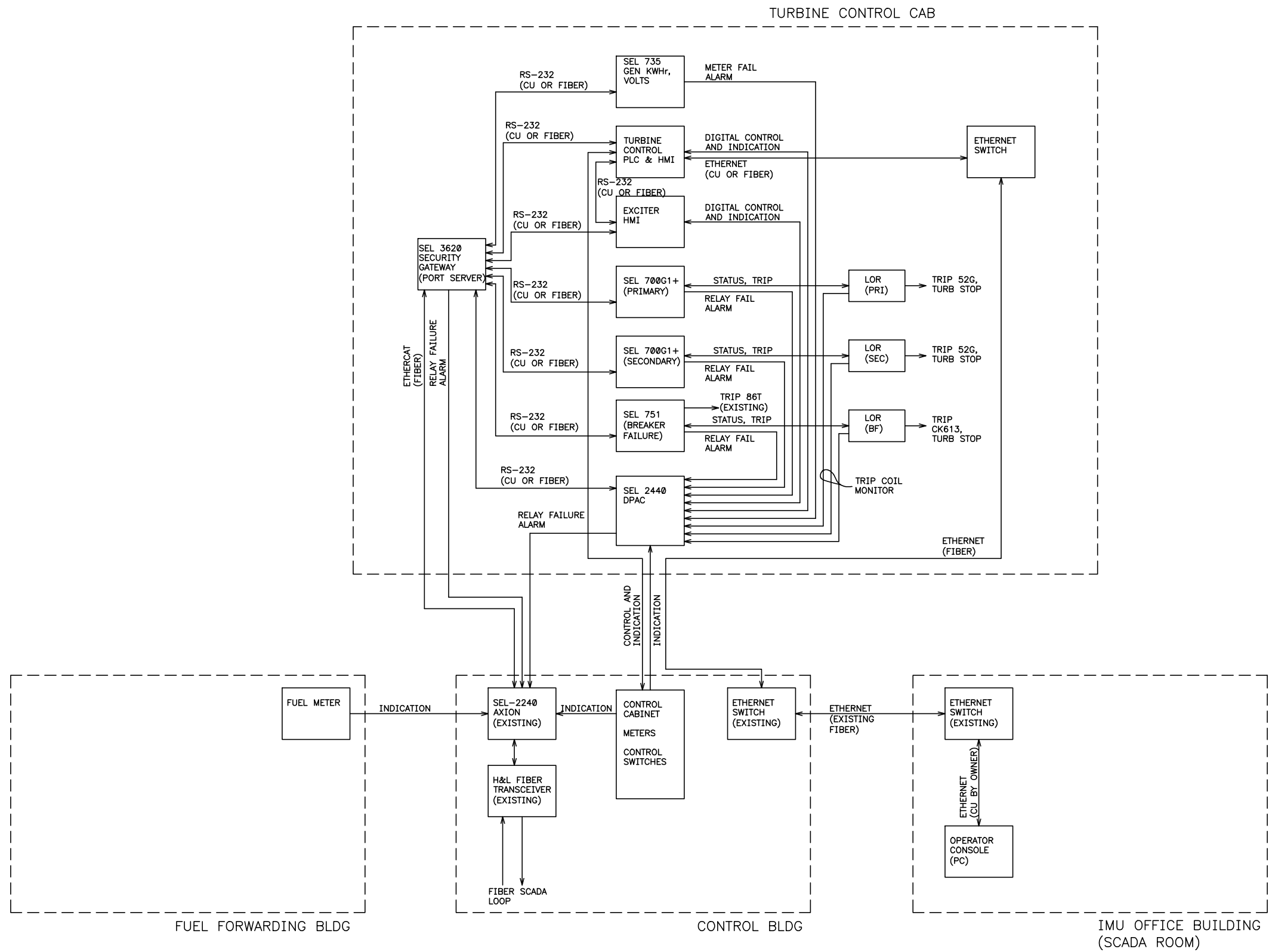
ENABLE	TAG NAME	POINT NUMBER	TAG TYPE	TAG ALIAS	VAR OBJ 10 DEFAULT	EVENT CLASS	STATUS VALUE	CONTROL MODEL	NUMBER OF PULSES	ON PULSE DURATION	OFF PULSE DURATION	COMMENT
TRUE	OSI_DNP_MAP_DNP.BO_00008.operClose	8	operSPC	OSI_BO_ISOC_DROOP.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00009.status	9	SPS	OSI_BO_EXCITER_AM_MODE.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00009.operPulse	9	operSPC	OSI_BO_EXCITER_AM_MODE.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00009.operLatchOn	9	operSPC	OSI_BO_EXCITER_AM_MODE.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00009.operLatchOff	9	operSPC	OSI_BO_EXCITER_AM_MODE.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00009.operTrip	9	operSPC	OSI_BO_EXCITER_AM_MODE.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00009.operClose	9	operSPC	OSI_BO_EXCITER_AM_MODE.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00010.status	10	SPS	OSI_BO_ESTOP.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00010.operPulse	10	operSPC	OSI_BO_ESTOP.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00010.operLatchOn	10	operSPC	OSI_BO_ESTOP.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00010.operLatchOff	10	operSPC	OSI_BO_ESTOP.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00010.operTrip	10	operSPC	OSI_BO_ESTOP.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00010.operClose	10	operSPC	OSI_BO_ESTOP.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00011.status	11	SPS	OSI_BO_ALARM_LIGHT.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00011.operPulse	11	operSPC	OSI_BO_ALARM_LIGHT.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00011.operLatchOn	11	operSPC	OSI_BO_ALARM_LIGHT.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00011.operLatchOff	11	operSPC	OSI_BO_ALARM_LIGHT.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00011.operTrip	11	operSPC	OSI_BO_ALARM_LIGHT.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00011.operClose	11	operSPC	OSI_BO_ALARM_LIGHT.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00012.status	12	SPS	OSI_BO_ALARM_HORN.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00012.operPulse	12	operSPC	OSI_BO_ALARM_HORN.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00012.operLatchOn	12	operSPC	OSI_BO_ALARM_HORN.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00012.operLatchOff	12	operSPC	OSI_BO_ALARM_HORN.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00012.operTrip	12	operSPC	OSI_BO_ALARM_HORN.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00012.operClose	12	operSPC	OSI_BO_ALARM_HORN.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00013.status	13	SPS	OSI_BO_MVAR_RAISE_LOWER.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00013.operPulse	13	operSPC	OSI_BO_MVAR_RAISE_LOWER.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00013.operLatchOn	13	operSPC	OSI_BO_MVAR_RAISE_LOWER.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00013.operLatchOff	13	operSPC	OSI_BO_MVAR_RAISE_LOWER.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00013.operTrip	13	operSPC	OSI_BO_MVAR_RAISE_LOWER.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00013.operClose	13	operSPC	OSI_BO_MVAR_RAISE_LOWER.operClose				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00014.status	14	SPS	OSI_BO_MW_RAISE_LOWER.status	2	0	FALSE					
TRUE	OSI_DNP_MAP_DNP.BO_00014.operPulse	14	operSPC	OSI_BO_MW_RAISE_LOWER.operPulse				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00014.operLatchOn	14	operSPC	OSI_BO_MW_RAISE_LOWER.operLatchOn				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00014.operLatchOff	14	operSPC	OSI_BO_MW_RAISE_LOWER.operLatchOff				Persist				
TRUE	OSI_DNP_MAP_DNP.BO_00014.operTrip	14	operSPC	OSI_BO_MW_RAISE_LOWER.operTrip				Pulse	1	2000	2000	
TRUE	OSI_DNP_MAP_DNP.BO_00014.operClose	14	operSPC	OSI_BO_MW_RAISE_LOWER.operClose				Pulse	1	2000	2000	

COUNTERS

ENABLE	TAG NAME	POINT NUMBER	TAG TYPE	TAG ALIAS	VAR OBJ 20 DEFAULT	VAR OBJ 21 DEFAULT	VAR OBJ 22 DEFAULT	VAR OBJ 23 DEFAULT	EVENT CLASS	FROZEN EVENT CLASS	ACTUAL VALUE	FROZEN VALUE	COMMENT
TRUE	OSI_DNP_I	0	BCR	OSI_FUEL_OIL_ACCUMULATOR	6	6	2	6	0	0	0	0	
TRUE	OSI_DNP_I	1	BCR	OSI_GEN_PULSE_ACCUMULATOR	6	6	2	6	0	0	0	0	
TRUE	OSI_DNP_I	2	BCR	OSI_ST_PWR_PULSE_ACCUMULATOR	6	6	2	6	0	0	0	0	
TRUE	OSI_DNP_I	3	BCR		6	6	2	6	0	0	0	0	
TRUE	OSI_DNP_I	4	BCR		6	6	2	6	0	0	0	0	

ANALOG INPUTS

ENABLE	TAG NAME	POINT NUMBER	TAG TYPE	TAG ALIAS	VAR OBJ 30 DEFAULT	VAR OBJ 32 DEFAULT	EVENT CLASS	STATUS VALUE	INST MAGNITUDE	MAGNITUDE	DEADBAND	ZERO DEADBAND	MAX VALUE	HH LIMIT	H LIMIT	L LIMIT	LL LIMIT	MIN VALUE
TRUE	OSI_DNP_MAP_DNP.AI_00000	0	MV	OSI_A1	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00001	1	MV	OSI_UNIT8_MVARS	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00002	2	MV	OSI_UNIT8_MW	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00003	3	MV	OSI_A4	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00004	4	MV	OSI_A5	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00005	5	MV	OSI_OLD_TURBINE_RPM	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00006	6	MV	OSI_A7	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00007	7	MV	OSI_A8	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00008	8	MV	OSI_GEN_FREQUENCY	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00009	9	MV	OSI_GEN_VOLTS_AB	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00010	10	MV	OSI_GEN_VOLTS_BC	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00011	11	MV	OSI_GEN_VOLTS_CA	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00012	12	MV	OSI_GEN_AMPS_A	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00013	13	MV	OSI_GEN_AMPS_B	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00014	14	MV	OSI_GEN_AMPS_C	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00015	15	MV	OSI_A16	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00016	16	MV	OSI_A17	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00017	17	MV	OSI_A18	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00018	18	MV	OSI_A19	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00019	19	MV	OSI_DIESEL_SPEED	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00020	20	MV	OSI_REQ_WATER_FUEL	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00021	21	MV	OSI_ACT_WATER_FUEL	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00022	22	MV	OSI_FUEL_FLOW_RATE	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00023	23	MV	OSI_DIESEL_COOLING_TEMP	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00024	24	MV	OSI_LUBE_OIL_TEMP	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00025	25	MV	OSI_A26	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00026	26	MV	OSI_A27	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00027	27	MV	OSI_Bus_VOLTS	4	4	2		0	0	100	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00028	28	MV	OSI_TURBINE_SPEED	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00029	29	MV	OSI_EXHAUST_TEMP	4	4	2		0	0	10	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00030	30	MV	OSI_FUEL_STROKE	4	4	2		0	0	1	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37
TRUE	OSI_DNP_MAP_DNP.AI_00031	31	MV	OSI_H2O_TANK_LEVEL	4	4	2		0	0	1	2	1.00E+37	1.00E+36	1.00E+35	-1.00E+35	-1.00E+36	-1.00E+37



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ALSTHOM

FRANCE

1977

GENERATOR

Y

TYPE T190-200N° 410729

VOLTS

13800±5%

AMP.

1149

r.p.m.

3600

kVA

27471

DUTY

CONTINUOUS

TEMP

COLD AIR 150°C
STATOR 120°C
ROTOR 120°C

INSULCL F

cosφ

0.85

c/s

60

PROTECT.

ENCLOSED WITH
AIR FILTER

EXCITATION

V 182 A 434



GE GAS TURBINE

GREENVILLE, S.C. USA

NO: 00T143 AIR IN: 85°F ALT: 956 FT
BASE: 19,880 KW PEAK: FUEL: DISTILLATE
TURBINE EXHAUST: BASE: 913°F PEAK: PRESS: 14.30 PSI
CPRSR: STAGES 17 RPM 5100 CPRSR TURBINE: STAGES: 2
POWER TURBINE: STAGES RPM

CAUTION!

BEFORE INSTALLING, OPERATING OR DISMANTLING, READ GEK

SCHENECTADY, N. Y., GREENVILLE, S.C.

N. P. 275800

INDIANOLA MUNICIPAL UTILITIES

TURBINE 8 CONTROL REPLACEMENT PROJECT VOLUME 2 - TURBINE DATA



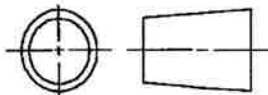
ISSUED FOR APPROVAL
OCTOBER 19, 2022



Appendix E - Turbine Field Devices

SIZE A	DWG NO 368A6177	SH 1	REV -
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THIRD ANGLE PROJECTION



THIS DOCUMENT SHALL BE REVISED IN ITS ENTIRETY. ALL SHEETS OF THIS DOCUMENT ARE THE SAME REVISION LEVEL AS INDICATED IN THE REVISION BLOCK.

REVISIONS

REV	DESCRIPTION	DATE	APPROVED

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 GENERAL ELECTRIC COMPANY.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PL DECIMALS ± 3 PL DECIMALS ± ANGLES ± FRACTIONS ± ✓	SIGNATURES	DATE	GENERAL ELECTRIC COMPANY GE Power Generation		
	DESIGNED <i>J. S. May</i> CHECKED <i>S. M. H. J. J. J.</i> DRAWN <i>W. S. H. J. J.</i> <i>Rich J. J. J.</i>	<i>03-2-21</i> <i>00-3-21</i> <i>00-03-27</i>			Device Summary First made for: ML:324A2977G001 DM:F2977G1 CC: 0414
	SIZE A		CAGE CODE DWG NO 368A6177	SCALE NONE	SHEET 1 OF 14
	DT-1N		FCTD		

Thu Mar 30 07:02:16 2000 "bob12"

SIZE	DWG NO	SR	REV
A	368A6177	2	-

System	Title
0415	CONTROL DEVICES -TURBINE
0416	LUBE OIL SYSTEM
0417	COOL & SEAL AIR SYSTEM
0418	TRIP OIL SYSTEM
0419	CONTROL AIR
0420	COOLING WATER SYSTEM
0421	STARTING SYSTEM
0422	GAS FUEL SYSTEM
0424	LIQUID FUEL SYSTEM
0425	ATOMIZING AIR SYSTEM
0426	FIRE PROTECTION SYSTEM
0427	FUEL FORWARDING SYSTEM
0434	HYDRAULIC SUPPLY SYSTEM
0436	HEAT & VENT SYSTEM
0462	WATER INJECTION SYSTEM
0477	FUEL PURGE

 GE Power Generation		GENERAL ELECTRIC COMPANY SCHENECTADY, NY	SIZE	CAGE CODE	DWG NO
			A		368A6177
DRAWN	Bill Maginn	2000-03-21			
ISSUED	Document Services	2000-03-21	SCALE	NONE	SHEET 2

SWITCH SETTINGS

Contact Condition		Additional Contacts	
NO -	Normally open	CEC -	Additional contact: Normally closed Electrically common
NC -	Normally closed	CES -	Additional contact: Normally closed Electrically separate
() -	Parenthesis indicates sets of contacts	OEC -	Additional contact: Normally open Electrically common
		OES -	Additional contact: Normally open Electrically separate

Example: NORM = (2) NO-CEC

 GE Power Generation GENERAL ELECTRIC COMPANY SCHENECTADY, NY		SIZE A	CAGE CODE	DWG NO 368A6177
DRAWN Bill Maginn	2000-03-21	SCALE NONE		SHEET 3
ISSUED Document Services	2000-03-21			

Device	System	Settings
12A	0418	TURBINE OVERSPEED ALARM SWITCH NORM=NC-OES;
20AA-1	0425	ATOMIZING AIR BYPASS VALVE NORM=A TO C OPEN; B CLOSED
20CB-1	0417	COMPRESSOR BLEED SOL 3 WAY VALVE NORM=B TO C OPEN; A CLOSED
20CF	0424	FUEL CLUTCH SOLENOID 3 WAY VALVE ND
20CS	0419	STARTING CLUTCH SOLENOID VALVE NORM=A TO C OPEN; B CLOSED 3 WAY VALVE
20DA	0421	DIESEL ENGINE ACCEL SOLENOID NR (4)
20DT	0421	DIESEL ENGINE EMERGENCY TRIP SOLENOID VALVE NC
20DV	0421	DIESEL ENGINE STOP SOLENOID VALVE NC
20FD	0427	DISTILLATE FUEL STOP VALVE
20FL	0424	LIQUID FUEL STOP VALVE TRIP SERVO VALVE
20PG-1	0477	GAS FUEL SYSTEM PURGE SOLENOID VALVE NORM=1 TO 3 OPEN; 2 CLOSED; PRESSURE AT 2 PRIMARY GAS FUEL SYSTEM-NORMALLY CLOSED
20PG-2	0477	GAS FUEL SYSTEM PURGE SOLENOID VALVE NORM=1 TO 3 OPEN; 2 CLOSED; PRESSURE AT 2 PRIMARY GAS FUEL SYSTEM-NORMALLY CLOSED
20PL-1	0477	LIQUID FUEL SYSTEM PURGE SOLENOID VALVE NORM=A TO C OPEN; B CLOSED
20TU	0421	TORQUE CONVERTER UNLOADING(DRAIN) SOLENOID VALVE NC (2)
20TV	0434	TURBINE COMPRESSOR IGV SOLENOID VALVE B TO T AND P TO A OPEN (4)
20VG-2	0477	FUEL GAS VENT SOLENOID VALVE NORM=1 TO 3 OPEN; 2 CLOSED; PRESS AT 2 NORM=OPEN TO PG-1 GAS PURGE VENT VALVE. THE ACTUATION SOLENOID IS A PART OF THE VALVE.
20WN-1	0462	WATER INJECTION SOL (MOTOR) VALVE NORM=CLOSED; VENTED TO DRAIN, PART OF VS2-1 120 VAC 60 HZ, 0.5 AMP
23HA-1	0436	SPACE HEATER-ACCESSORY COMPARTMENT 6.000 KW; 480 VAC; 3 PH; 60 HZ;
23HA-2	0436	SPACE HEATER-ACCESSORY COMPARTMENT 6.000 KW; 480 VAC; 3 PH; 60 HZ;
23HT-1	0436	SPACE HEATER-TURBINE COMPARTMENT 6.000 KW; 480 VAC; 3 PH; 60 HZ;



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Device	System	Settings
23HT-2	0436	SPACE HEATER-TURBINE COMPARTMENT 6.000 KW; 480 VAC; 3 PH; 60 HZ;
23QT-1	0416	IMMERSION HEATER-LUBE OIL TANK 5.000 KW; 480 VAC; 3 PH; 60 HZ;
23QT-2	0416	IMMERSION HEATER-LUBE OIL TANK 5.000 KW; 480 VAC; 3 PH; 60 HZ;
23QT-3	0416	IMMERSION HEATER-LUBE OIL TANK 5.000 KW; 480 VAC; 3 PH; 60 HZ;
23QT-4	0416	IMMERSION HEATER-LUBE OIL TANK 5.000 KW; 480 VAC; 3 PH; 60 HZ;
23WN-1	0462	WATER INJECTION PUMP MOTOR SPACE HEATER 60.00 W; 120 VAC; 1 PH; 60 HZ; PART OF 88WN-1
23WR-1	0462	WATER INJECTION SKID COMPT HEATER 10.00 KW; 460 VAC; 3 PH; 60 HZ; 10 KW IS MAX CASE
26AA-1	0425	ATOMIZING AIR TEMP SWITCH INCREASING: 275.0+-5.000 F OR 135.0+-2.778 C NORM=(2) NC-OEC;
26BA-1	0436	TURBINE COMPARTMENT HIGH TEMP-ALARM INCREASING: 300.0+-2.000 F OR 148.9+-1.111 C NC-SPST
26BA-2	0436	TURBINE COMPARTMENT TEMP-FAN SHUT OFF CONT DECREASING: 120.0+-2.000 F OR 48.89+-1.111 C NO-SPST
26DW-1	0420	COOLING WATER TEMP-DIESEL ENGINE INCREASING: 210.0+-3.000 F OR 98.89+-1.667 C (DECREASING: 190.0+-10.00 F OR 87.78+-5.556 C) NORM=(2) NC-OEC;
26HA	0436	ACCESSORY COMPARTMENT HEATER THERMOSTAT INCREASING: 50.00+-2.000 F OR 10.00+-1.111 C NO-DPST
26HT	0436	TURBINE COMPARTMENT HEATER THERMOSTAT INCREASING: 20.00+-2.000 F OR -6.667+-1.111 C NC-SPDT
26JS-1	0462	WATER INJECTION SKID COMPT THERMOSTAT INCREASING: 85.00+-3.000 F OR 29.44+-1.667 C (DECREASING: 82.00+-6.000 F OR 27.78+-3.333 C) NORM=(1) NO-CEC; CLOSSES TO CONTROL 88JS-1;
26JS-2	0462	WATER INJECTION SKID COMPT TEMP HIGH INCREASING: 115.0+-5.000 F OR 46.11+-2.778 C (DECREASING: 112.0+-5.000 F OR 44.44+-2.778 C) NORM=(1) NC-OEC; OPENS TO ALARM ON HIGH SKID TEMP;
26QA	0416	LUBE OIL HEADER-HIGH TEMP ALARM INCREASING: 165.0+-5.000 F OR 73.89+-2.778 C NC-SP

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Device	System	Settings
26QL	0416	LUBE OIL TANK TEMPERATURE-LOW INCREASING: 60.00+-5.000 F OR 15.56+-2.778 C NC-SP
26QM	0416	LUBE OIL TANK TEMPERATURE-MODERATE INCREASING: 70.00+-5.000 F OR 21.11+-2.778 C NC-SP
26QN	0416	LUBE OIL TANK TEMPERATURE-NORMAL DECREASING: 50.00+-5.000 F OR 10.00+-2.778 C NO-SP
26QT	0416	LUBE OIL HEADER HIGH TEMP TRIP INCREASING: 175.0+-3.000 F OR 79.44+-1.667 C NC-SP
26WR-1	0462	WATER INJECTION SKID COMPT THERMOSTAT DECREASING: 50.00+-2.000 F OR 10.00+-1.111 C (INCREASING: 55.00+-4.000 F OR 12.78+-2.222 C) NORM=(1) NC-OEC; CLOSSES W/ LOW TEMP TO CONTROL 23WR-1;
26WR-2	0462	WATER INJECTION SKID COMPT TEMP LOW DECREASING: 40.00+-2.000 F OR 4.444+-1.111 C (INCREASING: 47.00+-4.000 F OR 8.333+-2.222 C) NORM=(1) NO-CEC; OPENS TO ALARM ON LOW TEMP;
28FD-7	0415	FLAME DETECTOR COMBUSTION CHAMBER #7 HONEYWELL
28FD-8	0415	FLAME DETECTOR COMBUSTION CHAMBER #8 HONEYWELL
33CB-3	0417	COMP BLEED VALVE LIMIT SWITCH NORM=NO-CES;
33CB-4	0417	COMP BLEED VALVE LIMIT SWITCH NORM=NO-CES;
33CL-1A	0426	CO2 RELEASE BLOCKING DEVICE-LIMIT SWITCH NORM=SPDT INITIAL DISCHARGE
33CL-1B	0426	CO2 RELEASE BLOCKING DEVICE-LIMIT SWITCH NORM=SPDT EXTENDED DISCHARGE
33CS	0419	STARTING CLUTCH LIMIT SWITCH
33FL	0424	LIQUID FUEL STOP VALVE LIMIT SWITCH NORM=NO-CES;
33HR	0418	HYDRAULIC RATCHET-LIMIT SWITCH
33PG-1	0477	FUEL GAS SYSTEM PURGE VALVE LIMIT SWITCH
33PG-2	0477	FUEL GAS SYSTEM PURGE VALVE LIMIT SWITCH THIS DEVICE IS SUPPLIED AS PART OF VA13. NORM=(2) NO-CES; CLOSED WITH VALVE OPEN
33PG-3	0477	FUEL GAS SYSTEM PURGE VALVE LIMIT SWITCH NORM=(2) NC-OES; CLOSED WITH VALVE CLOSED; THIS DEVICE IS SUPPLIED AS PART OF VA13.



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Device	System	Settings
33PG-4	0477	FUEL GAS SYSTEM PURGE VALVE LIMIT SWITCH PART OF VA13 VALVE. NORM=(2) NO-CES; CLOSED WITH VALVE OPEN
33TV	0434	VIGV LIMIT SWITCH ASSY
39FC-1	0420	VIBRATION SWITCH-COOLING WATER FAN NORM=(2) NC-OEC; MOTOR TRIP AND ALARM
39FC-2	0420	VIBRATION SWITCH-COOLING WATER FAN NORM=(2) NC-OEC; MOTOR TRIP AND ALARM
39V-1	0415	VIBRATION SENSOR TURBINE
39V-2	0415	VIBRATION SENSOR TURBINE
43DE	0421	DIESEL ENGINE TEST SWITCH
43HR	0418	HYDRAULIC RATCHET-CONTROL SWITCH
45CP-1A	0426	FIRE PROTECTION-PRESSURE SWITCH
45CR-1A	0426	FIRE PROTECTION-RELEASE SOLENOID VALVE
45CR-2A	0426	FIRE PROTECTION-RELEASE SOLENOID VALVE
45FA1-1A	0426	FIRE DETECTOR-ACCESSORY COMPARTMENT INCREASING: 325.0 F OR 162.8 C
45FA2-2A	0426	FIRE DETECTOR-ACCESSORY COMPARTMENT INCREASING: 325.0 F OR 162.8 C
45FG1-1A	0426	FIRE DETECTOR-GENERATOR
45FT-1A	0426	FIRE DETECTOR-TURBINE COMPARTMENT INCREASING: 450.0 F OR 232.2 C NO-SPST
45FT-2A	0426	FIRE DETECTOR-TURBINE COMPARTMENT INCREASING: 450.0 F OR 232.2 C NO-SPST
45FT-3A	0426	FIRE DETECTOR-TURBINE COMPARTMENT INCREASING: 600.0 OR 600.0 NO-SPST
45FT-4A	0426	FIRE DETECTOR-TURBINE COMPARTMENT INCREASING: 450.0 F OR 232.2 C NO-SPST
45FT-5A	0426	FIRE DETECTOR-TURBINE COMPARTMENT INCREASING: 450.0 F OR 232.2 C NO-SPST
45FT-6A	0426	FIRE DETECTOR-TURBINE COMPARTMENT INCREASING: 600.0 F OR 315.6 C NO-SPST
49HA-1	0436	ACCESSORY COMPT SPACE HEATER OVERLOAD(PT OF 23HA-1)
49HA-2	0436	ACCESSORY COMPT SPACE HEATER OVERLOAD(PT OF 23HA-2)
49HT-1	0436	TURBINE COMPARTMENT SPACE HTR OVERLOAD (PT OF 23HT-1)
49HT-2	0436	TURBINE COMPARTMENT SPACE HTR OVERLOAD (PT OF 23HT-2)

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Device	System	Settings
63AD-1	0425	ATOMIZING AIR COMP DIFF PRESSURE SWITCH DECREASING: 4.000+-1.000 PSIG OR 0.2759+-0.0690 BARG (INCREASING: 11.00+-1.000 PSIG OR 0.7587+-0.0690 BARG) NORM=(2) NO-CES; ENERGIZE TO CLOSE;
63DM-1	0421	DIESEL ENGINE MIN SPEED INCREASING: 8.000+-0.5000 PSIG OR 0.5518+-0.0345 BARG (DECREASING: 4.000+-0.5000 PSIG OR 0.2759+-0.0345 BARG) NORM=(2) NC-OES;
63FD-1	0427	DISTILLATE FUEL PRESSURE DECREASING: 43.00+-1.500 PSIG OR 2.966+-0.1035 BARG (INCREASING: 50.00+-1.500 PSIG OR 3.448+-0.1035 BARG) NORM=NC-CES;
63FD-2	0427	FUEL FORWARDING PRESSURE DECREASING: 43.00+-1.500 PSIG OR 2.966+-0.1035 BARG (INCREASING: 50.00+-1.500 PSIG OR 3.448+-0.1035 BARG) NORM=NC-CES;
63FG	0422	GAS FUEL PRESSURE INCREASING: 175.0+-5.000 PSIG OR 12.07+-0.3449 BARG (DECREASING: 165.0+-2.000 PSIG OR 11.38+-0.1379 BARG) NORM=NO-CES;
63FL-2	0424	LIQUID FUEL PRESSURE SWITCH DECREASING: 12.00+-2.000 PSIG OR 0.8276+-0.1379 BARG (INCREASING: 16.00+-0.5000 PSIG OR 1.104+-0.0345 BARG) NORM=(2) NO-CES;
63HG	0418	HYDRAULIC TRIP PRESSURE FOR GAS FUEL STOP VALVE INCREASING: 26.00+-1.000 PSIG OR 1.793+-0.0690 BARG (DECREASING: 20.00+-1.000 PSIG OR 1.379+-0.0690 BARG) NORM=(2) NO-CES;
63HL	0418	HYDRAULIC TRIP PRESSURE FOR LIQUID FUEL STOP VALVE INCREASING: 26.00+-1.000 PSIG OR 1.793+-0.0690 BARG (DECREASING: 20.00+-1.000 PSIG OR 1.379+-0.0690 BARG) NORM=(2) NO-CES;
63HQ	0434	LOW HJYD OIL SUPPLY PRESSURE-ALARM DECREASING: 1150+-40.00 PSIG OR 79.32+-2.759 BARG (INCREASING: 1050+-30.00 PSIG OR 72.42+-2.069 BARG) NORM=(2) NO-CES;
63PG-1	0477	FUEL GAS SYSTEM PURGE PRESSURE SWITCH INCREASING: 50.00+-1.000 PSIG OR 3.448+-0.0690 BARG (DECREASING: 46.00+-3.000 PSIG OR 3.173+-0.2069 BARG) PRIMARY GAS FUEL SYSTEM
63QA	0416	LOW LUBE OIL PRESSURE-ALARM INCREASING: 16.00+-1.000 PSIG OR 1.104+-0.0690 BARG (DECREASING: 12.00+-1.000 PSIG OR 0.8276+-0.0690 BARG) NC-OES
63QD	0421	DIESEL ENGINE LUBE OIL PRESSURE SWITCH DECREASING: 8.500+-0.5000 PSIG OR 0.5862+-0.0345 BARG (INCREASING: 4.500+-0.5000 PSIG OR 0.3104+-0.0345 BARG) NORM=(2) NO-CEC;


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63QL	0416	EMERGENCY LUBE OIL PUMP-START INCREASING: 9.000+-1.000 PSIG OR 0.6207+-0.0690 BARG (DECREASING: 6.000+-1.000 PSIG OR 0.4138+-0.0690 BARG) NORM=OES; NC-OES
63QN	0416	NORMAL LUBE OIL PRESS-EMERGENCY PUMP STOP INCREASING: 18.00+-1.000 PSIG OR 1.241+-0.0690 BARG (DECREASING: 15.00+-1.000 PSIG OR 1.035+-0.0690 BARG) NC-OES
63QT	0416	TURBINE BEARING HEADER LUBE OIL LUBE PRESSURE TRIP INCREASING: 8.000+-1.000 PSIG OR 0.5518+-0.0690 BARG (DECREASING: 8.900+-0.5000 PSIG OR 0.6138+-0.0345 BARG) NO-CES
63WC-1	0420	LOW COOLING WATER PRESSURE DECREASING: 38.00+-1.000 PSIG OR 2.621+-0.0690 BARG NORM=(2) NO-CEC; ALARM & AUX PUMP START;
63WN-1	0462	WATER INJECTION PRESSURE DECREASING: 7.000+-1.000 PSIA OR 0.4828+-0.0690 BARA (INCREASING: 8.000+-1.000 PSIA OR 0.5518+-0.0690 BARA) NORM=(1) NO-CEC; OPENS ON DECR ABS INLET PRESSURE;
63WN-3	0462	WATER INJECTION DIFFERENTIAL PRESSURE INCREASING: 15.00+-1.000 PSID OR 1.035+-0.0690 BARD (DECREASING: 13.50+-1.000 PSID OR 0.9311+-0.0690 BARD) NORM=(1) NC-OEC; OPENS ON INCR FW1-1 PRESSURE DIF;
65DE	0421	TACHOMETER GENERATOR-DIESEL ENGINE
65FP	0424	BYPASS VALVE SERVO RATED FLOW: 0.5000 GPM AT 1000 PSID
65GC	0422	GAS CONTROL VALVE SERVO VALVE
71QH	0416	HIGH LUBE OIL LEVEL NORM=NC-OES; SEE LUBE OIL
71QL	0416	LUBE OIL TANK LEVEL LOW INDICATOR NORM=NC-CEC; SEE LUBE OIL
71WL-1	0420	LOW COOLING WATER LEVEL NORM=(2) NO-CEC;
71WS-1	0424	WASTE SUMP TANK LEVEL-HIGH ALARM NORM=NO-CEC; SEE LIQUID FUEL
71WS-2	0424	WASTE SUMP TANK LEVEL-LOW NORM=NO-CEC; SEE LIQUID FUEL
77FD-1	0424	FLOW DIVIDER MAG PICKUP-SPEED
77FD-2	0424	FLOW DIVIDER MAG PICKUP-SPEED
77HC-1	0415	HIGH PRESSURE SET MAGNETIC PICKUP-SPEED CM
77HC-2	0415	HIGH PRESSURE SET MAGNETIC PICKUP-SPEED CM

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Device	System	Settings
77HT-1	0415	HIGH PRESSURE SET MAGNETIC PICKUP (OVERSPEED)
77HT-2	0415	HIGH PRESSURE SET MAGNETIC PICKUP (OVERSPEED)
77HT-3	0415	HIGH PRESSURE SET MAGNETIC PICKUP (OVERSPEED)
77HT-4	0415	HIGH PRESSURE SET MAGNETIC PICKUP (OVERSPEED)
88BA	0436	TURBINE AND ACCESSORY COMPT COOLING AIR FAN MOTOR 5.500 HP; 1800 RPM; 480 VAC; 3 PH; 60 HZ;
88DS	0421	DIESEL ENGINE ELECTRIC STARTING MOTOR 10.00 HP; 2500 RPM; 125 VDC;
88FC-1	0420	COOLING WATER FAN MOTOR 20.00 HP; 1800 RPM; 460 VAC; 3 PH; 60 HZ;
88FC-2	0420	COOLING WATER FAN MOTOR 20.00 HP; 1800 RPM; 460 VAC; 3 PH; 60 HZ;
88FD-1	0427	FUEL FORWARDING PUMP MOTOR 8.440 HP; 3600 RPM; 480 VAC; 3 PH; 60 HZ;
88FD-2	0427	FUEL FORWARDING PUMP MOTOR 8.440 HP; 3600 RPM; 480 VAC; 3 PH; 60 HZ;
88HA-1	0436	ACCESSORY COMPT SPACE HEATER BLOWER MOTOR(P.T. OF 23HA-1)
88HA-2	0436	ACCESSORY COMPT SPACE HEATER BLOWER MOTOR(P.T. OF 23HA-2)
88HR-1	0434	HYDRAULIC RATCHET PUMP MOTOR 0.7500 HP; 3000 RPM; 115 VDC;
88HT-1	0436	TURBINE COMPARTMENT SPACE HTR BLOWER MOTOR(P.T. OF 23HT-1)
88HT-2	0436	TURBINE COMPARTMENT SPACE HTR BLOWER MOTOR(P.T. OF 23HT-2)
88JS-1	0462	WATER INJECTION SKID COOLING AIR FAN MOTOR 0.5000 HP; 1800 RPM; 120 VAC; 1 PH; 60 HZ;
88QC	0416	COOLDOWN LUBE OIL PUMP 7.500 HP; 3600 RPM; 480 VAC; 3 PH; 60 HZ;
88QE-1	0416	EMERGENCY LUBE OIL PUMP MOTOR 7.500 HP; 3000 RPM; 120 VDC;
88WC-1	0420	COOLING WATER PUMP #1 MOTOR 20.00 HP; 3600 RPM; 460 VAC; 3 PH; 60 HZ;
88WC-2	0420	COOLING WATER PUMP #2 MOTOR 20.00 HP; 3600 RPM; 460 VAC; 3 PH; 60 HZ;
88WN-1	0462	WATER INJECTION PUMP MOTOR 100.0 HP; 3600 RPM; 460 VAC; 3 PH; 60 HZ; PART OF PW1-1 PUMP ASSY
88WP-1	0424	WASTE TRANSFER PUMP MOTOR 0.0500 HP; 1680 RPM; 480 VAC; 3 PH; 60 HZ;
90SR	0422	STOP/SPEED RATIO VALVE SERVO VALVE
90WN-1	0462	WATER INJECTION FLOW CONTROL VALVE ACTUATOR PART OF VC4-1 FLOW CONTROL VLV 4-20 MA INPUT SIGNAL, 120 VAC MOTOR
95GF-1	0422	FUEL GAS ANALOG FLOW COMPUTER RATED FLOW: MIN. 0.0 PPS OR 0.0 KG/S RATED FLOW: MAX. 6.000 PPS OR 2.722 KG/S



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Device	System	Settings
95SP-1	0415	COMBUSTION CHAMBER SPARK PLUG
95SP-2	0415	COMBUSTION CHAMBER SPARK PLUG
95TR-1	0415	IGNITION TRANSFORMER FOR 95SP-1
95TR-2	0415	IGNITION TRANSFORMER FOR 95SP-2
96CD	0417	COMPRESSOR DISCH PRESSURE TRANSMITTER
96FG	0422	GAS FUEL PRESSURE TRANSDUCER
96GC-1	0422	FUEL GAS CONTROL VALVE LVDT
96GC-2	0422	FUEL GAS CONTROL VALVE LVDT
96GS-1	0422	GAS FUEL SPLITTER VALVE LVDT
96SR-1	0422	STOP/SPEED RATIO VALVE LVDT
96WF-1	0462	WATER INJECTION FLOW TRANSMITTER 4.000+-0.2000 MA= 6.000 GPM OR 0.3785 LPS 20.00+-0.2000 MA= 60.00 GPM OR 3.785 LPS 2-WIRE LOOP POWERED, PART OF FM1-1
96WF-2	0462	WATER INJECTION FLOW TRANSMITTER 4.000+-0.2000 MA= 6.000 GPM OR 0.3785 LPS 20.00+-0.2000 MA= 60.00 GPM OR 3.785 LPS 2-WIRE LOOP POWERED, PART OF FM1-1
96WF-3	0462	WATER INJECTION FLOW TRANSMITTER 4.000+-0.2000 MA= 6.000 GPM OR 0.3785 LPS 20.00+-0.2000 MA= 60.00 GPM OR 3.785 LPS 2-WIRE LOOP POWERED, PART OF FM1-1
96WN-2	0462	WATER INJECTION CONTROL VALVE POSITION 4.000+-0.2000 MA= 4.000 GPM OR 0.2523 LPS 20.00+-0.2000 MA= 75.00 GPM OR 4.731 LPS POSITION FEEDBACK, PART OF 90WN-1
96WP-1	0462	WATER INJECTION SKID PRESSURE TRANSMITTER 4.000 +-0.2000 MA = 0.0 PSIG OR 0.0 BARG 20.00 +-0.2000 MA = 800.0 PSIG OR 55.18 BARG 2-WIRE LOOP POWERED, PUMP DISCHARGE PRESSURE
AL-58	0462	AC LIGHT-WATER INJECTION SKID 120 VAC, 60 HZ, 80 W, FLOURESCENT DC BATTERY BACKUP ON AC FAILURE
AL-59	0462	AC LIGHT-WATER INJECTION SKID 120 VAC, 60 HZ, 80 W, FLOURESCENT
AL-82	0462	AC LIGHT-WATER INJECTION SKID 120 VAC, 60 HZ, 80 W, FLOURESCENT
AL-86	0462	AC LIGHT-WATER INJECTION SKID 120 VAC, 60 HZ, 80 W, FLOURESCENT
AR-41	0462	AC RECEPTACLE-WATER INJECTION SKID POWER OUTLET, 120 VAC, 60 HZ, 1 PH, DUPLEX
AR-42	0462	AC RECEPTACLE-WATER INJECTION SKID POWER OUTLET, 120 VAC, 60 HZ, 1 PH, DUPLEX
ASW-28	0462	AC LIGHT SWITCH-WATER INJECTION SKID 120 VAC LIGHT SWITCH

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Device	System	Settings
CA1	0425	MAIN ATOMIZING AIR COMPRESSOR ROOTS ROTARY POSITIVE DISPLACEMENT RATED=3 LB/SEC AT 1.56 PRESS RATING SPEED: 6000 RPM; DRIVEN BY ACCESSORY GEAR
CA2	0425	BOOSTER ATOMIZING AIR COMPRESSOR DRIVEN BY: DIESEL ENGINE RATED: 264 CFM @ 8 PSIG SPEED: 3594 RPM
FA3-1	0477	LIQUID FUEL NOZZLE PURGE FILTER
FCV-1	0434	INLET GUIDE VANE FLOW CONTROL VALVE
FM1-1	0462	NOX REDUCTION WATER FLOW METER RANGE 6 - 60 GPM (23 - 227 LPM)
FT-GI-RTD1	0422	GAS FUEL SUPPLY TEMPERATURE
FW1-1	0462	WATER INJECTION FILTER MAIN FILTER, D/S OF PUMP BETA 200 FOR 20 MICRON PARTICLES
FW1-2	0462	WATER INJECTION SYSTEM STRAINER INLET STRAINER BASKET HAS 1/16 INCH HOLES 150# RATING
FW1-3	0462	WATER INJECTION SYSTEM STRAINER D/S FLOWMETER, IN-LINE CONE STRAINER, 600# 5/32 PERFORATIONS WITH 40 MESH SCREEN
FW3-1	0462	LAST CHANCE WATER INJECTION FILTER FILTRATION: 15 MICRON NOMINAL, PART OF VS2-1
HX1-1	0425	ATOMIZING AIR PRE-COOLER
MG2-2	0422	GAS FUEL METER TUBE/VENTURI-PRIMARY
PDD1	0425	ATOMIZING AIR FLUID PRESSURE DAMPENER
PDS1	0425	ATOMIZING AIR SEPARATOR
PW1-1	0462	WATER INJECTION PUMP RATED FLOW: 40.00 GPM AT 450 PSID (3600 RPM)
SL1-1	0426	FIRE ALARM STROBE AND HORN 100 DB @ 10 FT./300 CANDELA/24 VDC INTERIOR- ACCESS. COMPT. (ZONE 1) CLASS 1, GROUP D, DIV 2 APPROVED
TT-XD-1	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-10	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-11	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-12	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-2	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-3	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K

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Device	System	Settings
TT-XD-4	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-5	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-6	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-7	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-8	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
TT-XD-9	0415	EXHAUST TEMPERATURE THERMOCOUPLE TYPE K
VA13-1	0477	FUEL GAS SYSTEM PURGE VALVE PRIMARY GAS FUEL SYSTEM PURGE NORMALLY CLOSED
VA13-2	0477	FUEL GAS SYSTEM PURGE VALVE PRIMARY GAS FUEL SYSTEM PURGE-NORMALLY CLOSED
VA18-1	0425	ATOMIZING AIR COMPRESSOR BYPASS AIR OPERATED VALVE NORM=CLOSED;
VA19-1	0477	LIQUID FUEL NOZZLE PURGE VALVE NORM=C TO L OPEN; U CLOSED
VC4-1	0462	WATER INJECTION FLOW CONTROL VALVE 1" VALVE, MOTOR ACTUATED, 4 TO 75 GPM LINEAR FLOW CONTROLLER
VCK2-1TH10	0477	CHECK VALVE SET 0.5000+-0.5000 PSIG OR 0.0345+-0.0345 BARG LIQUID FUEL PURGE CHECK VALVE
VCK8-1T10	0462	WATER INJECTION CHECK VALVE SET 10.00+-1.000 PSID OR 0.6897+-0.0690 BARD CRACKING PRESSURE
VPR-1	0416	SI SUPPLY PRESSURE REGULATOR SET 50.00+-2.000 PSIG OR 3.448+-0.1379 BARG
VPR-2	0416	LUBE OIL HEADER PRESSURE REGULATOR VALVE 25 + 2, - 0 PSIG
VPR-5	0421	STARTING TURBINE BEARING LUBE OIL PRESSURE REG VALVE
VPR-6	0434	RATCHET SEQUENCE VALVE SET 230.0+-30.00 PSIG OR 15.86+-2.069 BARG
VPR35	0427	LIGHT DIST FUEL SUPPLY-PRESS REGULATOR VALVE SET 43.00+-1.000 PSIG OR 2.966+-0.0690 BARG
VPR54-1	0477	PURGE CONTROL VALVE AIR PRESSURE REGULATOR SET 47.50+-2.500 PSIG OR 3.276+-0.1724 BARG
VPR54-2	0477	PURGE CONTROL VALVE AIR PRESSURE REGULATOR SET 33.00+-0.5000 PSIG OR 2.276+-0.0345 BARG PRESSURE REGULATOR FOR THE CV500 CONTROL VALVE
VPR62-11	0462	H2O INJECTION STOP VALVE ACTUATION PRESSURE REGULATOR SET 100.0+-5.000 PSIG OR 6.897+-0.3449 BARG PART OF VS2-1 STOP VLV ASSY

 GE Power Generation GENERAL ELECTRIC COMPANY SCHENECTADY, NY		SIZE A	CAGE CODE	DWG NO 368A6177
DRAWN Bill Maginn	2000-03-21			
ISSUED Document Services	2000-03-21	SCALE NONE	SHEET 13	

Device	System	Settings
VPR7-1	0421	DIESEL ENGINE WATER INLET PRESSURE RGLTR 2 WAY VALVE SET 8.000+-0.5000 PSIG OR 0.5518+-0.0345 BARG 205 GPM FLOW
VQE1-1	0462	QUICK-EXHAUST VALVE, WATER INJECTION STOP VALVE PART OF VS2-1 STOP VALVE ASSY
VR-13	0421	DIESEL LUBE OIL PRESSURE RELIEF VALVE SET 125.0+-5.000 PSIG OR 8.621+-0.3449 BARG
VR1	0416	MAIN LUBE PUMP PRESSURE RELIEF VALVE SET 65.00+-2.000 PSIG OR 4.483+-0.1379 BARG
VR12-1	0425	ATOMIZING AIR BOOSTER PRESSURE RELIEF VALVE SET 20 1 PSIG
VR21	0434	MAIN HYDRAULIC SUPPLY PUMP PRESSURE RELIEF VALVE SET 1500+-50.00 PSIG OR 103.5+-3.448 BARG
VR3-1	0434	HYDRAULIC RATCHET PUMP PRESSURE RELIEF VALVE SET 1500+-50.00 PSIG OR 103.5+-3.448 BARG
VR4	0424	MAIN FUEL PUMP PRESSURE RELIEF VALVE SET 1500+-50.00 PSIG OR 103.5+-3.448 BARG
VR50-1	0427	LIGHT DIST FUEL UPSTREAM PRESSURE REGULATOR VALVE SET 50.00+-30.00 PSIG OR 3.448+-2.069 BARG
VR6	0434	RATCHET REVERSING PRESSURE RELIEF VALVE SET 1500+-50.00 PSIG OR 103.5+-3.448 BARG
VR70-1	0462	H2O INJECTION STOP VALVE ACTUATION PRESSURE RELIEF VALVE SET 120.0+-5.000 PSIG OR 8.276+-0.3449 BARG PART OF VS2-1 STOP VLV ASSY
VS2-1	0462	WATER INJECTION STOP VALVE OPEN WHEN 20WN-1 ENERGIZED WATER ACTUATED, SPRING CLOSE, NORM=CLOSED
VTR1-1	0420	LUBE OIL HEADER TEMP REGULATOR VALVE SET 130.0+-8.000 F OR 54.44+-4.444 C
VTR2-1	0420	ATOMIZING AIR PRECOOLER AIR DISCH TEMP RGLTR VALVE SET 225.0+-8.000 F OR 107.2+-4.444 C

 GE Power Generation GENERAL ELECTRIC COMPANY SCHENECTADY, NY		SIZE A	CAGE CODE 	DWG NO 368A6177
DRAWN Bill Maginn	2000-03-21	SCALE NONE		SHEET 14
ISSUED Document Services	2000-03-21			

Device	System	Settings
VPR7-1	0421	DIESEL ENGINE WATER INLET PRESSURE RGLTR 2 WAY VALVE SET 8.000+-0.5000 PSIG OR 0.5518+-0.0345 BARG 205 GPM FLOW
VQE1-1	0462	QUICK-EXHAUST VALVE, WATER INJECTION STOP VALVE PART OF VS2-1 STOP VALVE ASSY
VR-13	0421	DIESEL LUBE OIL PRESSURE RELIEF VALVE SET 125.0+-5.000 PSIG OR 8.621+-0.3449 BARG
VR1	0416	MAIN LUBE PUMP PRESSURE RELIEF VALVE SET 65.00+-2.000 PSIG OR 4.483+-0.1379 BARG
VR12-1	0425	ATOMIZING AIR BOOSTER PRESSURE RELIEF VALVE SET 20 1 PSIG
VR21	0434	MAIN HYDRAULIC SUPPLY PUMP PRESSURE RELIEF VALVE SET 1500+-50.00 PSIG OR 103.5+-3.448 BARG
VR3-1	0434	HYDRAULIC RATCHET PUMP PRESSURE RELIEF VALVE SET 1500+-50.00 PSIG OR 103.5+-3.448 BARG
VR4	0424	MAIN FUEL PUMP PRESSURE RELIEF VALVE SET 1500+-50.00 PSIG OR 103.5+-3.448 BARG
VR50-1	0427	LIGHT DIST FUEL UPSTREAM PRESSURE REGULATOR VALVE SET 50.00+-30.00 PSIG OR 3.448+-2.069 BARG
VR6	0434	RATCHET REVERSING PRESSURE RELIEF VALVE SET 1500+-50.00 PSIG OR 103.5+-3.448 BARG
VR70-1	0462	H2O INJECTION STOP VALVE ACTUATION PRESSURE RELIEF VALVE SET 120.0+-5.000 PSIG OR 8.276+-0.3449 BARG PART OF VS2-1 STOP VLV ASSY
VS2-1	0462	WATER INJECTION STOP VALVE OPEN WHEN 20WN-1 ENERGIZED WATER ACTUATED, SPRING CLOSE, NORM=CLOSED
VTR1-1	0420	LUBE OIL HEADER TEMP REGULATOR VALVE SET 130.0+-8.000 F OR 54.44+-4.444 C
VTR2-1	0420	ATOMIZING AIR PRECOOLER AIR DISCH TEMP RGLTR VALVE SET 225.0+-8.000 F OR 107.2+-4.444 C

 GE Power Generation GENERAL ELECTRIC COMPANY SCHENECTADY, NY		SIZE A	CAGE CODE	DWG NO 368A6177
DRAWN Bill Maginn	2000-03-21			
ISSUED Document Services	2000-03-21	SCALE NONE	SHEET 14	

1. SEE DEVICE SUMMARY (MLI 0414) FOR CONTROL DEVICE SETTINGS.
2. 39V-3 MOUNTED ON GENERATOR

THIS DRAWING TO BE REVISED ON FORMTEK ONLY

SH	REV	F297761-0415	
1	-		
REVISION			
REV	DESCRIPTION	DATE	APPROVED

[illegible]

REV STATUS OF SHEETS	
REV	--
SH	2 1

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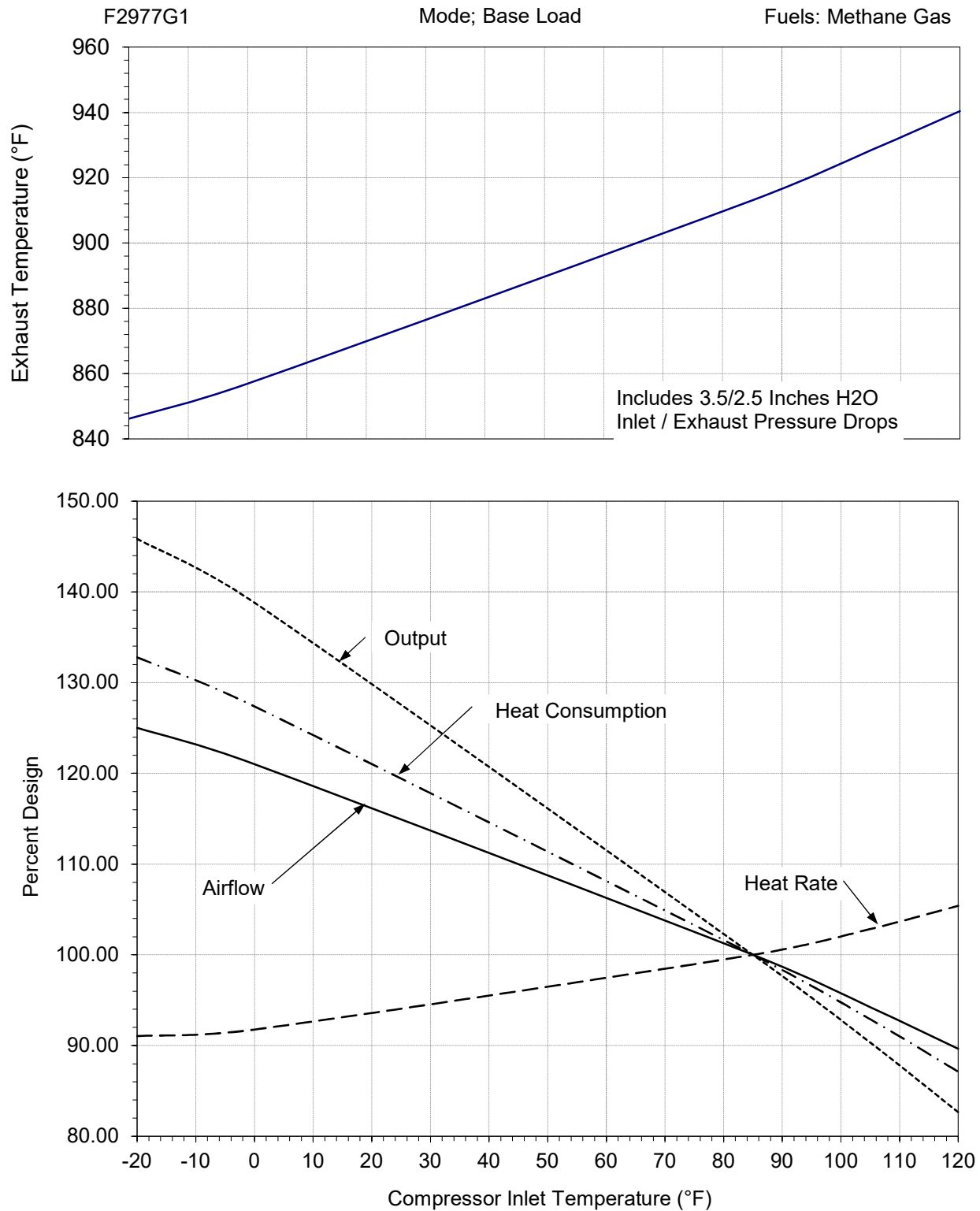


DT-1N

FCTD

Appendix F - Performance Data

**GENERAL ELECTRIC ALSTHOM MAKE 51P GAS TURBINE. INDIANOLA
MUNICIPAL UTILITIES, UNIT#00T143. EFFECT OF COMPRESSOR INLET
TEMPERATURE ON MAXIMUM OUPTPUT, HEATRTE, HEAT
CONSUMPTION, AIR FLOW AND
EXHAUSE TEMP. AT 100.0% SHAFT SPEED**



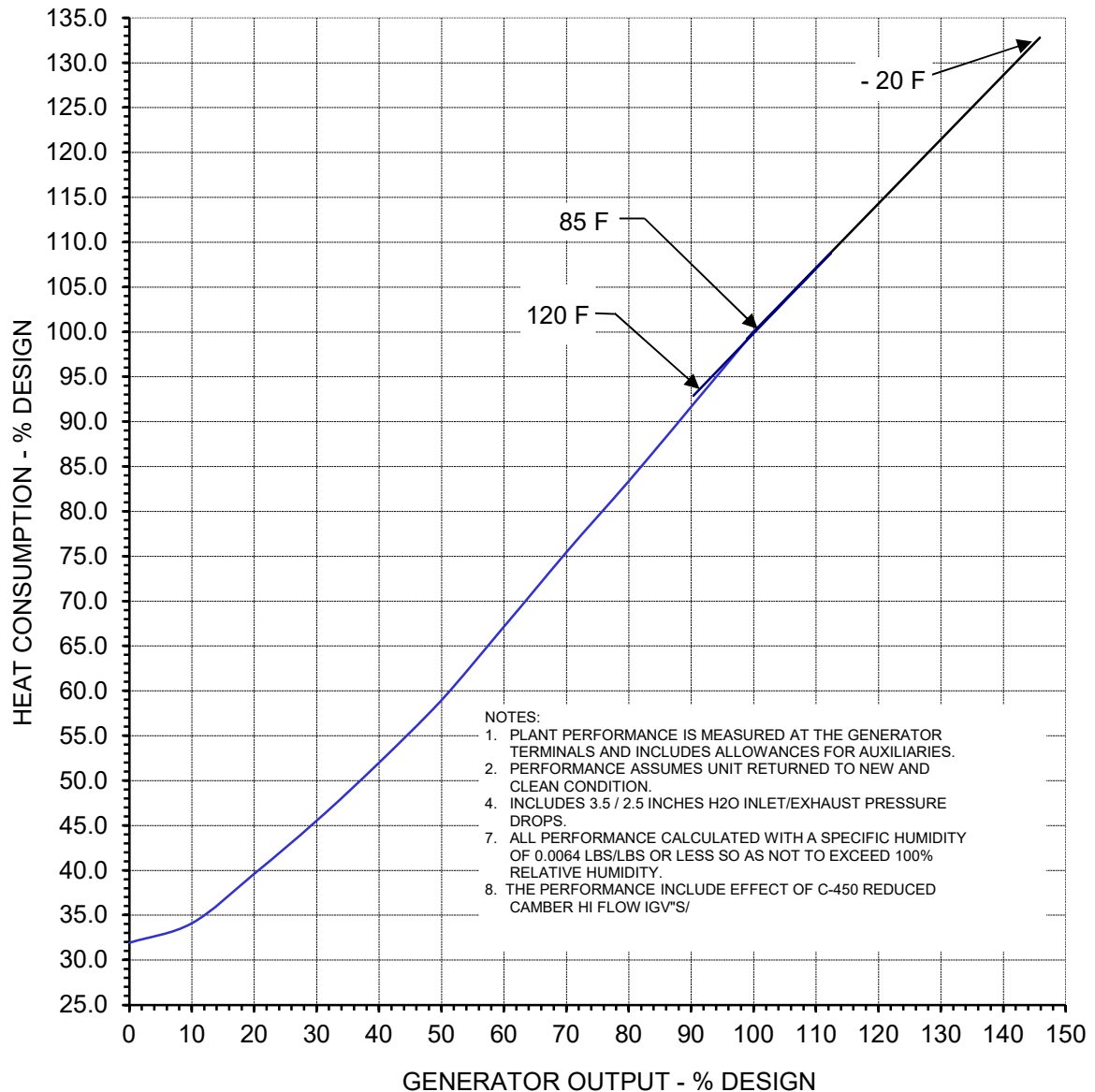
JAY HARI 03/27/2000

543HA338 REV 2

**GENERAL ELECTRIC ALSTHOM MAKE 51P GAS TURBINE
INDIANOLA MUNICIPAL UTILITIES, UNIT # 00T143 ESTIMATED
PERFORMANCE - COMPRESSOR INLET TEMPERATURE 85 DEG. F.
ATMOSPHERIC PRESSURE 14.2089 PSIA.**

FUEL		METHANE GAS
DESIGN OUTPUT	KW	20070
DESIGN HEAT RATE	BTU/KW-HR	14080
DESIGN HEAT CONS. (LHV)	BTU/HR	282.6E6
DESIGN EXHAUST FLOW	LBS/HR	896100

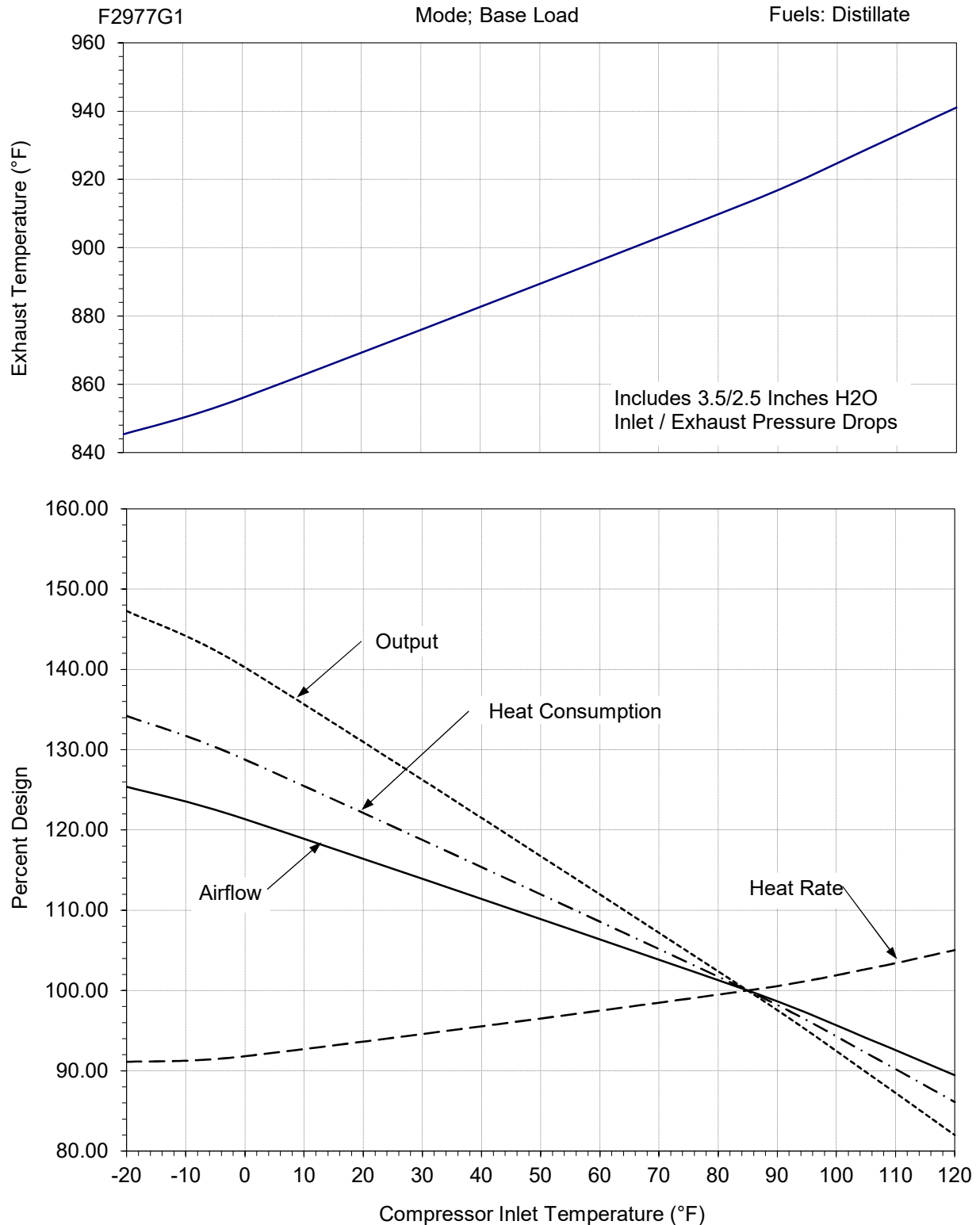
MODE: BASE LOAD
F2977G1



JAY HARI 03/27/2000

543HA339 REV 3

**GENERAL ELECTRIC ALSTHOM MAKE 51P GAS TURBINE. INDIANOLA
MUNICIPAL UTILITIES, UNIT#00T143. EFFECT OF COMPRESSOR INLET
TEMPERATURE ON MAXIMUM OUPTPUT, HEATRATE, HEAT
CONSUMPTION, AIR FLOW AND
EXHAUSE TEMP. AT 100.0% SHAFT SPEED**



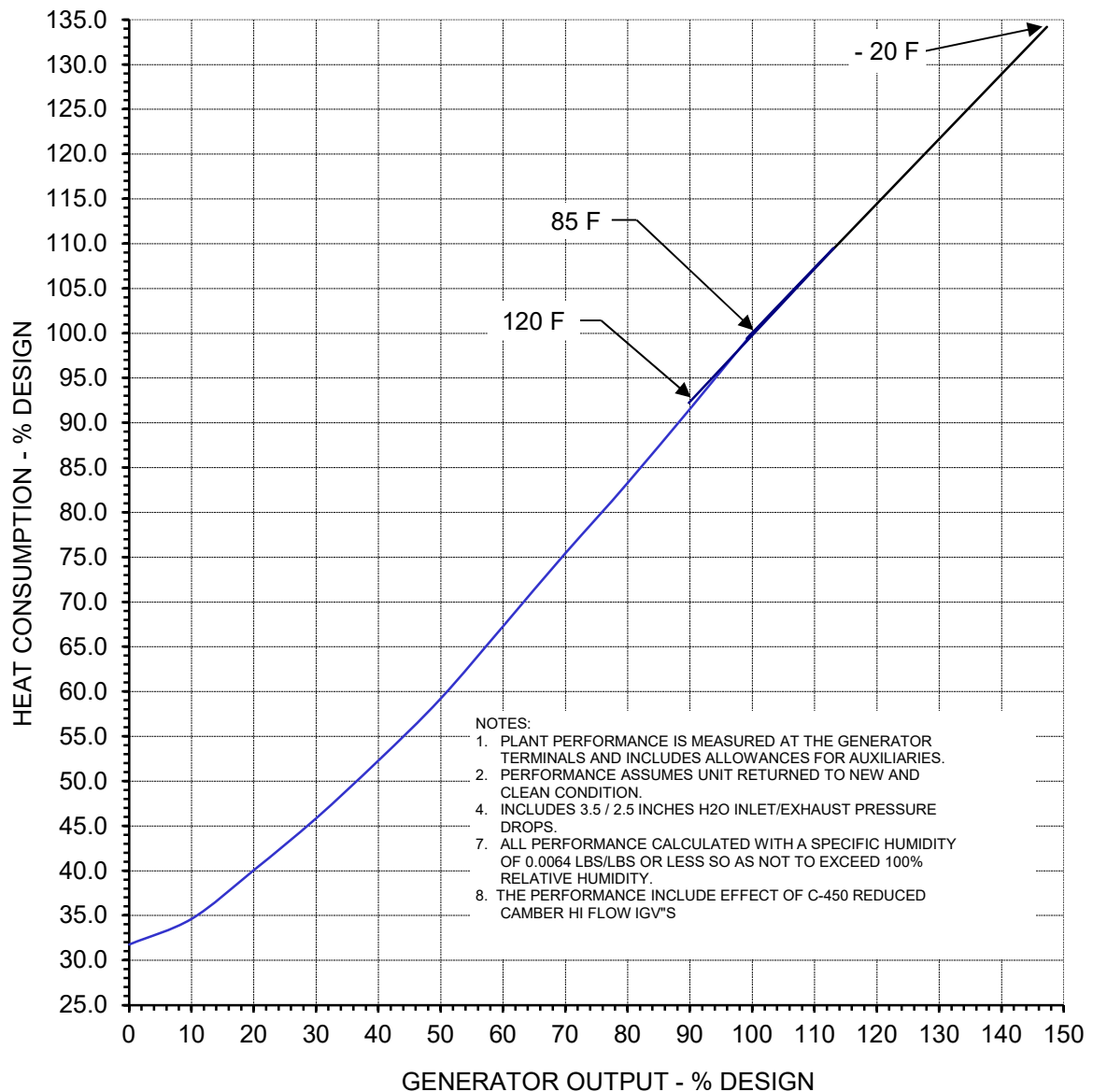
JAY HARI 03/27/2000

543HA340 REV 1

**GENERAL ELECTRIC ALSTHOM MAKE 51P GAS TURBINE
INDIANOLA MUNICIPAL UTILITIES, UNIT # 00T143 ESTIMATED
PERFORMANCE - COMPRESSOR INLET TEMPERATURE 85 DEG. F.
ATMOSPHERIC PRESSURE 14.2089 PSIA.**

FUEL		DISTILLATE
DESIGN OUTPUT	KW	19880
DESIGN HEAT RATE	BTU/KW-HR	14300
DESIGN HEAT CONS. (LHV)	BTU/HR	284.3E6
DESIGN EXHAUST FLOW	LBS/HR	899700

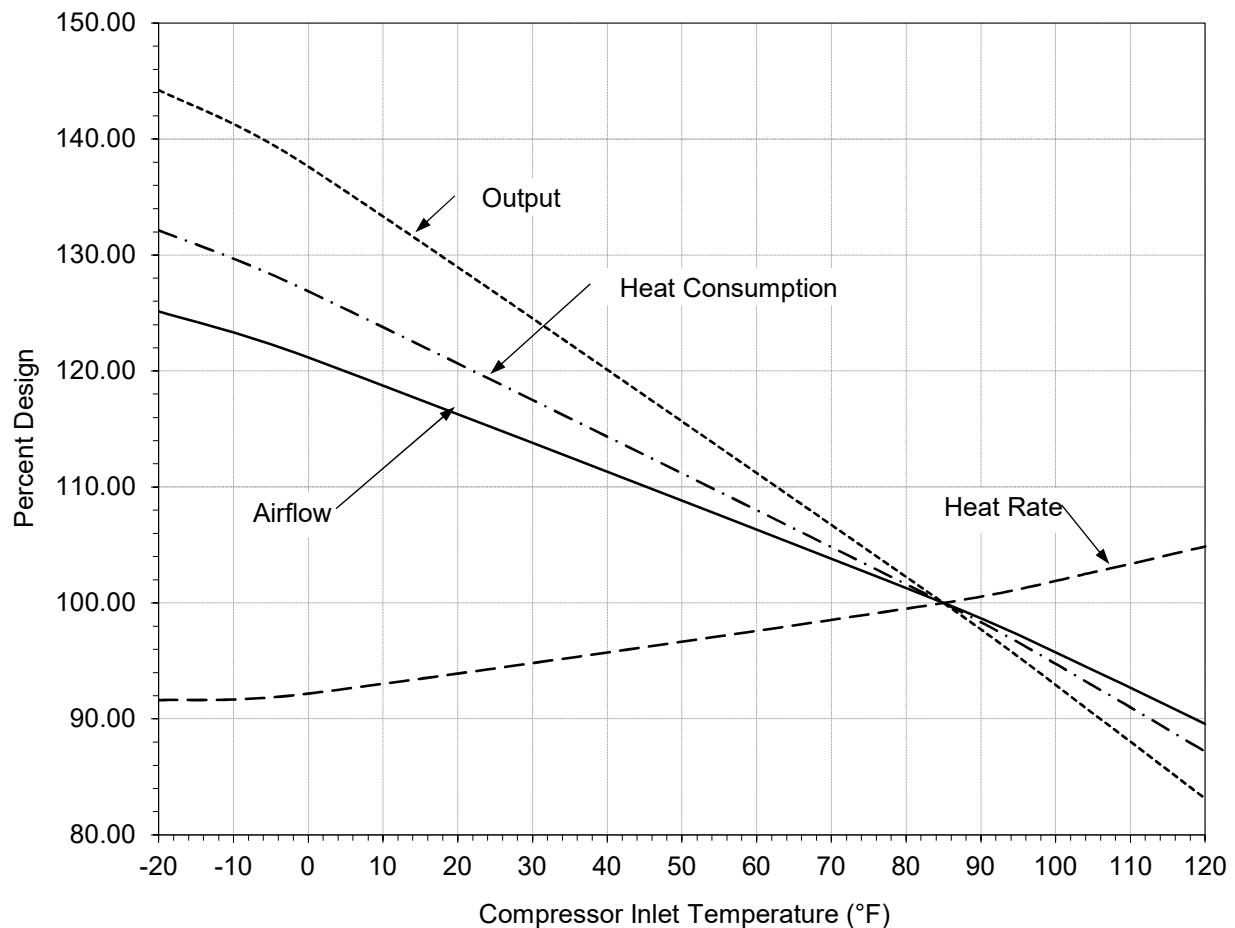
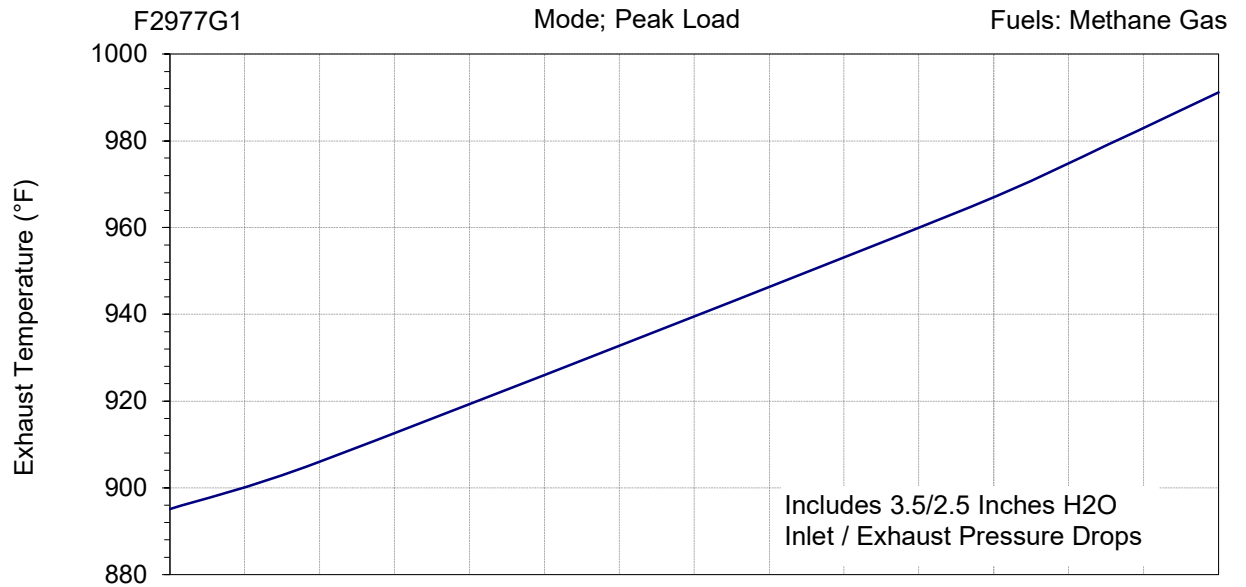
MODE: BASE LOAD
F2977G1



JAY HARI 03/27/2000

543HA341 REV 1

**GENERAL ELECTRIC ALSTHOM MAKE 51P GAS TURBINE. INDIANOLA
MUNICIPAL UTILITIES, UNIT#00T143. EFFECT OF COMPRESSOR INLET
TEMPERATURE ON MAXIMUM OUPTPUT, HEATRATE, HEAT
CONSUMPTION, AIR FLOW AND
EXHAUSE TEMP. AT 100.0% SHAFT SPEED**



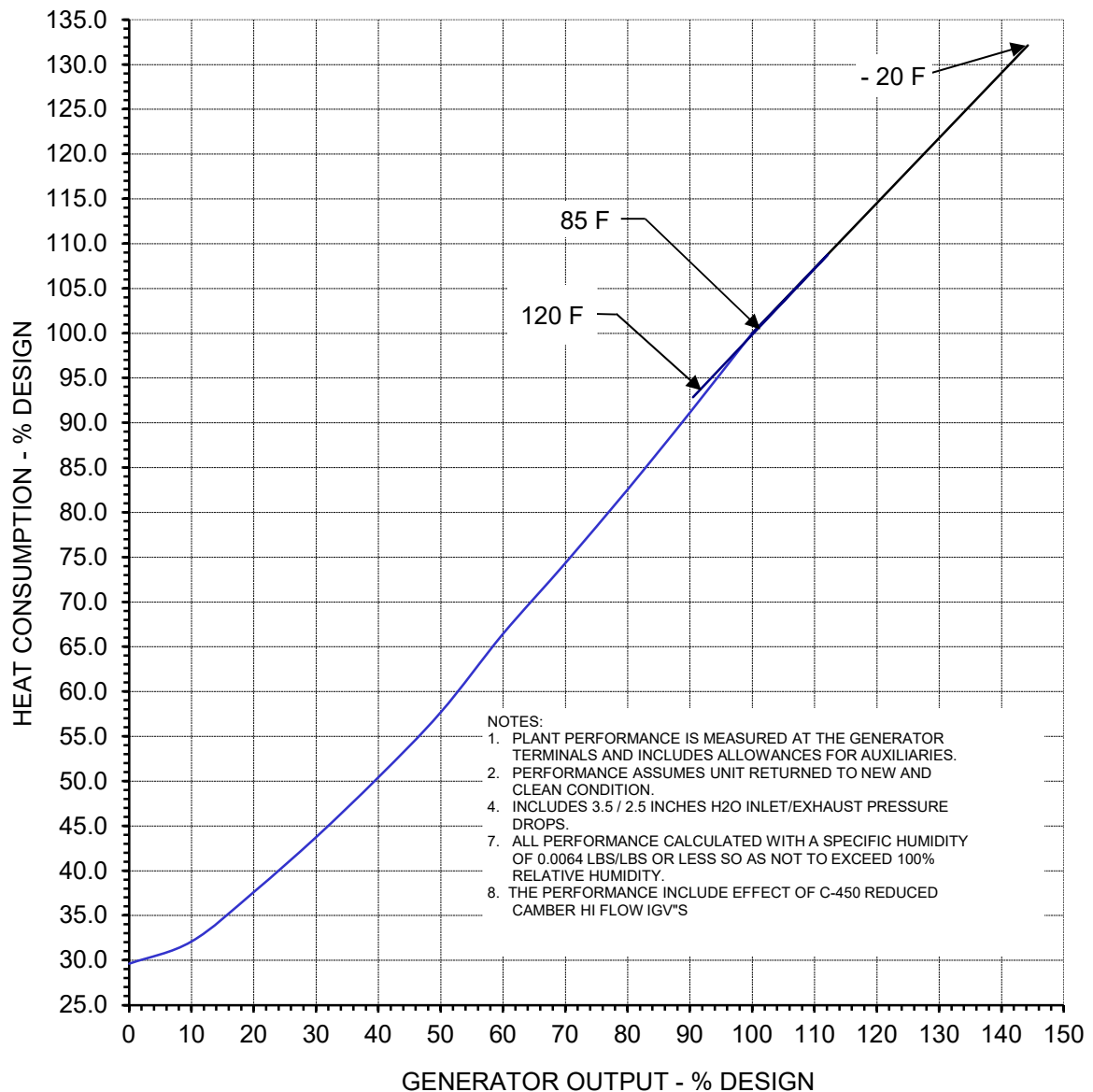
JAY HARI 05/26/2000

543HA360 REV 0

**GENERAL ELECTRIC ALSTHOM MAKE 51P GAS TURBINE
INDIANOLA MUNICIPAL UTILITIES, UNIT # 00T143 ESTIMATED
PERFORMANCE - COMPRESSOR INLET TEMPERATURE 85 DEG. F.
ATMOSPHERIC PRESSURE 14.2089 PSIA.**

FUEL		METHANE GAS
DESIGN OUTPUT	KW	21820
DESIGN HEAT RATE	BTU/KW-HR	13950
DESIGN HEAT CONS. (LHV)	BTU/HR	304.3E6
DESIGN EXHAUST FLOW	LBS/HR	897700

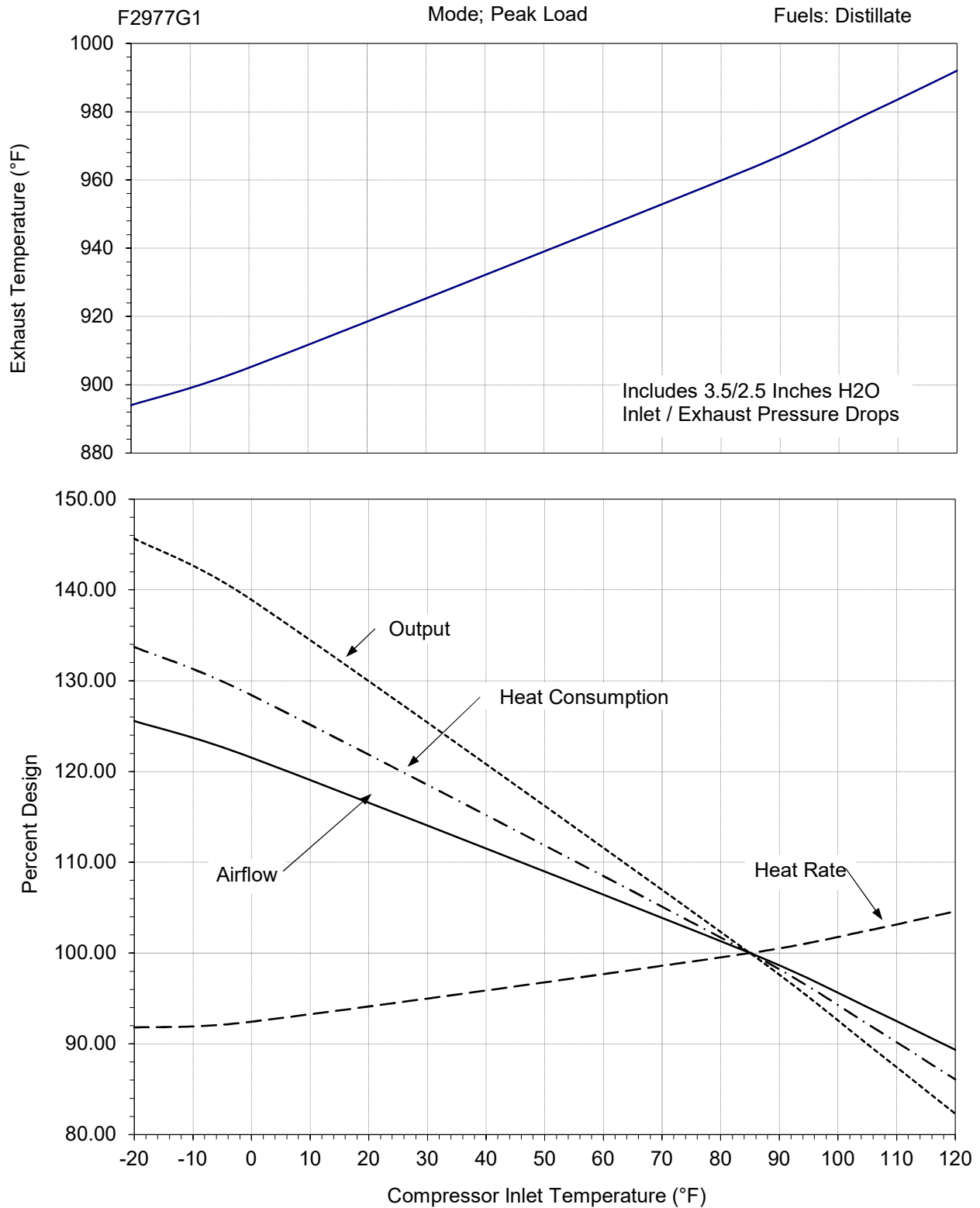
MODE: PEAK LOAD
F2977G1



JAY HARI 05/26/2000

543HA361 REV 0

**GENERAL ELECTRIC ALSTHOM MAKE 51P GAS TURBINE. INDIANOLA
MUNICIPAL UTILITIES, UNIT#00T143. EFFECT OF COMPRESSOR INLET
TEMPERATURE ON MAXIMUM OUPTPUT, HEATRATE, HEAT
CONSUMPTION, AIR FLOW AND
EXHAUSE TEMP. AT 100.0% SHAFT SPEED**



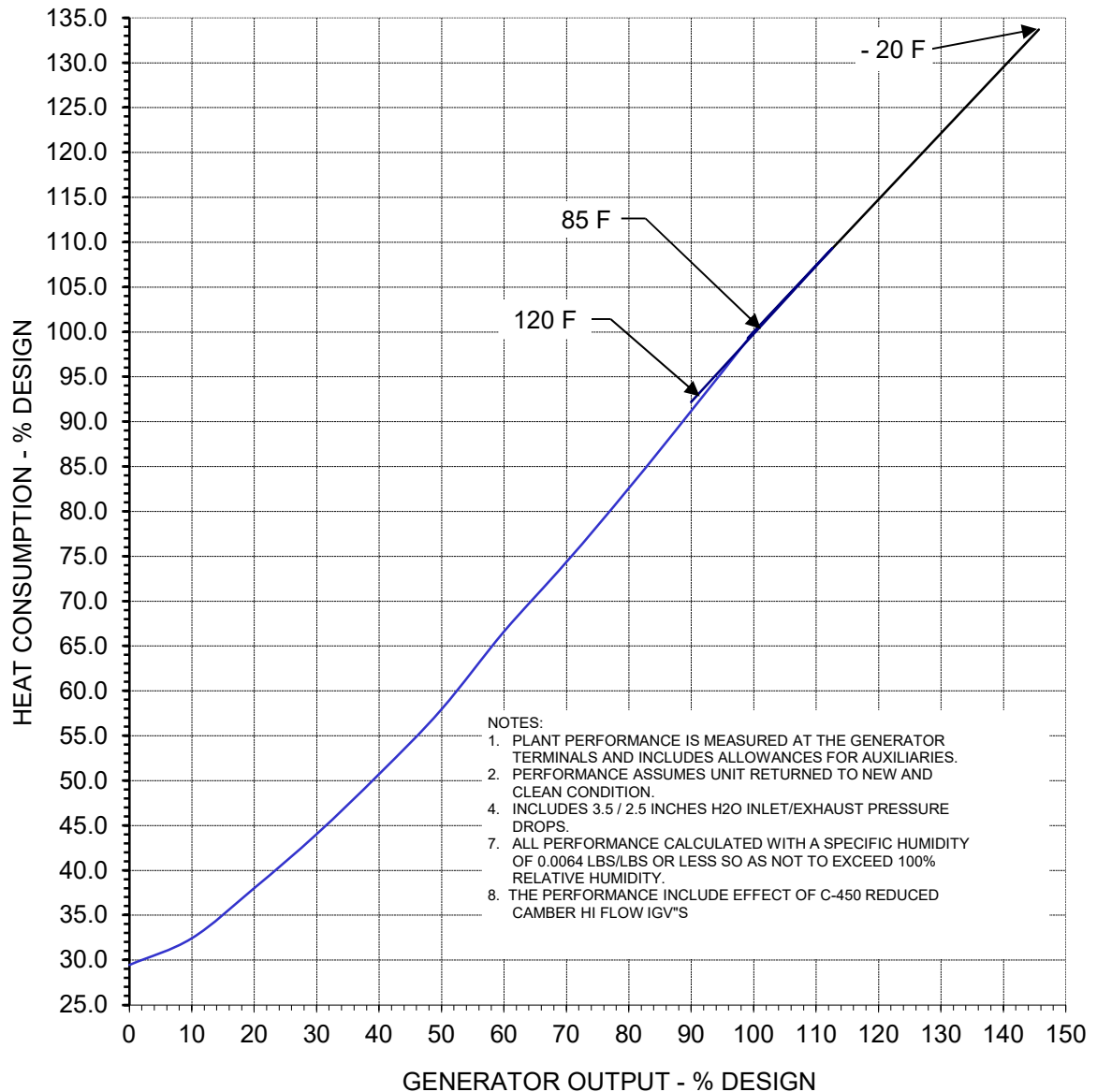
JAY HARI 05/26/2000

543HA362 REV 0

**GENERAL ELECTRIC ALSTHOM MAKE 51P GAS TURBINE
INDIANOLA MUNICIPAL UTILITIES, UNIT # 00T143 ESTIMATED
PERFORMANCE - COMPRESSOR INLET TEMPERATURE 85 DEG. F.
ATMOSPHERIC PRESSURE 14.2089 PSIA.**

FUEL		DISTILLATE
DESIGN OUTPUT	KW	21640
DESIGN HEAT RATE	BTU/KW-HR	14150
DESIGN HEAT CONS. (LHV)	BTU/HR	306.2E6
DESIGN EXHAUST FLOW	LBS/HR	901700

MODE: PEAK LOAD
F2977G1



JAY HARI 05/26/2000

543HA363 REV 0

Indianola Municipal Utilities

Combustion Turbine/Generator No. 8

Generator Nameplate Data

Manufacturer	Alsthom
Date	1977
Generator	Y
Type	T190-200
No.	410729
Volts	13,800 +/- 5%
Amps	1149
RPM	3600
kVA	27,471
Duty	Continuous
Temperature	Cold Air 15° C
	Stator 120° C
	Rotor 120° C
Insulation Class	F
Cos Theta	0.85
C/S	60
Protection	Enclosed with air filter
Excitation	182 volts
	434 amps

Information recorded from generator nameplate
11/27/00

FROM ORIGINAL
ALSTHOM MANUAL

TURBO-GENERATOR PACKAGE NR 60Hz 13.8 ± 5% kV

Reactive capability curves

Generator limitations:

- at 30°C ambient air
- at 40°C " "
- at 50°C " "

Filtered air cooled

Mvar leading Mvar lagging

0 pf leading 0 pf lagging

Stability limit at constant power angle = 90° (at 13.8 kV)

Stability limit of constant power angle

0.20 0.40 0.60 0.70 0.80 0.85 0.90 0.95 pf leading

0.20 0.40 0.60 0.70 0.80 0.85 0.90 0.95 pf lagging

Gear mechanical limit

Turbine base output: at 30°C at 40°C at 50°C

ALSTHOM ATLANTIQUE 38-T-2801 D

Δ MW

30 25 20 15 10 5 0

25 20 15 10 5 0

YANBU

TURBO-GENERATOR

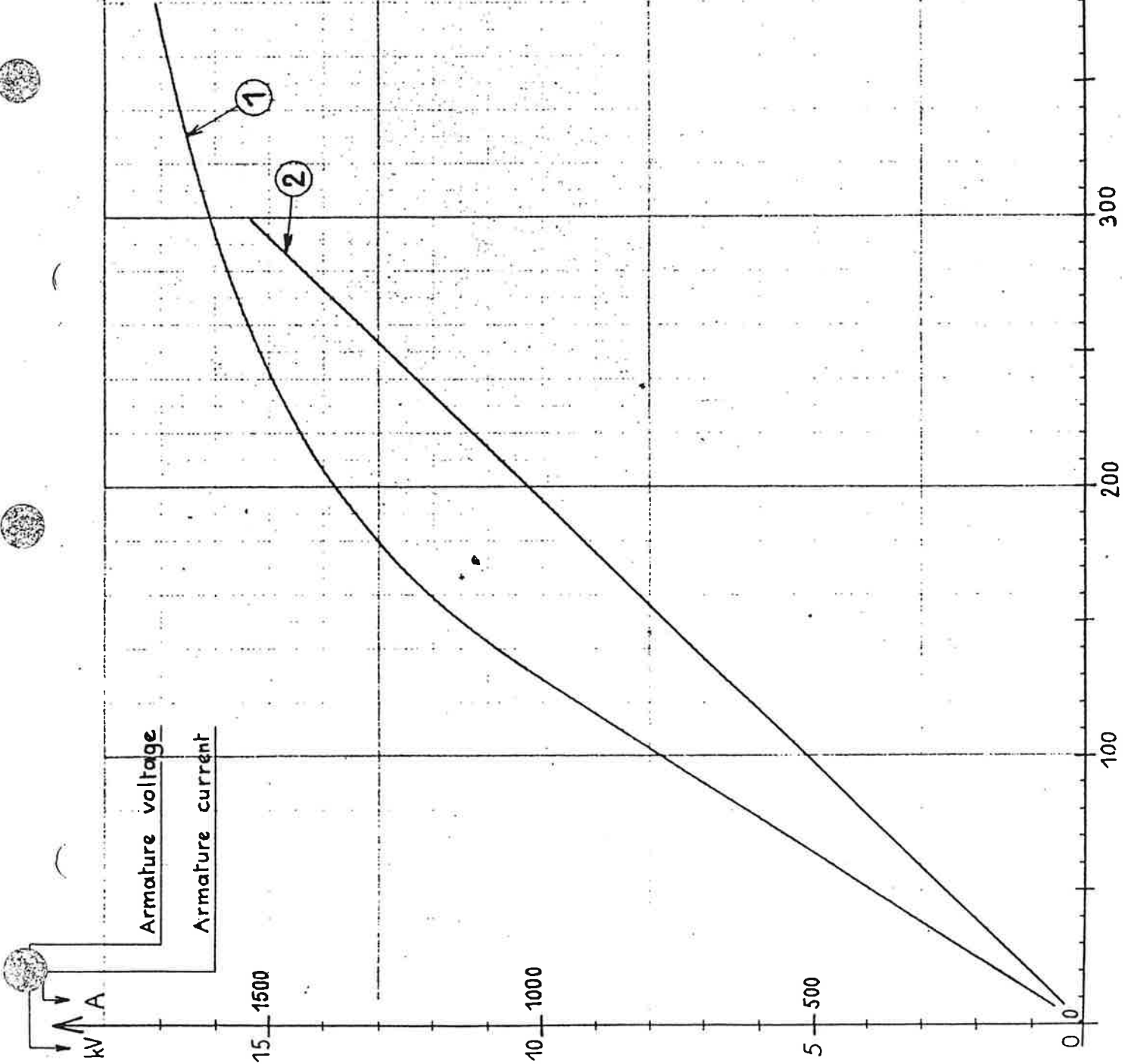
PACKAGE NR 60Hz 13.8 k

No-load and short circuit

characteristic curves

- ① No-load characteristic curve
- ② Short-circuit characteristic curve (three-phase)

ALSTHOM
ATLANTIQUE
39-TP-008-C



YANBU

TURBO-GENERATOR PACKAGE NR 60Hz 13.8kV

Efficiency versus power factor, at 23.350kW output.

(Efficiency is calculated conventionally, according to A.S.A. standards)

Efficiency
%

97.5

97

96.5

96

0.90

0.80

power factor 0.70

Lagging

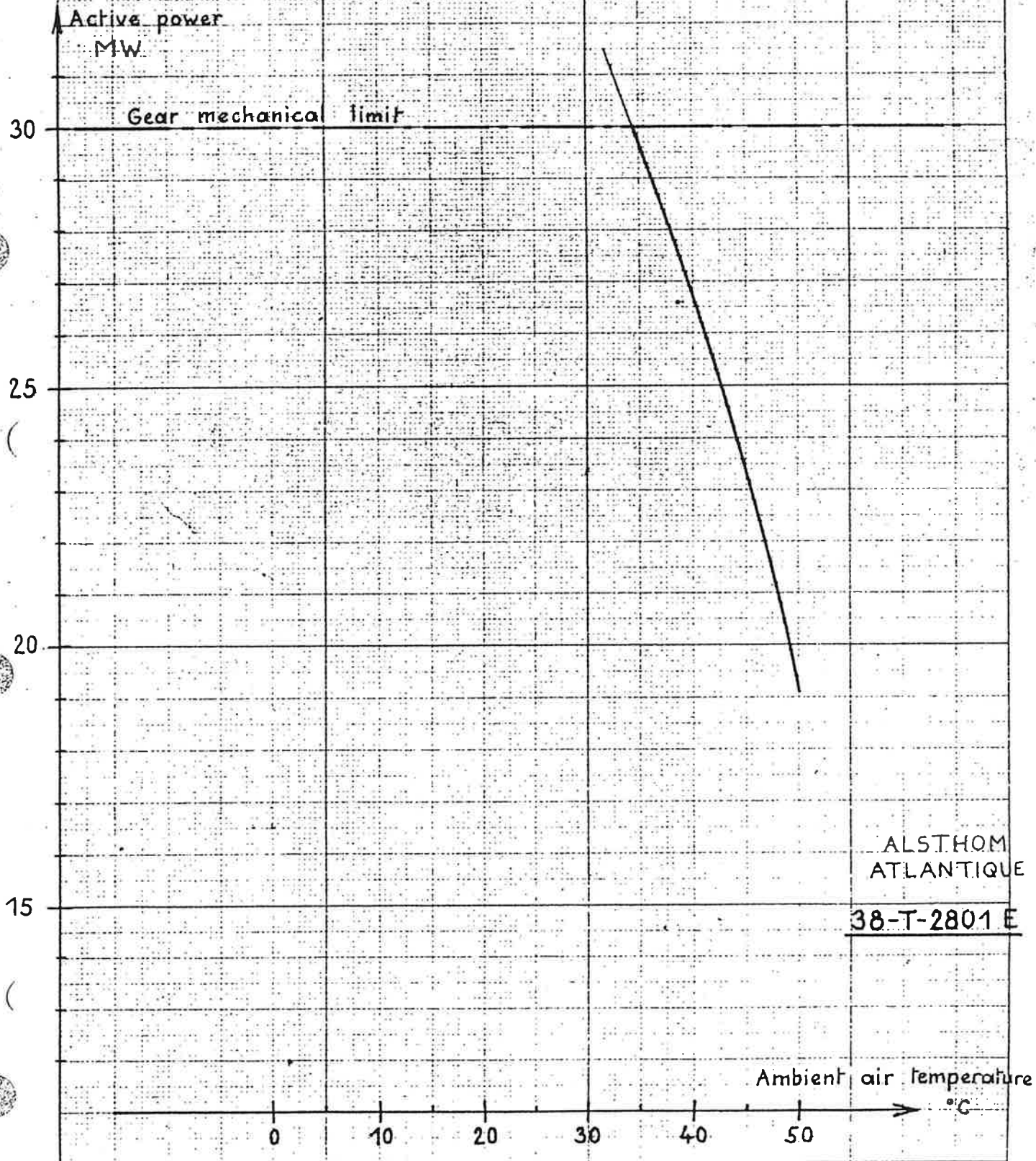
Leading

TURBO-GENERATOR PACKAGE NR 60Hz 13.8±5%kV 0.85 pf

Filtered air cooling

Generator capability versus ambient air temperature.

Total temperatures guarantees : Stator $\leq 120^{\circ}\text{C}$ (by embedded detectors)
Rotor $\leq 120^{\circ}\text{C}$ (by resistance variation)



**ABB ALSTOM
POWER****FAX**

Customer Service Segment
Steam Turbines & Generators Business

To: Timothy G. ERNST
P&E Engineering Co.

Fax: +1 515 989 3138
CC:

From: Eric TARIANT
Area Sales Manager

Tel: +33 3 84 55 40 63
Fax: +33 3 84 55 35 67
Email: eric.tariant@power.alstom.com

N° of pages: 1+7

Date: 04/07/00

Subject: Test data for Generator

Ref: CSF-TTE-186-2

Dear Mr Ernst,

Following your e-mail dated April, 4th, you will find here attached and as required, the information we have collected in our engineering department.
I hope this document will come up to your expectations.
If you need more information, do not hesitate to contact me.

With my best regards.

Eric Tariant

Enclosed: 7 pages

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90018 Belfort Cedex (France)
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Fax: +33 (0) 3 84 55 31 52
Siret 389 192 246 00095
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92309 Levallois-Perret Cedex (France)
389 192 246 RCS Nanterre
Code APE 291 A - TVA: FR 69 389 192 246

YANBU

9/mil Daoust dm 04/04

SECTION IIIBID DATAP. MACHARD
TEL. 03 84 55 27 48
06 07 18 79 67

5/04

GAS TURBINE GENERATOR

Type

Manufacturer

Model No.

Base Load Station Net kW (ISO Liquid Fuel)

Peak Load Station Net kW (ISO Liquid Fuel)

POWER TURBINE

Type

Manufacturer

GENERATOR

Type

Manufacturer

Speed (rpm)

Rated kVA

Rated Voltage

Rated Amperes

Rated Power Factor

Field Voltage - no load

Field Voltage - peak load, 0.85 pf
(peak load is taken as the turbine
peak load at 15°C ambient: 25 200 kW.)PACKAGE, Filtered air cooled360027 471 kVA13 800 V1149 A0.8585V173 V

[1-1-15]

GENERATOR (Contd)

Field Current - peak load, 0.95 pf amps

4.12 A

Maximum total temperature at base load:

Rotor ($^{\circ}\text{C}$) $\leq 120^{\circ}\text{C}$ } see notesStator ($^{\circ}\text{C}$) $\leq 120^{\circ}\text{C}$ } NE 38-T-2801 E

Generator short circuit ratio at base rated kVA

calculated: 0.895 (non guaranteed)

Subtransient Reactance - rated voltage

7.7 %

Transient Reactance - rated voltage

11.5 %

Zero Sequence Reactance

5.4 %

Negative Sequence - rated voltage

7.9 %

Synchronous Reactance (unsaturated)

140.0 %Air Flow (~~cfm~~) m^3/s 12.5MOTOR CONTROL CENTER ENCLOSURE

Manufacturer

Type

Cat. No.

Bus Rating

Momentary Short Circuit Rating

EXCITER AND VOLTAGE REGULATOR

Manufacturer

Type of Exciter

Capacity, kW

Rated Voltage

Type of Voltage Regulator

Speed of Response

D-1-19

CONTROL SYSTEM

Manufacturer _____

Type _____

GENERATOR INTAKE AIR FILTER

Manufacturer _____

Type _____

A. A. F.

"Varical"

STARTING SYSTEM

Type _____

Number of attempts to start that can be
made at 122°F without outside ac power _____WEIGHT

Gas Turbine Unit _____

Generator and Exciter _____

See drawing N^o 38-T-2801 A

Exciter _____

1 100 kg

Starting Equipment _____

Heaviest piece to be handled after
erection _____Heaviest piece to be handled for
hot-gas path inspection _____Heaviest piece to be handled for
combustion inspection _____

Turbine and Compressor Rotor(s) _____

Generator Rotor _____

12 900 kg

AUXILIARY POWER REQUIREMENTS

(Check those that are shaft driven)

Air Compressors (if required) _____

Lube Oil and Space Heaters _____

Generator Inlet Air Filter System _____

Lube Oil Pump(s) - ac _____

D-1-83

PERFORMANCE (Contd)

<u>Startup and Shutdown</u>	<u>Time</u>	<u>Fuel Consumption (Btu)</u>
From cold standstill to synchronization	_____	_____
From no load to fuel shutoff	_____	_____

If manufacturer has both normal and fast startup cycles, the times and fuel requirements are to be given for both

LUBE OIL

Type and quantity for turbine	_____
Type and quantity for generator	_____
Tests required and frequency	_____
Hours of operation between changes	_____
Lube oil consumption during operation	_____

supplied by the turbine 620 l/min

OPERATING CONDITIONS (BASE LOAD)

	100	50	50	48
Inlet temperature °F	_____	_____	_____	_____
Exhaust flow #/sec	_____	_____	_____	_____
KW	_____	_____	_____	_____
Exhaust temp. °F	_____	_____	_____	_____
Heat rate (Btu)	_____	_____	_____	_____

FUEL REQUIREMENT

Quantity required at turbine (gpm)	_____
Pressure required at interface point (psig)	_____

DRAWINGS INCLUDED WITH PROPOSAL

Typical mechanical arrangement drawing included	_____
Drawing No.	_____

D-1-53

DRAWINGS INCLUDED WITH PROPOSAL (Contd)

Typical one-line electrical diagram included

Drawing No.

Turbine performance curves included

Generator performance curves included : N^o 38-T-2801 E and 38-T-2801 D

Guaranteed and maximum predicted performance data (yes/no)

EXCEPTIONS TO SPECIFICATION

Have any exceptions been taken to this specification (yes/no)

If yes, has each exception been described in detail and included as an integral part of the proposal (yes/no)

EXPERIENCE

Bidder shall supply list of units which are similar to those described herein

D-1-54

TYPE I-190-200 PROPOSITION NUMBER I-2801 PAGE 1

SPECIFICATION I-2801 GENERATOR TYPE PACKAGE

1 - NOMINAL CHARACTERISTICS:

BY AMBIENT AIR TEMPERATURE:..... 15.00 DEGREE C

- NUMBER.....	23.350 MW
- ACTIVE POWER.....	27.471 MVA
- APPARENT POWER.....	0.895
- POWER FACTOR.....	13.800 KV
- VOLTAGE.....	3600 V.P.M.
- ROTATION SPEED.....	60 HZ
- FREQUENCY.....	4
- NUMBER OF PHASES.....	STAR
- COUPLING OF PHASES.....	F
- CLASS OF INSULATION.....	ASA
- STANDARDS.....	
- TEMPERATURES: STATOR (BY EMBEDDED DETECTORS).....	120 DEGREE C
(MAX VALUES)	
ROTOR (BY RESISTANCE VARIATION).....	120 DEGREE C

2 - OPERATING CHARACTERISTICS:

- SHORT-CIRCUIT RATIO.....	0.895
- RESISTANCES AT 75 DG:	
- ONE STATOR PHASE.....	0.00797 OHM
- ROTOR.....	0.37273 OHM
- REACTANCES:	
- SYNCHRONOUS X _D , NON SATURATED.....	140.0 Ω
- TRANSIENT X _D , NON SATURATED.....	14.2 Ω
- TRANSIENT X _D , SATURATED.....	11.5 Ω
- SUBTRANSIENT X _D , NON SATURATED.....	10.4 Ω
- SUBTRANSIENT X _D , SATURATED.....	7.7 Ω
- NEGATIVE SEQUENCE X ₁ , NON SATURATED.....	10.6 Ω
- NEGATIVE SEQUENCE X ₁ , SATURATED.....	7.9 Ω
- ZERO SEQUENCE X ₀	5.4 Ω
- TIME CONSTANTS:	
- TRANSIENT, OPEN CIRCUIT T _{DO}	5.524 S
- TRANSIENT, SHORT-CIRCUIT T _{DO}	0.561 S
- APERIODIC, T _A	0.130 S

THREE-PHASE SHORT-CIRCUIT CURRENT WITH EXCITATION:

		AT NO-LOAD	AT FULL LOAD
- INSTANTANEOUS SYMMETRICAL..... RMS	I	12.93 IN	13.46 IN
- INSTANTANEOUS ASYMMETRICAL..... PEAK	I	32.85 IN	33.52 IN
- CONTINUOUS..... RMS	I	0.90 IN	1.77 IN

In = 1149 A

PDS 1.7

VARIAN

PACKAGE

PAGE 2

TYPE T 190-200

PROPOSITION NUMBER T 2801

SPECIFICATION (T 2801) GENERATOR TYPE "PACKAGE"

- VOLTAGE RISE IN CASE OF SUDDEN DISCHARGE FROM THE FULL LOAD:

P.F. = 1 15.07 %
 P.F. = 0.850 24.65 %

RATED

RATED FIELD CURRENT

RATED FIELD VOLTAGE 394 V
 165 V

- EFFICIENCY:

LOAD	W	23.350	17.512	11.675	5.837
EFFICIENCY:					
P.F. = 1	%	97.09	96.34	95.79	95.31
P.F. = 0.850	%	96.87	96.12	95.64	95.24

- COOLING:

COOLANT	FLOW	INLET TEMPERATURE (DEGREE C)	OUTLET TEMPERATURE (DEGREE C)	NUMBER OF COOLERS
FILTERED AIR... (IN OPEN CIRCUIT)	17.5 M3/S	15.0	55.8	

- DIMENSIONS AND WEIGHT:

DRAWING NUMBER 48-1-2801

- EXCITER SYSTEM: A.C. EXCITER WITH ROTATING DIODES
(SCHEMA NUMBER 54-105 053)

POWER (D.C. SIDE) 79. KW
 VOLTAGE " " 182 V

TOTAL PAGE(S) 08

Appendix G - Mark V I/O and Alarm Lists

I/O REPORT INDEXES

The I/O Report catalogs signal transmissions into thirteen individual classifications. Some of these alphanumeric and textual listings are too varied (Cable Number) or self-evident (Nomenclature) to summarize. However, in a effort to promote understanding of this document, the following records are offered:

Note: These References Are Subject To Change.

TERMINAL BOARDS

Core	Terminal Board	Card Location	Typical Device
C	CTBA	6	ANALOG I/O (4/20ma input/output)
C	TECA	9	RTD INPUTS
C	TECB (OPTIONAL)	7	ANALOG INPUTS (0/1ma, 4/20ma, RTD)
C	TEQA (OPTIONAL)	8	THERMOCOUPLE INPUTS
CD	DTBA	6	DIGITAL INPUT (Contacts 1 through 46)
CD	DTBB	7	DIGITAL INPUT (Contacts 47 through 96)
CD	DTBC	8	Solenoids/Relays 1 through 18; Relays 19 through 30)
CD	DTED	9	Solenoids/Relays 31 through 48; Relays 49 through 60)
P	PTBA	6	PROTECTION I/O (Flame Detectors, Overspeed, Synchronizing, Trip Solenoid Drivers)
PD	PDTB	1	PANEL POWER INPUTS
QD1	DTBA	6	DIGITAL INPUT (Contacts 1 through 46)
QD1	DTBB	7	DIGITAL INPUT (Contacts 47 through 96)
QD1	DTBC	8	Solenoids/Relays 1 through 18; Relays 19 through 30)
QD1	DTED	9	Solenoids/Relays 31 through 48; Relays 49 through 60)
(OPTIONAL CORE) QD2	DTBA	6	DIGITAL INPUT (Contacts 1 through 46)
(OPTIONAL CORE) QD2	DTBB	7	DIGITAL INPUT (Contacts 47 through 96)
(OPTIONAL CORE) QD2	DTBC	8	Solenoids/Relays 1 through 18; Relays 19 through 30)
(OPTIONAL CORE) QD2	DTED	9	Solenoids/Relays 31 through 48; Relays 49 through 60)
R	TEQA	8	THERMOCOUPLE INPUTS
R	TEQB	7	ANALOG INPUTS (PCD, VDC, Vibration)
R	TEQC	9	ANALOG I/O (LVDT/R Monitoring, 4/20ma-IN, 4-20/200ma-OUT)
S	TEQD (OPTIONAL)	7	PROXIMITOR INPUTS
R, S, T	QTEA	6	ANALOG IN/OUT (LVDT Excitation)

SIGNAL ABBREVIATION

(Alphanumeric Signal Abbreviations should be read in the following manner:
MA001P = Milliamp Output, (Position 01, Positive)

Note: Signal abbreviations and terminal configurations below are offered as an should be considered representative only.

SIGNAL	DESCRIPTION	SIGNAL	DESCRIPTION
BUSPT1	Running Line Voltage Input #1	MPUIH	Magnetic Pickup (1) High
BUSPT2	Running Line Voltage Input #2	MPUIL	Magnetic Pickup (1) Low
BUSPT3	Running Line Voltage Input #2	OSPHH	Overspeed High Pressure Shaft High
		OSHPIL	Overspeed High Pressure Shaft Low
CT01	Contact Input (01 on Core)	P15A	Positive 15 Amp.
BUS_A	On Bus A	ICOMA	Common
CO01SOL	Contact Output (01) Solenoid	N15A	Negative 15 Amp.
CO01NO	Contact Output (01) Normally Open		
CO01C	Contact Output (01) Common	POS01H	Position Feedback (01) High (from LVDT)
CO01NC	Contact Output (01) Normally Closed	POS01L	Position Feedback (01) Low (from LVDT)
CPDSPP	Comp. Dischg. Press. Pos. Excitation, <S>	RTD01A	Resistance Temperature Detector (01)
CPDSN	Comp. Dischg. Press. Neg. Excitation, <S>	RTD01B	Resistance Temperature Detector (01)
CPDSP	Comp. Dischg. Press. Pos. In, <S>	RTD01C	Resistance Temperature Detector (01)
CPDSN	Comp. Dischg. Press. Neg. In, <S>	SHVLTA	Shaft Voltage Positive
		SHVLTB	Shaft Voltage Negative
AC/DC Panel Power		SHCURA	Shaft Current Positive
DCHI	Direct Current High	SHCURB	Shaft Current Negative
DCLO	Direct Current Low	SPARE	Spare Terminal (Non-Active Software Input)
AC1H	Alternating Current (1) High	SV001	Servo Valve Output (01)
AC1N	Alternating Current (1) Negative	SV0X1	Servo Valve Output (X1)
AC2H	Alternating Current (1) High	SV0R1	Servo Valve Output (R1)
AC2N	Alternating Current (1) Negative		
FL1H	Flame Detect (1) High	TC01P	Thermocouple (01) Positive
FL1L	Flame Detect (1) Low	TC01N	Thermocouple (01) Negative
GENPT1	Generator Line Voltage Input #1	TIC_1	Time Tic (Low)
GENPT2	Generator Line Voltage Input #2	TRP1	Trip Circuit Logic Input in <P>
GENPT3	Generator Line Voltage Input #3	TRP2	Trip Circuit Logic Input in <P>
LV001E	Lintr. Variable Diff. Transd. (01) Excitation		
LV001L	Lintr. Variable Diff. Transd. (01) Low	TTL1H	Transistor Transistor Logic Input (1) High
		TTL1L	Transistor Transistor Logic Input (1) Low
MA101P	Milliamp Input (01) Positive	TTL1P	Transistor Transistor Logic Input (1) Positive
MA101N	Milliamp Input (01) Negative	TTL1N	Transistor Transistor Logic Input (1) Negative
MA101E	Milliamp Input (01) Excitation		
MA001P	Milliamp Output (01) Positive	VDC1RP	DC Voltage Input (1) Reference Positive
MA001N	Milliamp Output (01) Negative	VDC1RN	DC Voltage Input (1) Reference Negative
VIB01H	Vibration (01) High	VDC1RE	DC Voltage Input (1) High
VIB01L	Vibration (01) Low	VDC1RL	DC Voltage Input (1) Low

HEADER INDEX

The I/O Report immediately below is offered in order to provide a synopsis of an actual document's content.

HEADER	DESCRIPTION
Cable Num	Also known as "J-Number". This value reveals which cable is carrying the I/O transmission. The cable may have either Pyle National plug connectors or hard wire to the panel. The cables are listed in the GEPG Cable Block Diagram if used. Eg: J17
Pnt	Conductor number of cable. Reveals which wire within the cable is carrying the described I/O transmission. Eg: 14 (conductor number 14)
Wire Num	Numbers assigned and maintained by GEPG to relate devices to wires. Eg: 772
Interpos'g Term. Board	Interposing Terminal Board location. This is a reference of the Terminal Board most immediate to, yet still outside of the Mark V control panel. Eg: TBQ 11
Core Name	Core Processor designation: < R > - One of three Redundant Controllers (TMR) or Single Controller (Simplex) < S > - One of three Redundant Controllers (TMR only) < T > - One of three Redundant Controllers (TMR only) < C > - Common Core < P > - Protection Core, < QD1 > - Digital I/O for Redundant Controllers or Single controller < R > < S > < T > (< Q >) Cores < QD2 > - OPTIONAL Digital I/O for < R > < S > < T > (< Q >) Cores < PD > - Power Distribution Core < CD > - Digital I/O for Common Core < C > < PUU > - Power Load Unbalance Core (Large Steam Turbine only)
Term. Board	Printed wire board equipped with Phoenix connectors. (See I/O Report Indexes for description of board). Termination screws are mounted on this hardware Eg: DTBB
Screw Num	Wire termination point on Terminal board. Terminations can handle one (1) #12 AWG or two (2) #14 AWG wires per point for control I/O, 300 volt, 10 amp, designed to UL, CSA and VDE. Features: captive screws, dead front for safety, 85% copper alloy with nickel plating. These points are typically called "green screws" as the wires are connected and held via a series of screws mounted in a green pre-drilled polymer brack I/O wire is to have 600V insulation rating. Eg: 039
I/O Abbrev.	Input/Output abbreviation (See Signal Abbreviation list on page 4). This alphanumeric value designates the type of I/O being sent or received. Example MA101P = Milliamp Input #1 (Positive). Eg: C161

HEADER INDEX (cont.)

HEADER	DESCRIPTION
Device name	The Device name describes the device that is interfaced with the Mark V control panel. This nomenclature is based on American National Institute ANSI (C37.2) and IEEE Industry Standards. Primary device nomenclature consists in general, of a 1 or 2 digit number, plus (1 or) 2 letters. If two or more devices have similar functions and thus have the same basic name, all must have a dash number. Eg: 26FD-1 Position and limit switches may have additional notations consisting of two letters, plus a number if required. The first letter indicates contact condition (open or closed). The second letter is used to indicate end position (where contact condition is or becomes as indicated by first letter). See GPPG Device Summary for complete description of letters and devices. Eg: 33FL-1/ac
Contact Sense	If the device listed is a contact, this record will provide its de-energized condition or "contact sense." Eg: NO = Normally Open, NC = Normally Closed C = Form C; Used in conjunction with NO and NC relay outputs.
Signal Name	Software Signal name according to Mark V database. If the signal is not used, the signal name will be the hardware name. Hardware points which are not associated with a software point appear blank. Note: A signal may have multiple screw termination points and thus may appear several times. Eg: LS9EA = Exciter Overvoltage
Scale Type	Scale Type reflects the software point name's scaling used by the Operator Interface. Eg: CIM = Contact Input CIM I = Contact Input inversion TC = Thermocouple LOG = Logical MWATT = Megawatt.
Nomenclature	Text formatted signal identification. This text describes the devices and or conditions associated with the software signal. Eg: Torque Adjuster Drive Motor. System Line Voltage.

Cable Num	Wire Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
		4800		<C>	CTBA	001	MAO01P	NHP		NHPX	RPM	TURBINE SPEED 4-20 mA / 0-5463 RPM
		4801		<C>	CTBA	002	MAO01N	NHP		NHPX	RPM	TURBINE SPEED 4-20 mA / 0-5463 RPM
		4802		<C>	CTBA	003	MAO02P	TX		TX	TC	EXHAUST TEMP. 4-20 mA / 0-1300 degF
		4803		<C>	CTBA	004	MAO02N	TX		TX	TC	EXHAUST TEMP. 4-20 mA / 0-1300 degF
		4804		<C>	CTBA	005	MAO03P	FSR		FSR	PCT	FUEL STROKE REF. 4-20 mA / 95-107 %
		4805		<C>	CTBA	006	MAO03N	FSR		FSR	PCT	FUEL STROKE REF. 4-20 mA / 95-107 %
				<C>	CTBA	007	MAO04P			Q_C_MAO04	TC	Wb. oil Head Temp 0-100%
				<C>	CTBA	008	MAO04N			Q_C_MAO04	TC	Exhaust Temp 4-20 0-250°
				<C>	CTBA	009	MAO05P			Q_C_MAO05	Ratio	Required Water Flow
				<C>	CTBA	010	MAO05N			Q_C_MAO05	Ratio	Fuel Flow 4-20 0-3 Ratio
				<C>	CTBA	011	MAO06P			Q_C_MAO06	Ratio	Actual Water - Fuel Flow 0-3 Ratio
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				<C>	CTBA	036	TIC_L					

Cable Num	Wire Pnt	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
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Cable Num	Wire Pnt Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
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Cable Num	Wire Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
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Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
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400		<R>TBQA002		<C>	TBQA	002	TC01N	TT-XD-1		TTXD 1 C	TC	Exhaust temperature thermocouple #01
401		<R>TBQA003		<C>	TBQA	003	TC02P	TT-XD-2		TTXD 2 C	TC	Exhaust temperature thermocouple #02
402		004		<C>	TBQA	004	TC02N	TT-XD-2		TTXD 2 C	TC	Exhaust temperature thermocouple #02
403		005		<C>	TBQA	005	TC03P	TT-XD-3		TTXD 3 C	TC	Exhaust temperature thermocouple #03
404		006		<C>	TBQA	006	TC03N	TT-XD-3		TTXD 3 C	TC	Exhaust temperature thermocouple #03
405		007		<C>	TBQA	007	TC04P	TT-XD-4		TTXD 4 C	TC	Exhaust temperature thermocouple #04
406		008		<C>	TBQA	008	TC04N	TT-XD-4		TTXD 4 C	TC	Exhaust temperature thermocouple #04
407		009		<C>	TBQA	009	TC05P	TT-XD-5		TTXD 5 C	TC	Exhaust temperature thermocouple #05
408		010		<C>	TBQA	010	TC05N	TT-XD-5		TTXD 5 C	TC	Exhaust temperature thermocouple #05
409		011		<C>	TBQA	011	TC06P	TT-XD-6		TTXD 6 C	TC	Exhaust temperature thermocouple #06
410		012		<C>	TBQA	012	TC06N	TT-XD-6		TTXD 6 C	TC	Exhaust temperature thermocouple #06
411		013		<C>	TBQA	013	TC07P	TT-XD-7		TTXD 7 C	TC	Exhaust temperature thermocouple #07
412		014		<C>	TBQA	014	TC07N	TT-XD-7		TTXD 7 C	TC	Exhaust temperature thermocouple #07
413		015		<C>	TBQA	015	TC08P	TT-XD-8		TTXD 8 C	TC	Exhaust temperature thermocouple #08
414		016		<C>	TBQA	016	TC08N	TT-XD-8		TTXD 8 C	TC	Exhaust temperature thermocouple #08

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
		415	017	<C>	TBQA	017	TC09P	TT-XD-9		TTXD 9 C	TC	Exhaust temperature thermocouple #09
		416	018	<C>	TBQA	018	TC09N	TT-XD-9		TTXD 9 C	TC	Exhaust temperature thermocouple #09
		417	019	<C>	TBQA	019	TC10P	TT-XD-10		TTXD 10 C	TC	Exhaust temperature thermocouple #10
		418	020	<C>	TBQA	020	TC10N	TT-XD-10		TTXD 10 C	TC	Exhaust temperature thermocouple #10
		419	021	<C>	TBQA	021	TC11P	TT-XD-11		TTXD 11 C	TC	Exhaust temperature thermocouple #11
		420	<R>TBQA022	<C>	TBQA	022	TC11N	TT-XD-11		TTXD 11 C	TC	Exhaust temperature thermocouple #11
		421	<R>TBQA023	<C>	TBQA	023	TC12P	TT-XD-12		TTXD 12 C	TC	Exhaust temperature thermocouple #12
		422	<R>TBQA024	<C>	TBQA	024	TC12N	TT-XD-12		TTXD 12 C	TC	Exhaust temperature thermocouple #12
		465		<C>	TBQA	025	TC13P	CT-DA-3		C C TC13	TC	Compressor discharge thermocouple
		466		<C>	TBQA	026	TC13N	CT-DA-3		C C TC13	TC	Compressor discharge thermocouple
		463		<C>	TBQA	027	TC14P	CT-DA-3		CTDA3	TC	Compressor discharge thermocouple
		464		<C>	TBQA	028	TC14N	CT-DA-3		CTDA3	TC	Compressor discharge thermocouple
		463		<C>	TBQA	029	TC15P	CT-DA-2		CTDA2	TC	Compressor discharge thermocouple
		464		<C>	TBQA	030	TC15N	CT-DA-2		CTDA2	TC	Compressor discharge thermocouple
		441		<C>	TBQA	031	TC16P	TT-WS1FO-2		TTWS1FO2	TC	Turbine temperature-wheelspace 1st stg fwd outer
		442		<C>	TBQA	032	TC16N	TT-WS1FO-2		TTWS1FO2	TC	Turbine temperature-wheelspace 1st stg fwd outer
		439		<C>	TBQA	033	TC17P	TT-WS1FO-3		TTWS1FO3	TC	Turbine temperature-wheelspace 1st stg fwd outer
		440		<C>	TBQA	034	TC17N	TT-WS1FO-3		TTWS1FO3	TC	Turbine temperature-wheelspace 1st stg fwd outer
		443		<C>	TBQA	035	TC18P	TT-WS1AO-2		TTWS1AO2	TC	Turbine temperature-wheelspace 1st stg aft outer
		444		<C>	TBQA	036	TC18N	TT-WS1AO-2		TTWS1AO2	TC	Turbine temperature-wheelspace 1st stg aft outer
		445		<C>	TBQA	037	TC19P	TT-WS1AO-3		TTWS1AO3	TC	Turbine temperature-wheelspace 1st stg aft outer
		446		<C>	TBQA	038	TC19N	TT-WS1AO-3		TTWS1AO3	TC	Turbine temperature-wheelspace 1st stg aft outer
		447		<C>	TBQA	039	TC20P	TT-WS2FO-2		TTWS2FO2	TC	Turbine temperature-wheelspace 1st stg aft outer
		448		<C>	TBQA	040	TC20N	TT-WS2FO-2		TTWS2FO2	TC	Turbine temperature-wheelspace 1st stg aft outer
		449		<C>	TBQA	041	TC21P	TT-WS2FO-3		TTWS2FO3	TC	Turbine temperature-wheelspace 2nd stg fwd outer
		450		<C>	TBQA	042	TC21N	TT-WS2FO-3		TTWS2FO3	TC	Turbine temperature-wheelspace 2nd stg fwd outer
		451		<C>	TBQA	043	TC22P	TT-WS2AO-1		TTWS2AO1	TC	Turbine temperature-wheelspace 2nd stg aft outer
		452		<C>	TBQA	044	TC22N	TT-WS2AO-1		TTWS2AO1	TC	Turbine temperature-wheelspace 2nd stg aft outer
		453		<C>	TBQA	045	TC23P	TT-WS2AO-2		TTWS2AO2	TC	Turbine temperature-wheelspace 2nd stg aft outer
		454		<C>	TBQA	046	TC23N	TT-WS2AO-2		TTWS2AO2	TC	Turbine temperature-wheelspace 2nd stg aft outer
		451		<C>	TBQA	047	TC24P	TC		C C TC24	TC	Lube oil hand temp
		452		<C>	TBQA	048	TC24N	TC		C C TC24	TC	Lube oil hand temp
		453		<C>	TBQA	049	TC25P	TC		C C TC25	TC	Lube oil hand temp
		454		<C>	TBQA	050	TC25N	TC		C C TC25	TC	Lube oil hand temp
		451		<C>	TBQA	051	TC26P	TC		C C TC26	TC	Lube oil hand temp

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<C>	TBQA	052	TC26N			C C TC26		
		781		<C>	TBQA	053	TC27P	GEN. RTD C21		GENRTDC21	TC	GENERATOR STATOR TC - C21
		782		<C>	TBQA	054	TC27N	GEN. RTD C21		GENRTDC21	TC	GENERATOR STATOR TC - C21
		783		<C>	TBQA	055	TC28P	GEN. RTD C22		GENRTDC22	TC	GENERATOR STATOR TC - C22
		784		<C>	TBQA	056	TC28N	GEN. RTD C22		GENRTDC22	TC	GENERATOR STATOR TC - C22
		785		<C>	TBQA	057	TC29P	GEN. RTD C23		GENRTDC23	TC	GENERATOR STATOR TC - C23
		786		<C>	TBQA	058	TC29N	GEN. RTD C23		GENRTDC23	TC	GENERATOR STATOR TC - C23
		787		<C>	TBQA	059	TC30P	GEN. RTD C31		GENRTDC31	TC	GENERATOR STATOR TC - C31
		788		<C>	TBQA	060	TC30N	GEN. RTD C31		GENRTDC31	TC	GENERATOR STATOR TC - C31
		789		<C>	TBQA	061	TC31P	GEN. RTD C32		GENRTDC32	TC	GENERATOR STATOR TC - C32
		790		<C>	TBQA	062	TC31N	GEN. RTD C32		GENRTDC32	TC	GENERATOR STATOR TC - C32
		791		<C>	TBQA	063	TC32P	GEN. RTD C33		GENRTDC33	TC	GENERATOR STATOR TC - C33
		792		<C>	TBQA	064	TC32N	GEN. RTD C33		GENRTDC33	TC	GENERATOR STATOR TC - C33
		4700		<C>	TBQA	065	TC33P	GEN. RTD C1		GENRTDC1	TC	GENERATOR COLD AIR TC - C1
		4701		<C>	TBQA	066	TC33N	GEN. RTD C1		GENRTDC1	TC	GENERATOR COLD AIR TC - C1
		4702		<C>	TBQA	067	TC34P	GEN. RTD C2		GENRTDC2	TC	GENERATOR COLD AIR TC - C2
		4703		<C>	TBQA	068	TC34N	GEN. RTD C2		GENRTDC2	TC	GENERATOR COLD AIR TC - C2
		4706		<C>	TBQA	069	TC35P	GEN. RTD C5		GENRTDC5	TC	GENERATOR HOT AIR TC - C5
		4707		<C>	TBQA	070	TC35N	GEN. RTD C5		GENRTDC5	TC	GENERATOR HOT AIR TC - C5
		4708		<C>	TBQA	071	TC36P	GEN. RTD C6		GENRTDC6	TC	GENERATOR HOT AIR TC - C6
		4709		<C>	TBQA	072	TC36N	GEN. RTD C6		GENRTDC6	TC	GENERATOR HOT AIR TC - C6
		4710		<C>	TBQA	073	TC37P	GEN. RTD C7		GENRTDC7	TC	GENERATOR HOT AIR TC - C7
		4711		<C>	TBQA	074	TC37N	GEN. RTD C7		GENRTDC7	TC	GENERATOR HOT AIR TC - C7
		3906		<C>	TBQA	075	TC38P	GEN. RTD C8		GENRTDC8	TC	GENERATOR HOT AIR TC - C8
		3907		<C>	TBQA	076	TC38N	GEN. RTD C8		GENRTDC8	TC	GENERATOR HOT AIR TC - C8
				<C>	TBQA	077	TC39P			C C TC39		
				<C>	TBQA	078	TC39N			C C TC39		
				<C>	TBQA	079	TC40P			C C TC40		
				<C>	TBQA	080	TC40N			C C TC40		
				<C>	TBQA	081	TC41P			C C TC41		
				<C>	TBQA	082	TC41N			C C TC41		
				<C>	TBQA	083	TC42P			C C TC42		
				<C>	TBQA	084	TC42N			C C TC42		
				<C>	TBQA	085	SPARE	SPARE TERMINAL				NON ACTIVE INPUT (DO NOT USE)
				<C>	TBQA	086	SPARE	SPARE TERMINAL				NON ACTIVE INPUT (DO NOT USE)

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<C>	TBOA	087	SPARE	SPARE TERMINAL				NON ACTIVE INPUT (DO NOT USE)
				<C>	TBOA	088	SPARE	SPARE TERMINAL				NON ACTIVE INPUT (DO NOT USE)
				<C>	TBOA	089	SPARE	SPARE TERMINAL				NON ACTIVE INPUT (DO NOT USE)
				<C>	TBOA	090	SPARE	SPARE TERMINAL				NON ACTIVE INPUT (DO NOT USE)
				<CD>	DTBA	001	CI01			C CD CI01		
				<CD>	DTBA	002	BUS_A			C_CD_CI01		
				<CD>	DTBA	003	CI02			C CD CI02		
				<CD>	DTBA	004	BUS_A			C_CD_CI02		
617				<CD>	DTBA	005	CI03	12HA-1	NO	L12HBLT	CIM I	Overspeed bolt trip - hp turbine overspeed alarm
107				<CD>	DTBA	006	BUS_A	12HA-1	NO	L12HBLT	CIM_I	Overspeed bolt trip - hp turbine overspeed alarm
203				<CD>	DTBA	007	CI04	26QN-1	NO	L26QN	CIM	Lube oil tank temp-normal
107				<CD>	DTBA	008	BUS_A	26QN-1	NO	L26QN	CIM	Lube oil tank temp-normal
				<CD>	DTBA	009	CI05			C CD CI05		
				<CD>	DTBA	010	BUS_A			C_CD_CI05		
4120				<CD>	DTBA	011	CI06	43TSN	NC	L43TSN	CIM I	480V TRANSFER SWITCH - NORMAL POSITION <i>not use</i>
107				<CD>	DTBA	012	BUS_A	43TSN	NC	L43TSN	CIM_I	480V TRANSFER SWITCH - NORMAL POSITION <i>use</i>
S-15(2BLK)				<CD>	DTBA	013	CI07	5RTU	NO	L5RTU_ALM	CIM I	EMERGENCY STOP PB ALARM-RTU
S-15(2RED)				<CD>	DTBA	014	BUS_A	5RTU	NO	L5RTU_ALM	CIM_I	EMERGENCY STOP PB ALARM-RTU
				<CD>	DTBA	015	CI08			C CD CI08		
				<CD>	DTBA	016	BUS_A			C_CD_CI08		
				<CD>	DTBA	017	CI09			C CD CI09		
				<CD>	DTBA	018	BUS_A			C_CD_CI09		
				<CD>	DTBA	019	CI10			C CD CI10		
				<CD>	DTBA	020	BUS_B			C_CD_CI10		
				<CD>	DTBA	021	CI11			C CD CI11		
				<CD>	DTBA	022	BUS_B			C_CD_CI11		
182				<CD>	DTBA	023	CI12	43DE/TEST	NO	L43DSTS	CIM	Diesel engine test switch
107				<CD>	DTBA	024	BUS_B	43DE/TEST	NO	L43DSTS	CIM	Diesel engine test switch
159				<CD>	DTBA	025	CI13	63DM	NO	L63DM	CIM	Diesel engine minimum speed pressure switch
107				<CD>	DTBA	026	BUS_B	63DM	NO	L63DM	CIM	Diesel engine minimum speed pressure switch
160				<CD>	DTBA	027	CI14	63QD-1	NO	L63QDN	CIM	Diesel engine lube oil pressure normal
107				<CD>	DTBA	028	BUS_B	63QD-1	NO	L63QDN	CIM	Diesel engine lube oil pressure normal
				<CD>	DTBA	029	CI15			C CD CI15		
				<CD>	DTBA	030	BUS_B			C_CD_CI15		
157				<CD>	DTBA	031	CI16	33CS/be	NO	L33CSE	CIM	Starting clutch engaged
107				<CD>	DTBA	032	BUS_B	33CS/be	NO	L33CSE	CIM	Starting clutch engaged

Cable Num	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
	149 107		<CD> <CD>	DTBA DTBA	033 034	CI17 BUS_B	33HR/bf-ar 33HR/bf-ar	NC NC	L33HRF L33HRF	CIM CIM	Hydraulic Ratchet in Forward Stroke Hydraulic Ratchet in Forward Stroke
	147 107		<CD> <CD>	DTBA DTBA	035 036	CI18 BUS_B	43HR/JOG;NO 43HR/JOG;NO	NO NO	L43HRJOG L43HRJOG	CIM CIM	Hydraulic ratchet jog push button Hydraulic ratchet jog push button
	4532 107		<CD> <CD>	DTBA DTBA	037 038	CI19 BUS_C	49GHX 49GHX	NC NC	L49GHX L49GHX	CIM_I CIM_I	23HG OVERLOAD RELAY 23HG OVERLOAD RELAY
	653 107		<CD> <CD>	DTBA DTBA	039 040	CI20 BUS_C	49HR-1 49HR-1	NC NC	L49HR1A L49HR1A	CIM_I CIM_I	Hydraulic ratchet motor overload relay Hydraulic ratchet motor overload relay
	624 107		<CD> <CD>	DTBA DTBA	041 042	CI21 BUS_C	27OE 27OE	NO NO	L27OEN L27OEN	CIM_I CIM_I	EMERGENCY LUBE OIL PUMP UNDERVOLTAGE RELAY EMERGENCY LUBE OIL PUMP UNDERVOLTAGE RELAY
	4181 107		<CD> <CD>	DTBA DTBA	043 044	CI22 BUS_C	52WC-2/AUX 52WC-2/AUX	NC NC	L52WC2AUX L52WC2AUX	CIM_I CIM_I	[88WC-2] CIRCUIT BREAKER STATUS [88WC-2] CIRCUIT BREAKER STATUS
	2659 107		<CD> <CD>	DTBA DTBA	045 046	CI23 BUS_C	72OEX 72OEX	NC NC	L72OEX L72OEX	CIM CIM	Emergency lube oil pump motor aux relay Emergency lube oil pump motor aux relay
	4182 107		<CD> <CD>	DTBA DTBA	047 048	CI24 BUS_C	49WCX-2 49WCX-2	NC NC	L49WC2 L49WC2	CIM_I CIM_I	[88WC-2] MOTOR OVERLOAD RELAY [88WC-2] MOTOR OVERLOAD RELAY
	4132 107		<CD> <CD>	DTBA DTBA	049 050	CI25 BUS_C	49WCX-1 49WCX-1	NC NC	L49WC1 L49WC1	CIM_I CIM_I	[88WC-1] MOTOR OVERLOAD RELAY [88WC-1] MOTOR OVERLOAD RELAY
	4131 107		<CD> <CD>	DTBA DTBA	051 052	CI26 BUS_C	52WC-1/AUX 52WC-1/AUX	NC NC	L52WC1AUX L52WC1AUX	CIM_I CIM_I	[88WC-1] CIRCUIT BREAKER STATUS [88WC-1] CIRCUIT BREAKER STATUS
	7204 107	ESTOPPB2 ESTOPPB1	<CD> <CD>	DTBA DTBA	053 054	CI27 BUS_C	5E-1/PB 5E-1/PB	NC NC	L5E L5E	CIM_I CIM_I	Emergency trip pushbutton / alarm Emergency trip pushbutton / alarm
	4201 107	<CI> TBG01 <CI> TBG03	<CD> <CD>	DTBA DTBA	055 056	CI28 BUS_D	27FP 27FP	NO NO	L27FP L27FP	CIM_I CIM_I	FIRE PROTECTION CONTROL CIRCUIT DC UNDERVOLTAGE FIRE PROTECTION CONTROL CIRCUIT DC UNDERVOLTAGE
	4651 107		<CD> <CD>	DTBA DTBA	057 058	CI29 BUS_D	49QT 49QT	NC NC	L49QT L49QT	CIM_I CIM_I	23QT OVERLOAD 23QT OVERLOAD
	4912 107		<CD> <CD>	DTBA DTBA	059 060	CI30 BUS_D	26FH 26FH	NC NC	L26FH1L L26FH1L	CIM_I CIM_I	FUEL TEMP. LOW - START HEATER & LEAD FWD PUMP FUEL TEMP. LOW - START HEATER & LEAD FWD PUMP
			<CD> <CD>	DTBA DTBA	061 062	CI31 BUS_D	C CD CI31 C_CD_CI31				
			<CD> <CD>	DTBA DTBA	063 064	CI32 BUS_D	C CD CI32 C_CD_CI32				
	4232 107		<CD> <CD>	DTBA DTBA	065 066	CI33 BUS_D	49FCX-1 49FCX-1	NC NC	L49FCX1 L49FCX1	CIM_I CIM_I	[88FC-1] OVERLOAD RELAY [88FC-1] OVERLOAD RELAY
	4330		<CD>	DTBA	067	CI34	52FD-1	NO	L52FD1	CIM	[88FD-1] RUN STATUS CONTACT

Cable Num	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
	107		<CD>	DTBA	068	BUS_D	52FD-1	NO	L52FD1	CIM	[88FD-1] RUN STATUS CONTACT
	4605 107		<CD>	DTBA	069	CI35	52BA	NC	L52BA	CIM	[88BA] RUN STATUS CONTACT
			<CD>	DTBA	070	BUS_D	52BA	NC	L52BA	CIM	[88BA] RUN STATUS CONTACT
	4601 107		<CD>	DTBA	071	CI36	52QC	NO	L52QC	CIM	[88QC] RUN STATUS CONTACT
			<CD>	DTBA	072	BUS_D	52QC	NO	L52QC	CIM	[88QC] RUN STATUS CONTACT
	4603 107		<CD>	DTBA	073	CI37	52QT	NO	L52QT	CIM	[23QT] RUN STATUS CONTACT
			<CD>	DTBA	074	BUS_E	52QT	NO	L52QT	CIM	[23QT] RUN STATUS CONTACT
	4910 107		<CD>	DTBA	075	CI38	52FH	NO	L52FH	CIM	[23FH] RUN STATUS CONTACT { IF USED -CUST. STARTER }
			<CD>	DTBA	076	BUS_E	52FH	NO	L52FH	CIM	[23FH] RUN STATUS CONTACT { IF USED -CUST. STARTER }
	4380 107		<CD>	DTBA	077	CI39	52FD-2	NO	L52FD2	CIM	[88FD-2] RUN STATUS CONTACT
			<CD>	DTBA	078	BUS_E	52FD-2	NO	L52FD2	CIM	[88FD-2] RUN STATUS CONTACT
	4608 107		<CD>	DTBA	079	CI40	72HR	NO	L72HR_DSP	CIM	[88HR] RUN STATUS CONTACT
			<CD>	DTBA	080	BUS_E	72HR	NO	L72HR_DSP	CIM	[88HR] RUN STATUS CONTACT
	4610 107		<CD>	DTBA	081	CI41	52HT	NO	L52HT	CIM	[88HT] RUN STATUS CONTACT
			<CD>	DTBA	082	BUS_E	52HT	NO	L52HT	CIM	[88HT] RUN STATUS CONTACT
	4609 107		<CD>	DTBA	083	CI42	52HA	NO	L52HA	CIM	[88HA] RUN STATUS CONTACT
			<CD>	DTBA	084	BUS_E	52HA	NO	L52HA	CIM	[88HA] RUN STATUS CONTACT
	4382 107		<CD>	DTBA	085	CI43	49FCX-2	NC	L49FCX2	CIM I	[88FC-2] MOTOR OVERLOAD RELAY
			<CD>	DTBA	086	BUS_E	49FCX-2	NC	L49FCX2	CIM_I	[88FC-2] MOTOR OVERLOAD RELAY
	4382 107		<CD>	DTBA	087	CI44	49VGX	NC	L49VGX	CIM I	[88VG] MOTOR OVERLOAD RELAY
			<CD>	DTBA	088	BUS_E	49VGX	NC	L49VGX	CIM_I	[88VG] MOTOR OVERLOAD RELAY
	8500 107		<CD>	DTBA	089	CI45	30EX	NC	L30EX	CIM I	EX2000 GENERAL ALARM
			<CD>	DTBA	090	BUS_E	30EX	NC	L30EX	CIM_I	EX2000 GENERAL ALARM
	4658 107		<CD>	DTBA	091	CI46	49HT	NC	L49HT	CIM I	[88HT] OVERLOAD RELAY
			<CD>	DTBA	092	BUS_E	49HT	NC	L49HT	CIM_I	[88HT] OVERLOAD RELAY
			<CD>	DTBA	093	SPARE					
			<CD>	DTBA	094	SPARE					
			<CD>	DTBA	095	SPARE					
			<CD>	DTBA	096	SPARE					
	1021 107		<CD>	DTBB	001	CI47	CA1/START	NO	CA1STRSEL	CIM	Cable remote start selector switch
			<CD>	DTBB	002	BUS_A	CA1/START	NO	CA1STRSEL	CIM	Cable remote start selector switch
	1022 107		<CD>	DTBB	003	CI48	CA1/STOP	NO	CA1STPSEL	CIM	Cable remote stop selector switch
			<CD>	DTBB	004	BUS_A	CA1/STOP	NO	CA1STPSEL	CIM	Cable remote stop selector switch
	1023 107		<CD>	DTBB	005	CI49	CA43BP/PRE SEL	NO	CA43PSEL	CIM	Cable remote preselect load selector switch
			<CD>	DTBB	006	BUS_A	CA43BP/PRE SEL	NO	CA43PSEL	CIM	Cable remote preselect load selector switch

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
1026 107		1026 107		<CD>	DTBB	007	CI50 BUS_A	CA43BP/BASE	NO	CA43SEL	CIM	Cable remote base load selector switch
				<CD>	DTBB	008		CA43BP/BASE	NO	CA43SEL	CIM	Cable remote base load selector switch
1024 107		1024 107		<CD>	DTBB	009	CI51 BUS_A	CA43BP/PEAK	NO	CA43SEL	CIM	Cable remote peak load selector switch
				<CD>	DTBB	010		CA43BP/PEAK	NO	CA43SEL	CIM	Cable remote peak load selector switch
1025 107		1025 107		<CD>	DTBB	011	CI52 BUS_A	CA1F/FLS	NO	CA1FSTSEL	CIM	Cable remote fast load start select
				<CD>	DTBB	012		CA1F/FLS	NO	CA1FSTSEL	CIM	Cable remote fast load start select
				<CD>	DTBB	013	CI53 BUS_A	CA GEN OFF	NO	C CD CI53 C_CD_CI53	CIM	Cable remote GEN CTRL OFF
				<CD>	DTBB	014			NO	C CD CI54 C_CD_CI54	CIM	Cable remote PF ON
				<CD>	DTBB	015	CI54 BUS_A	CA PF ON	NO	C CD CI54 C_CD_CI54	CIM	Cable remote PF ON
				<CD>	DTBB	016			NO	C CD CI55 C_CD_CI55	CIM	Cable remote CTRL ON
				<CD>	DTBB	017	CI55 BUS_A	CA VARN	NO	C CD CI55 C_CD_CI55	CIM	Cable remote CTRL ON
				<CD>	DTBB	018			NO			
1032 107		1032 107		<CD>	DTBB	019	CI56 BUS_A	CA43F/DIST	NO	CA43DIST	CIM	CABLE REMOTE - DISTILLATE FUEL SELECTION
				<CD>	DTBB	020		CA43F/DIST	NO	CA43DIST	CIM	CABLE REMOTE - DISTILLATE FUEL SELECTION
1031 107		1031 107		<CD>	DTBB	021	CI57 BUS_B	CA43F/GAS	NO	CA43GAS	CIM	CABLE REMOTE - GAS FUEL SELECTION
				<CD>	DTBB	022		CA43F/GAS	NO	CA43GAS	CIM	CABLE REMOTE - GAS FUEL SELECTION
1027 107		1027 107		<CD>	DTBB	023	CI58 BUS_B	CA70R4/CS/RAISE	NO	CA70R4CSR	CIM	CABLE REMOTE - SPEED SETPOINT RAISE
				<CD>	DTBB	024		CA70R4/CS/RAISE	NO	CA70R4CSR	CIM	CABLE REMOTE - SPEED SETPOINT RAISE
1028 107		1028 107		<CD>	DTBB	025	CI59 BUS_B	CA70R4/CS/LOWER	NO	CA70R4CSL	CIM	CABLE REMOTE - SPEED SETPOINT LOWER
				<CD>	DTBB	026		CA70R4/CS/LOWER	NO	CA70R4CSL	CIM	CABLE REMOTE - SPEED SETPOINT LOWER
1060 107		1060 107		<CD>	DTBB	027	CI60 BUS_B	CA90R4/CS/RAISE	NO	CA90R4CSR	CIM	Cable remote exciter voltage setpoint raise select
				<CD>	DTBB	028		CA90R4/CS/RAISE	NO	CA90R4CSR	CIM	Cable remote exciter voltage setpoint raise select
1061 107		1061 107		<CD>	DTBB	029	CI61 BUS_B	CA90R4/CS/LOWER	NO	CA90R4CSL	CIM	Cable remote exciter voltage setpoint lower select
				<CD>	DTBB	030		CA90R4/CS/LOWER	NO	CA90R4CSL	CIM	Cable remote exciter voltage setpoint lower select
1082 107		1082 107		<CD>	DTBB	031	CI62 BUS_B	CA43EX/AUTO	NO	CA43EX_AUTO	CIM	CABLE REMOTE EX2000 AUTO SELECT
				<CD>	DTBB	032		CA43EX/AUTO	NO	CA43EX_AUTO	CIM	CABLE REMOTE EX2000 AUTO SELECT
1081 107		1081 107		<CD>	DTBB	033	CI63 BUS_B	CA43CS/ISOCH	NO	CA43SCI	CIM	Cable remote isoch load selector switch
				<CD>	DTBB	034		CA43CS/ISOCH	NO	CA43SCI	CIM	Cable remote isoch load selector switch
1090 107		1090 107		<CD>	DTBB	035	CI64 BUS_B	CA43CS/DR00P	NO	CA43SCD	CIM	Cable remote droop load selector switch
				<CD>	DTBB	036		CA43CS/DR00P	NO	CA43SCD	CIM	Cable remote droop load selector switch
1600 107		1600 107		<CD>	DTBB	037	CI65 BUS_B	CA43EX/MAN	NO	CA43EX_MAN	CIM	CABLE REMOTE EX2000 MANUAL SELECT
				<CD>	DTBB	038		CA43EX/MAN	NO	CA43EX_MAN	CIM	CABLE REMOTE EX2000 MANUAL SELECT
				<CD>	DTBB	039	CI66 BUS_B	26JS-2	NC	L26JS2H	CIM I	WATER INJECTION SKID WATER TEMP. SWITCH
				<CD>	DTBB	040		26JS-2	NC	L26JS2H	CIM I	WATER INJECTION SKID WATER TEMP. SWITCH
				<CD>	DTBB	041	CI67			C_CD_CI67		

Cable Num	Wire Pnt Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
			<CD>	DTBB	042	BUS_C			C_CD_C167		
			<CD>	DTBB	043	CI68		NA	C_CD_C168		
			<CD>	DTBB	044	BUS_C		NA	C_CD_C168		
			<CD>	DTBB	045	CI69		NA	C_CD_C169		
			<CD>	DTBB	046	BUS_C		NA	C_CD_C169		
			<CD>	DTBB	047	CI70	64F	NC	L64F	CIM I	GENERATOR FIELD GROUND - 64F ALARM
	4752 107		<CD>	DTBB	048	BUS_C	64F	NC	L64F	CIM I	GENERATOR FIELD GROUND - 64F ALARM
			<CD>	DTBB	049	CI71		NA	C_CD_C171		
			<CD>	DTBB	050	BUS_C		NA	C_CD_C171		
			<CD>	DTBB	051	CI72		NA	C_CD_C172		
			<CD>	DTBB	052	BUS_C		NA	C_CD_C172		
			<CD>	DTBB	053	CI73		NA	C_CD_C173		
			<CD>	DTBB	054	BUS_C		NA	C_CD_C173		
			<CD>	DTBB	055	CI74			C_CD_C174		
			<CD>	DTBB	056	BUS_C			C_CD_C174		
			<CD>	DTBB	057	CI75			C_CD_C175		
			<CD>	DTBB	058	BUS_C			C_CD_C175		JUMPER TO 26QT on 201-878A-05 ?
			<CD>	DTBB	059	CI76			C_CD_C176		
			<CD>	DTBB	060	BUS_C			C_CD_C176		JUMPER TO 63QT on 201-878A-05 ?
			<CD>	DTBB	061	CI77			C_CD_C177		
			<CD>	DTBB	062	BUS_D			C_CD_C177		JUMPER TO 63HL on 201-878A-05 ?
			<CD>	DTBB	063	CI78			C_CD_C178		
			<CD>	DTBB	064	BUS_D			C_CD_C178		JUMPER TO 63HL on 201-878A-05 ?
			<CD>	DTBB	065	CI79			C_CD_C179		
			<CD>	DTBB	066	BUS_D			C_CD_C179		JUMPER TO 26QT on 201-878A-05 ?
			<CD>	DTBB	067	CI80			C_CD_C180		
			<CD>	DTBB	068	BUS_D			C_CD_C180		JUMPER TO 26QT on 201-878A-05 ?
			<CD>	DTBB	069	CI81			C_CD_C181		
			<CD>	DTBB	070	BUS_D			C_CD_C181		JUMPER TO 26QT on 201-878A-05 ?
			<CD>	DTBB	071	CI82			C_CD_C182		
			<CD>	DTBB	072	BUS_D			C_CD_C182		
			<CD>	DTBB	073	CI83		NA	C_CD_C183		
			<CD>	DTBB	074	BUS_D		NA	C_CD_C183		
			<CD>	DTBB	075	CI84		NA	C_CD_C184		
			<CD>	DTBB	076	BUS_D		NA	C_CD_C184		

Aux Lube oil Pump Run

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<CD>	DTBC	012	CO03NC	3SQ	C	S3SQ	LOG	Cable remote sequence in progress ind
		NA		<CD>	DTBC	013	CO04SO	28FDX	C	S28FDX	LOG	Cable remote flame indication
		1037		<CD>	DTBC	014	CO04NO	28FDX	C	S28FDX	LOG	Cable remote flame indication
		1017		<CD>	DTBC	015	CO04C	28FDX	C	S28FDX	LOG	Cable remote flame indication
				<CD>	DTBC	016	CO04NC	28FDX	C	S28FDX	LOG	Cable remote flame indication
				<CD>	DTBC	017	CO05SO	3-1	C	S3SQ	LOG	Complete sequence indication relay
		1046		<CD>	DTBC	018	CO05NO	3-1	C	S3SQ	LOG	Complete sequence indication relay
		1017		<CD>	DTBC	019	CO05C	3-1	C	S3SQ	LOG	Complete sequence indication relay
				<CD>	DTBC	020	CO05NC	3-1	C	S3SQ	LOG	Complete sequence indication relay
				<CD>	DTBC	021	CO06SO	83FG	C	S83FG	LOG	Cable remote gas fuel select indication
		1033		<CD>	DTBC	022	CO06NO	83FG	C	S83FG	LOG	Cable remote gas fuel select indication
		1017		<CD>	DTBC	023	CO06C	83FG	C	S83FG	LOG	Cable remote gas fuel select indication
				<CD>	DTBC	024	CO06NC	83FG	C	S83FG	LOG	Cable remote gas fuel select indication
				<CD>	DTBC	025	CO07SO	83FL	C	S83FL	LOG	Cable remote liq fuel select indication
		1042		<CD>	DTBC	026	CO07NO	83FL	C	S83FL	LOG	Cable remote liq fuel select indication
		1017		<CD>	DTBC	027	CO07C	83FL	C	S83FL	LOG	Cable remote liq fuel select indication
		NA		<CD>	DTBC	028	CO07NC	83FL	C	S83FL	LOG	Cable remote liq fuel select indication
				<CD>	DTBC	029	CO08SO	1Z	NO	S1Z	LOG	Cable remote auxiliaries master control relay
		NA		<CD>	DTBC	030	CO08NO	1Z	NO	S1Z	LOG	Cable remote auxiliaries master control relay
		1036		<CD>	DTBC	031	CO08C	1Z	NO	S1Z	LOG	Cable remote auxiliaries master control relay
		1017		<CD>	DTBC	032	CO08NC	1Z	NO	S1Z	LOG	Cable remote auxiliaries master control relay
		NA		<CD>	DTBC	033	CO09SO	83SCI	NO	S83SCI	LOG	Cable remote isochronous mode indication
		NA		<CD>	DTBC	034	CO09NO	83SCI	NO	S83SCI	LOG	Cable remote isochronous mode indication
		1052		<CD>	DTBC	035	CO09C	83SCI	NO	S83SCI	LOG	Cable remote isochronous mode indication
		1017		<CD>	DTBC	036	CO09NC	83SCI	NO	S83SCI	LOG	Cable remote isochronous mode indication
		NA		<CD>	DTBC	037	CO10SO	4DS	NO	S4DS	LOG	Cable remote diesel cranking indication
		NA		<CD>	DTBC	038	CO10NO	4DS	NO	S4DS	LOG	Cable remote diesel cranking indication
		1001		<CD>	DTBC	039	CO10C	4DS	NO	S4DS	LOG	Cable remote diesel cranking indication
		1017		<CD>	DTBC	040	CO10NC	4DS	NO	S4DS	LOG	Cable remote diesel cranking indication
		NA		<CD>	DTBC	041	CO11SO	4DE	NO	S4DE	LOG	Cable remote diesel running indication
		1002		<CD>	DTBC	042	CO11NO	4DE	NO	S4DE	LOG	Cable remote diesel running indication
		1017		<CD>	DTBC	043	CO11C	4DE	NO	S4DE	LOG	Cable remote diesel running indication
		NA		<CD>	DTBC	044	CO11NC	4DE	NO	S4DE	LOG	Cable remote diesel running indication
				<CD>	DTBC	045	CO12SO	52GX	C	S52GX	LOG	CABLE REMOTE GEN BREAKER CLOSED/OPEN IND
		NA		<CD>	DTBC	046	CO12NO	52GX	C	S52GX	LOG	CABLE REMOTE GEN BREAKER CLOSED/OPEN IND
		1044		<CD>	DTBC	047	CO12C	52GX	C	S52GX	LOG	CABLE REMOTE GEN BREAKER CLOSED/OPEN IND
		1017		<CD>	DTBC	048	CO12NC	52GX	C	S52GX	LOG	CABLE REMOTE GEN BREAKER CLOSED/OPEN IND
		1043		<CD>	DTBC	049	CO13SO	83PS	C	S83PS	LOG	Cable remote preset load indication
		NA		<CD>	DTBC	050	CO13NO	83PS	C	S83PS	LOG	Cable remote preset load indication
		1057		<CD>	DTBC	051	CO13C	83PS	C	S83PS	LOG	Cable remote preset load indication
		1017		<CD>	DTBC	052	CO13NC	83PS	C	S83PS	LOG	Cable remote preset load indication
		NA		<CD>	DTBC	052	CO13NC	83PS	C	S83PS	LOG	Cable remote preset load indication

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
		NA		<CD>	DTBC	053	CO14SO	83B	C	S83B	LOG	Cable remote base load indicated
		1038		<CD>	DTBC	054	CO14NO	83B	C	S83B	LOG	Cable remote base load indicated
		1017		<CD>	DTBC	055	CO14C	83B	C	S83B	LOG	Cable remote base load indicated
		NA		<CD>	DTBC	056	CO14NC	83B	C	S83B	LOG	Cable remote base load indicated
		NA		<CD>	DTBC	057	CO15SO	83P	C	S83P	LOG	Cable remote peak load indicated
		1039		<CD>	DTBC	058	CO15NO	83P	C	S83P	LOG	Cable remote peak load indicated
		1017		<CD>	DTBC	059	CO15C	83P	C	S83P	LOG	Cable remote peak load indicated
		NA		<CD>	DTBC	060	CO15NC	83P	C	S83P	LOG	Cable remote peak load indicated
		NA		<CD>	DTBC	061	CO16SO	SOLN FUNCT NOT AVAIL	C	S45FTX	LOG	CABLE REMOTE FIRE INDICATION <i>CAC EXHIBIT</i>
		1049		<CD>	DTBC	062	CO16NO	45FTX	C	S45FTX	LOG	CABLE REMOTE FIRE INDICATION <i>AC-ALARM</i>
		1017		<CD>	DTBC	063	CO16C	45FTX	C	S45FTX	LOG	CABLE REMOTE FIRE INDICATION <i>NOT USED</i>
		NA		<CD>	DTBC	064	CO16NC	45FTX	C	S45FTX	LOG	CABLE REMOTE FIRE INDICATION <i>NOT USED</i>
		NA		<CD>	DTBC	065	CO17SO	SOLN FUNCT NOT AVAIL	C	S26TCZ	LOG	Cable remote fuel temp control indication <i>NOT USED</i>
		1041		<CD>	DTBC	066	CO17NO	26TCZ	C	S26TCZ	LOG	Cable remote fuel temp control indication <i>NOT USED</i>
		1017		<CD>	DTBC	067	CO17C	26TCZ	C	S26TCZ	LOG	Cable remote fuel temp control indication <i>NOT USED</i>
		NA		<CD>	DTBC	068	CO17NC	26TCZ	C	S26TCZ	LOG	Cable remote fuel temp control indication <i>NOT USED</i>
		NA		<CD>	DTBC	069	CO18SO	SOLN FUNCT NOT AVAIL	C	S30X	LOG	Cable remote alarm indication
		1047		<CD>	DTBC	070	CO18NO	30X	C	S30X	LOG	Cable remote alarm indication
		1017		<CD>	DTBC	071	CO18C	30X	C	S30X	LOG	Cable remote alarm indication
		NA		<CD>	DTBC	072	CO18NC	30X	C	S30X	LOG	Cable remote alarm indication
		1017		<CD>	DTBC	073	CO19NO	30Y	C	S30Y	LOG	Cable remote alarm bell driver
		1082		<CD>	DTBC	074	CO19C	30Y	C	S30Y	LOG	Cable remote alarm bell driver
		NA		<CD>	DTBC	075	CO19NC	30Y	C	S30Y	LOG	Cable remote alarm bell driver
		1051		<CD>	DTBC	076	CO20NO	43R-30Y	NO	S43R-30Y	LOG	CABLE REMOTE ALARM BELL DRIVER <i>EX2000</i>
		1017		<CD>	DTBC	077	CO20C	43R-30Y	NO	S43R-30Y	LOG	CABLE REMOTE ALARM BELL DRIVER <i>NOT USED</i>
		NA		<CD>	DTBC	078	CO20NC	43R-30Y	NO	S43R-30Y	LOG	CABLE REMOTE ALARM BELL DRIVER <i>NOT USED</i>
		1142		<CD>	DTBC	079	CO21NO	43R-CC	C	L43R CC	LOG	REMOTE SEL-CONTACT TO 52G/CC CIRCUIT
		1141		<CD>	DTBC	080	CO21C	43R-CC	C	L43R CC	LOG	REMOTE SEL-CONTACT TO 52G/CC CIRCUIT
		1148		<CD>	DTBC	081	CO21NC	43R-CC	C	L43R CC	LOG	REMOTE SEL-CONTACT TO 52G/CC CIRCUIT
		...		<CD>	DTBC	082	CO22NO	3-GLC	NC	L3 GLC	LOG	COMPLETE SEQ. LOGIC FOR GEN. COMPT. LOUVER CONTROL
		...		<CD>	DTBC	083	CO22C	3-GLC	NC	L3 GLC	LOG	COMPLETE SEQ. LOGIC FOR GEN. COMPT. LOUVER CONTROL
		...		<CD>	DTBC	084	CO22NC	3-GLC	NC	L3 GLC	LOG	COMPLETE SEQ. LOGIC FOR GEN. COMPT. LOUVER CONTROL
		...		<CD>	DTBC	085	CO23NO	14HSX	NC	L14HSX2	LOG	FULL SPEED LOGIC
		...		<CD>	DTBC	086	CO23C	14HSX	NC	L14HSX2	LOG	FULL SPEED LOGIC
		...		<CD>	DTBC	087	CO23NC	14HSX	NC	L14HSX2	LOG	FULL SPEED LOGIC
		...		<CD>	DTBC	088	CO24NO	39VA-RTU	NO	L39VA RTU	LOG	HIGH VIBRATION ALARM - RTU
		...		<CD>	DTBC	089	CO24C	39VA-RTU	NO	L39VA RTU	LOG	HIGH VIBRATION ALARM - RTU
		...		<CD>	DTBC	090	CO24NC	39VA-RTU	NO	L39VA RTU	LOG	HIGH VIBRATION ALARM - RTU
		...		<CD>	DTBC	091	CO25NO	27DZ-RTU	NO	L27DZ RTU	LOG	BATTERY UNDERVOLTAGE - RTU
		...		<CD>	DTBC	092	CO25C	27DZ-RTU	NO	L27DZ RTU	LOG	BATTERY UNDERVOLTAGE - RTU
		...		<CD>	DTBC	093	CO25NC	27DZ-RTU	NO	L27DZ RTU	LOG	BATTERY UNDERVOLTAGE - RTU

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<CD>	DTBC	094	C026NO	86MP-RTU	NO	L86MP RTU	LOG	MASTER PROTECTIVE LOCKOUT - RTU
				<CD>	DTBC	095	C026C	86MP-RTU	NO	L86MP RTU	LOG	MASTER PROTECTIVE LOCKOUT - RTU
				<CD>	DTBC	096	C026NC	86MP-RTU	NO	L86MP RTU	LOG	MASTER PROTECTIVE LOCKOUT - RTU
1054				<CD>	DTBC	097	C027NO	43RX-4	NO	L43RX4	LOG	REMOTE CONTROL SELECTED
1017				<CD>	DTBC	098	C027C	43RX-4	NO	L43RX4	LOG	REMOTE CONTROL SELECTED
				<CD>	DTBC	099	C027NC	43RX-4	NO	L43RX4	LOG	REMOTE CONTROL SELECTED
1059				<CD>	DTBC	100	C028NO	1FX-R	NO	L1FXR	LOG	CABLE REMOTE FAST LOAD START
1017				<CD>	DTBC	101	C028C	1FX-R	NO	L1FXR	LOG	CABLE REMOTE FAST LOAD START
				<CD>	DTBC	102	C028NC	1FX-R	NO	L1FXR	LOG	CABLE REMOTE FAST LOAD START
844				<CD>	DTBC	103	C029NO	70RX-I	NO	L70RXI	LOG	GCP-SPEED/LOAD SETPOINT RAISE
834				<CD>	DTBC	104	C029C	70RX-I	NO	L70RXI	LOG	GCP-SPEED/LOAD SETPOINT RAISE
NA				<CD>	DTBC	105	C029NC	70RX-I	NO	L70RXI	LOG	GCP-SPEED/LOAD SETPOINT RAISE
845				<CD>	DTBC	106	C030NO	70LX-I	NO	L70LXI	LOG	GCP-SPEED/LOAD SETPOINT LOWER
834				<CD>	DTBC	107	C030C	70LX-I	NO	L70LXI	LOG	GCP-SPEED/LOAD SETPOINT LOWER
NA				<CD>	DTBC	108	C030NC	70LX-I	NO	L70LXI	LOG	GCP-SPEED/LOAD SETPOINT LOWER
108				<CD>	DTBD	001	C031SO	20DA-I	NO	L20DAIX	LOG	DIESEL ENGINE THROTTLE LOCKING SOLENOID VLV
220				<CD>	DTBD	002	C031NO	20DA-I	NO	L20DAIX	LOG	DIESEL ENGINE THROTTLE LOCKING SOLENOID VLV
NA				<CD>	DTBD	003	C031C	20DA-I	NO	L20DAIX	LOG	DIESEL ENGINE THROTTLE LOCKING SOLENOID VLV
NA				<CD>	DTBD	004	C031NC	20DA-I	NO	L20DAIX	LOG	DIESEL ENGINE THROTTLE LOCKING SOLENOID VLV
NA				<CD>	DTBD	005	C032SO	43VR	C	L43VR	LOG	CABLE REMOTE EX2K MAN/AUTO
1072				<CD>	DTBD	006	C032NO	43VR	C	L43VR	LOG	CABLE REMOTE EX2K MAN/AUTO
1017				<CD>	DTBD	007	C032C	43VR	C	L43VR	LOG	CABLE REMOTE EX2K MAN/AUTO
1073				<CD>	DTBD	008	C032NC	43VR	C	L43VR	LOG	CABLE REMOTE EX2K MAN/AUTO
108				<CD>	DTBD	009	C033SO	20DT	NO	L20DTX	LOG	DIESEL ENGINE AIR STOP VALVE SOLENOID
259				<CD>	DTBD	010	C033NO	20DT	NO	L20DTX	LOG	DIESEL ENGINE AIR STOP VALVE SOLENOID
NA				<CD>	DTBD	011	C033C	20DT	NO	L20DTX	LOG	DIESEL ENGINE AIR STOP VALVE SOLENOID
NA				<CD>	DTBD	012	C033NC	20DT	NO	L20DTX	LOG	DIESEL ENGINE AIR STOP VALVE SOLENOID
108				<CD>	DTBD	013	C034SO	20DV-I	NO	L20DVX	LOG	DIESEL ENGINE FUEL STOP SOLENOID VALVE
222				<CD>	DTBD	014	C034NO	20DV-I	NO	L20DVX	LOG	DIESEL ENGINE FUEL STOP SOLENOID VALVE
NA				<CD>	DTBD	015	C034C	20DV-I	NO	L20DVX	LOG	DIESEL ENGINE FUEL STOP SOLENOID VALVE
NA				<CD>	DTBD	016	C034NC	20DV-I	NO	L20DVX	LOG	DIESEL ENGINE FUEL STOP SOLENOID VALVE
108				<CD>	DTBD	017	C035SO	20CS-I	NO	L20CSIX	LOG	Starting clutch solenoid valve
223				<CD>	DTBD	018	C035NO	20CS-I	NO	L20CSIX	LOG	Starting clutch solenoid valve
NA				<CD>	DTBD	019	C035C	20CS-I	NO	L20CSIX	LOG	Starting clutch solenoid valve
NA				<CD>	DTBD	020	C035NC	20CS-I	NO	L20CSIX	LOG	Starting clutch solenoid valve
108				<CD>	DTBD	021	C036SO	12HFD C-RTU	NO	L12HFD C RTU	LOG	CONTROL SPEED SIGNAL TROUBLE - RTU
223				<CD>	DTBD	022	C036NO	12HFD C-RTU	NO	L12HFD C RTU	LOG	CONTROL SPEED SIGNAL TROUBLE - RTU
NA				<CD>	DTBD	023	C036C	12HFD C-RTU	NO	L12HFD C RTU	LOG	CONTROL SPEED SIGNAL TROUBLE - RTU
NA				<CD>	DTBD	024	C036NC	12HFD C-RTU	NO	L12HFD C RTU	LOG	CONTROL SPEED SIGNAL TROUBLE - RTU
108				<CD>	DTBD	025	C037SO	12HFD P-RTU	NO	L12HFD P RTU	LOG	PROTECTIVE SPEED SIGNAL TROUBLE - RTU
223				<CD>	DTBD	026	C037NO	12HFD P-RTU	NO	L12HFD P RTU	LOG	PROTECTIVE SPEED SIGNAL TROUBLE - RTU

Cable Num	Wire Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<CD>	DTBD	027	CO37C	12HFD P-RTU	NO	L12HFD P RTU	LOG	PROTECTIVE SPEED SIGNAL TROUBLE - RTU
				<CD>	DTBD	028	CO37NC	12HFD P-RTU	NO	L12HFD_P-RTU	LOG	PROTECTIVE SPEED SIGNAL TROUBLE - RTU
				<CD>	DTBD	029	CO38SO	90R4X-L	NO	L90R4XL	LOG	CABLE REMOTE EX2000 LOWER - AUTO REGULATOR
		1070		<CD>	DTBD	030	CO38NO	90R4X-L	NO	L90R4XL	LOG	CABLE REMOTE EX2000 LOWER - AUTO REGULATOR
		1017		<CD>	DTBD	031	CO38C	90R4X-L	NO	L90R4XL	LOG	CABLE REMOTE EX2000 LOWER - AUTO REGULATOR
				<CD>	DTBD	032	CO38NC	90R4X-L	NO	L90R4XL	LOG	CABLE REMOTE EX2000 LOWER - AUTO REGULATOR
				<CD>	DTBD	033	CO39SO	90R4X-R	NO	L90R4XR	LOG	CABLE REMOTE EX2000 RAISE - AUTO REGULATOR
		1071		<CD>	DTBD	034	CO39NO	90R4X-R	NO	L90R4XR	LOG	CABLE REMOTE EX2000 RAISE - AUTO REGULATOR
		1017		<CD>	DTBD	035	CO39C	90R4X-R	NO	L90R4XR	LOG	CABLE REMOTE EX2000 RAISE - AUTO REGULATOR
				<CD>	DTBD	036	CO39NC	90R4X-R	NO	L90R4XR	LOG	CABLE REMOTE EX2000 RAISE - AUTO REGULATOR
				<CD>	DTBD	037	CO40SO	45FTX-RTU	NO	L45FTX RTU	LOG	FIRE - RTU
				<CD>	DTBD	038	CO40NO	45FTX-RTU	NO	L45FTX RTU	LOG	FIRE - RTU
				<CD>	DTBD	039	CO40C	45FTX-RTU	NO	L45FTX RTU	LOG	FIRE - RTU
				<CD>	DTBD	040	CO40NC	45FTX-RTU	NO	L45FTX RTU	LOG	FIRE - RTU
				<CD>	DTBD	041	CO41SO	30FD-RTU	NO	L30FD RTU	LOG	FAILURE TO IGNITE - RTU
				<CD>	DTBD	042	CO41NO	30FD-RTU	NO	L30FD RTU	LOG	FAILURE TO IGNITE - RTU
				<CD>	DTBD	043	CO41C	30FD-RTU	NO	L30FD RTU	LOG	FAILURE TO IGNITE - RTU
				<CD>	DTBD	044	CO41NC	30FD-RTU	NO	L30FD RTU	LOG	FAILURE TO IGNITE - RTU
				<CD>	DTBD	045	CO42SO	4DE SRI	NO	L4DE SRI	LOG	[72DS] DIESEL ENGINE START/RUN INDICATION
NA	926			<CD>	DTBD	046	CO42NO	4DE SRI	NO	L4DE SRI	LOG	[72DS] DIESEL ENGINE START/RUN INDICATION
925				<CD>	DTBD	047	CO42C	4DE SRI	NO	L4DE SRI	LOG	[72DS] DIESEL ENGINE START/RUN INDICATION
NA				<CD>	DTBD	048	CO42NC	4DE SRI	NO	L4DE SRI	LOG	[72DS] DIESEL ENGINE START/RUN INDICATION
				<CD>	DTBD	049	CO43SO	4DS	NO	L4DS	LOG	Master control - diesel engine starter
NA	924			<CD>	DTBD	050	CO43NO	4DS	NO	L4DS	LOG	Master control - diesel engine starter
925				<CD>	DTBD	051	CO43C	4DS	NO	L4DS	LOG	Master control - diesel engine starter
NA				<CD>	DTBD	052	CO43NC	4DS	NO	L4DS	LOG	Master control - diesel engine starter
				<CD>	DTBD	053	CO44SO	4GL1	NO	L4GL1	LOG	GENERATOR LOUVER DRIVE CONTROL
...				<CD>	DTBD	054	CO44NO	4GL1	NO	L4GL1	LOG	GENERATOR LOUVER DRIVE CONTROL
...				<CD>	DTBD	055	CO44C	4GL1	NO	L4GL1	LOG	GENERATOR LOUVER DRIVE CONTROL
NA				<CD>	DTBD	056	CO44NC	4GL1	NO	L4GL1	LOG	GENERATOR LOUVER DRIVE CONTROL
				<CD>	DTBD	057	CO45SO	4HR	NO	L4HR1X	LOG	Master control - hyd ratchet pump motor
				<CD>	DTBD	058	CO45NO	4HR	NO	L4HR1X	LOG	Master control - hyd ratchet pump motor
				<CD>	DTBD	059	CO45C	4HR	NO	L4HR1X	LOG	Master control - hyd ratchet pump motor
				<CD>	DTBD	060	CO45NC	4HR	NO	L4HR1X	LOG	Master control - hyd ratchet pump motor
				<CD>	DTBD	061	CO46SO	4GL2	NO	L4GL2	LOG	GENERATOR LOUVER DRIVE CONTROL
NA				<CD>	DTBD	062	CO46NO	4GL2	NO	L4GL2	LOG	GENERATOR LOUVER DRIVE CONTROL
...				<CD>	DTBD	063	CO46C	4GL2	NO	L4GL2	LOG	GENERATOR LOUVER DRIVE CONTROL
...				<CD>	DTBD	064	CO46NC	4GL2	NO	L4GL2	LOG	GENERATOR LOUVER DRIVE CONTROL
				<CD>	DTBD	065	CO47SO	SOLN FUNCT NOT AVAIL	NO		LOG	TURBINE AIR INLET TROUBLE - RTU
NA				<CD>	DTBD	066	CO47NO	30TF-RTU	NO	L30TF RTU	LOG	TURBINE AIR INLET TROUBLE - RTU
				<CD>	DTBD	067	CO47C	30TF-RTU	NO	L30TF RTU	LOG	TURBINE AIR INLET TROUBLE - RTU
				<CD>	DTBD	068	CO47NC	30TF-RTU	NO	L30TF RTU	LOG	TURBINE AIR INLET TROUBLE - RTU

Cable Num	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
	NA		<CD>	DTBD	069	CO48SO	SOLN FUNCT NOT AVAIL	NO		LOG	AUX/EMERG LUBE OIL PUMP RUNNING
			<CD>	DTBD	070	CO48NO	52QC/72QE-RTU	NO	LQC OE RTU	LOG	AUX/EMERG LUBE OIL PUMP RUNNING
			<CD>	DTBD	071	CO48C	52QC/72QE-RTU	NO	LQC OE RTU	LOG	AUX/EMERG LUBE OIL PUMP RUNNING
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	1057		<CD>	DTBD	073	CO49NO	70LX	NO	L70LX	LOG	REMOTE SPEED/LOAD LOWER INDICATION
	1017		<CD>	DTBD	074	CO49C	70LX	NO	L70LX	LOG	REMOTE SPEED/LOAD LOWER INDICATION
			<CD>	DTBD	075	CO49NC	70LX	NO	L70LX	LOG	REMOTE SPEED/LOAD LOWER INDICATION
	1058		<CD>	DTBD	076	CO50NO	70RX	NO	L70RX	LOG	REMOTE SPEED/LOAD RAISE INDICATION
	1017		<CD>	DTBD	077	CO50C	70RX	NO	L70RX	LOG	REMOTE SPEED/LOAD RAISE INDICATION
			<CD>	DTBD	078	CO50NC	70RX	NO	L70RX	LOG	REMOTE SPEED/LOAD RAISE INDICATION
			<CD>	DTBD	079	CO51NO	63QA/63QT-RTU	NO	L63QA OT RTU	LOG	LUBE OIL PRESSURE LOW/TRIP - RTU
			<CD>	DTBD	080	CO51C	63QA/63QT-RTU	NO	L63QA OT RTU	LOG	LUBE OIL PRESSURE LOW/TRIP - RTU
			<CD>	DTBD	081	CO51NC	63QA/63QT-RTU	NO	L63QA OT RTU	LOG	LUBE OIL PRESSURE LOW/TRIP - RTU
	1091		<CD>	DTBD	082	CO52NO	4T/94X	NO	L4T 94X	LOG	REMOTE STOP INDICATION
	1092		<CD>	DTBD	083	CO52C	4T/94X	NO	L4T 94X	LOG	REMOTE STOP INDICATION
			<CD>	DTBD	084	CO52NC	4T/94X	NO	L4T 94X	LOG	REMOTE STOP INDICATION
	4761		<CD>	DTBD	085	CO53NO	4EF	NO	L4EF	LOG	20EF SOLENOID VALVE
	4760		<CD>	DTBD	086	CO53C	4EF	NO	L4EF	LOG	20EF SOLENOID VALVE
			<CD>	DTBD	087	CO53NC	4EF	NO	L4EF	LOG	20EF SOLENOID VALVE
			<CD>	DTBD	088	CO54NO	63HQ-RTU	NO	L63HQ RTU	LOG	HYD. SUPPLY PRESSURE TROUBLE - RTU
			<CD>	DTBD	089	CO54C	63HQ-RTU	NO	L63HQ RTU	LOG	HYD. SUPPLY PRESSURE TROUBLE - RTU
			<CD>	DTBD	090	CO54NC	63HQ-RTU	NO	L63HQ RTU	LOG	HYD. SUPPLY PRESSURE TROUBLE - RTU
	8004		<CD>	DTBD	091	CO55NO	C3SU	NO	C3SU	LOG	[<CD> DTBD 101, 96] STARTUP COMPLETE
	8003		<CD>	DTBD	092	CO55C	C3SU	NO	C3SU	LOG	[<CD> DTBD 101, 96] STARTUP COMPLETE
			<CD>	DTBD	093	CO55NC	C3SU	NO	C3SU	LOG	[<CD> DTBD 101, 96] STARTUP COMPLETE
			<CD>	DTBD	094	CO56NO	C14HSX	NC	C14HSX	LOG	[<PI> TBD-1, <CD> DTBD 92] OPERATING SPEED
	8002		<CD>	DTBD	095	CO56C	C14HSX	NC	C14HSX	LOG	[<PI> TBD-1, <CD> DTBD 92] OPERATING SPEED
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	8013		<CD>	DTBD	097	CO57NO	C4	NO	C4	LOG	[<P> PTBA 45, 46] MASTER PERMISSIVE
	8014		<CD>	DTBD	098	CO57C	C4	NO	C4	LOG	[<P> PTBA 45, 46] MASTER PERMISSIVE
			<CD>	DTBD	099	CO57NC	C4	NO	C4	LOG	[<P> PTBA 45, 46] MASTER PERMISSIVE
	8005		<CD>	DTBD	100	CO58NO	C28FDX	NO	C28FDX	LOG	[<PI> TBD-6, <CD> DTBD 91/<P> PTBA 48] FLAME INDIC
	8004		<CD>	DTBD	101	CO58C	C28FDX	NO	C28FDX	LOG	[<PI> TBD-6, <CD> DTBD 91/<P> PTBA 48] FLAME INDIC
			<CD>	DTBD	102	CO58NC	C28FDX	NO	C28FDX	LOG	[<PI> TBD-6, <CD> DTBD 91/<P> PTBA 48] FLAME INDIC
			<CD>	DTBD	103	CO59NO	63HL/HG-RTU	NO	L63HL HG RTU	LOG	L1Q. FUEL/GAS FUEL HYD. OIL TRIP PRESSURE LOW
			<CD>	DTBD	104	CO59C	63HL/HG-RTU	NO	L63HL HG RTU	LOG	L1Q. FUEL/GAS FUEL HYD. OIL TRIP PRESSURE LOW
			<CD>	DTBD	105	CO59NC	63HL/HG-RTU	NO	L63HL HG RTU	LOG	L1Q. FUEL/GAS FUEL HYD. OIL TRIP PRESSURE LOW
			<CD>	DTBD	106	CO60NO	2DWZ-RTU	NO	L2DWZ RTU	LOG	DIESEL FAILURE TO BREAK TURBINE AWAY - RTU
			<CD>	DTBD	107	CO60C	2DWZ-RTU	NO	L2DWZ RTU	LOG	DIESEL FAILURE TO BREAK TURBINE AWAY - RTU
			<CD>	DTBD	108	CO60NC	2DWZ-RTU	NO	L2DWZ RTU	LOG	DIESEL FAILURE TO BREAK TURBINE AWAY - RTU

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<CPF>	TB2	001	AC2H	AC POWER				AC PANEL POWER FROM <CPF>
				<CPF>	TB2	002	AC2N	AC POWER				AC PANEL POWER FROM <CPF>
				<CPF>	TB2	003	AC1H	AC POWER				AC PANEL POWER FROM <CPF>
				<CPF>	TB2	004	AC1N	AC POWER				AC PANEL POWER FROM <CPF>
				<CPF>	TB2	005	DCH1	DC POWER				DC PANEL POWER FROM <CPF>
				<CPF>	TB2	006	DCL0	DC POWER				DC PANEL POWER FROM <CPF>
				<P>	PTBA	001	OSHP1H	77NH-1		TNH OS		High press shaft overspeed
				<P>	PTBA	002	OSHP1L	77NH-1		TNH_OS		High press shaft overspeed
				<P>	PTBA	003	OSLP1H			W P OSLP		
				<P>	PTBA	004	OSLP1L			W_P_OSLP		
				<P>	PTBA	005	OSHP2H	77NH-2		TNH OS		High press shaft overspeed
				<P>	PTBA	006	OSHP2L	77NH-2		TNH_OS		High press shaft overspeed
				<P>	PTBA	007	OSLP2H			W P OSLP		
				<P>	PTBA	008	OSLP2L			W_P_OSLP		
				<P>	PTBA	009	OSHP3H	77NH-3		TNH OS		High press shaft overspeed
				<P>	PTBA	010	OSHP3L	77NH-3		TNH_OS		High press shaft overspeed
				<P>	PTBA	011	OSLP3H			W P OSLP		
				<P>	PTBA	012	OSLP3L			W_P_OSLP		
				<P>	PTBA	013	FL1H	28FD-A		L28FDA	LOG	Flame detector channel #1
				<P>	PTBA	014	FL1L	28FD-A		L28FDA	LOG	Flame detector channel #1
				<P>	PTBA	015	FL2H	28FD-B		L28FDB	LOG	Flame detector channel #2
				<P>	PTBA	016	FL2L	28FD-B		L28FDB	LOG	Flame detector channel #2
				<P>	PTBA	017	FL3H			L28FDC		
				<P>	PTBA	018	FL3L			L28FDC		
				<P>	PTBA	019	FL4H			L28FDD		
				<P>	PTBA	020	FL4L			L28FDD		
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				<P>	PTBA	023	FL6H			L28FDF		
				<P>	PTBA	024	FL6L			L28FDF		
				<P>	PTBA	025	FL7H			L28FDG		
				<P>	PTBA	026	FL7L			L28FDG		
				<P>	PTBA	027	FL8H			L28FDH		
				<P>	PTBA	028	FL8L			L28FDH		
				<P>	PTBA	029	BUSPT1	RUN PT		SVL	V64K	P PTBA-29 System line voltage
				<P>	PTBA	030	BUSPT2	RUN PT		SVL	V64K	P PTBA-29 System line voltage

13 V's
V64K's

Cable Num	Wire Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
		NA		<P>	PTBA	031	BUSPT3	RUN PT		SVL	V64K	P PTBA- 29 System line voltage
		756	TBP008	<P>	PTBA	032	GENPT1	INC PT		DV	V64K	P PTBA- 32 Generator volts <i>GEN volts</i>
		751	TBP009	<P>	PTBA	033	GENPT2	INC PT		DV	V64K	P PTBA- 32 Generator volts <i>FROM NIS&US</i>
		NA		<P>	PTBA	034	GENPT3	INC PT		DV	V64K	P PTBA- 32 Generator volts
		1137	TBN002	<P>	PTBA	035	G125P	P125VDC(BKR BUS)				BREAKER SYNC/SYNC CHECK/SYNC PERMISSIVE
		1807	TBP001	<P>	PTBA	036	52GH	52GA/STA	NO			BREAKER STATUS
		1802	TBP002	<P>	PTBA	037	52GL	52GA/STA	NO			BREAKER STATUS
		1142	TBN005	<P>	PTBA	038	GCL1	25/25X/25P				BREAKER SYNC/SYNC CHECK/SYNC PERMISSIVE
				<P>	PTBA	039	GCL2					
				<P>	PTBA	040	GCL3					
		1153	TBN009	<P>	PTBA	041	G125N	N125VDC(BKR BUS)				BREAKER SYNC/SYNC CHECK/SYNC PERMISSIVE
		1131		<P>	PTBA	042	MAN	43S/CS/MAN	NO			SYNC SELECTOR SWITCH - MANUAL
				<P>	PTBA	043	TRP1	5E-1/PB	NC	L5E	CIM I	Emergency trip pushbutton / alarm
				<P>	PTBA	044	TRP2	5E-1/PB	NC	L5E	CIM-I	Emergency trip pushbutton / alarm
		TRIP2		<P>	PTBA	045	TRP3	C4 {NO}	NO	L5E 2		JUMPERED TO <CD? DTBD 97,98
		TRIP2		<P>	PTBA	046	TRP4	C4 {NO}	NO	L5E-2		JUMPERED TO <CD? DTBD 97,98
		TRIP3 {BLK}		<P>	PTBA	047	TRP5	45CP		L5E 3		FIRE SYSTEM TRIP-CHEMTRON
		TRIP3 {RED}		<P>	PTBA	048	TRP6	45CP		L5E-3		FIRE SYSTEM TRIP-CHEMTRON
		TRIP4 {BLK}		<P>	PTBA	049	TRP7	5RTU		L5RTU		RTU EMERGENCY STOP PB
		TRIP4 {RED}		<P>	PTBA	050	TRP8	5RTU		L5RTU		RTU EMERGENCY STOP PB
		TRIP5		<P>	PTBA	051	TRP9	JUMPER "B"		L4 FB 2		REMOVE JUMPER (WIRE NO & JMP PREFIX) IF USED
		TRIP5		<P>	PTBA	052	TRP10	JUMPER "B"		L4 FB-2		REMOVE JUMPER (WIRE NO & JMP-PREFIX) IF USED
		TRIP6		<P>	PTBA	053	TRP11	JUMPER "C"		L4 FB 3		REMOVE JUMPER (WIRE NO & JMP PREFIX) IF USED
		TRIP6		<P>	PTBA	054	TRP12	JUMPER "C"		L4 FB-3		REMOVE JUMPER (WIRE NO & JMP-PREFIX) IF USED
		3940		<P>	PTBA	055	TRP13	63QT		L4 FB 4		LOW LUBE OIL PRESSURE - TRIP LOAD
		3941		<P>	PTBA	056	TRP14	63QT		L4 FB-4		LOW LUBE OIL PRESSURE - TRIP LOAD
		NA		<P>	PTBA	057	SOL1X	20FG-1	NO	L20FG1X	LOG	Gas fuel stop valve solenoid
		NA		<P>	PTBA	058	SOL1Y	20FG-1	NO	L20FG1X	LOG	Gas fuel stop valve solenoid
		224		<P>	PTBA	059	SOL1H	20FG-1	NO	L20FG1X	LOG	Gas fuel stop valve solenoid
		225		<P>	PTBA	060	SOL1L	20FG-1	NO	L20FG1X	LOG	Gas fuel stop valve solenoid
		NA		<P>	PTBA	061	SOL2X	20FL-1	NO	L20FL1X	LOG	Liquid fuel stop valve solenoid
		NA		<P>	PTBA	062	SOL2Y	20FL-1	NO	L20FL1X	LOG	Liquid fuel stop valve solenoid
		232		<P>	PTBA	063	SOL2H	20FL-1	NO	L20FL1X	LOG	Liquid fuel stop valve solenoid
		233		<P>	PTBA	064	SOL2L	20FL-1	NO	L20FL1X	LOG	Liquid fuel stop valve solenoid
				<P>	PTBA	065	SOL3H			P RLY DRVR5		
				<P>	PTBA	066	SOL3L			P_RLY_DRVR5		
				<P>	PTBA	067	SOL4H			P_RLY_DRVR6		

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
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				<P>	PTBA	068	SOL4L			P_RLY_DRV6		
				<P>	PTBA	069	SOL5H			P_RLY_DRV7		
				<P>	PTBA	070	SOL5L			P_RLY_DRV7		
				<P>	PTBA	071	SOL6H			P_RLY_DRV8		
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				<P>	PTBA	073	GNC11H			GEN_AMPS_A		
				<P>	PTBA	074	GNC11L			GEN_AMPS_A		
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				<P>	PTBA	076	GNC12L			GEN_AMPS_B		
				<P>	PTBA	077	GNC13H			GEN_AMPS_C		
				<P>	PTBA	078	GNC13L			GEN_AMPS_C		
				<PD>	PDTB	001	DCH1	DC POWER <CPF>		DC PANEL POWER FROM <CPF>		
				<PD>	PDTB	002	DCH1	DC POWER <CPF>		DC PANEL POWER FROM <CPF>		
				<PD>	PDTB	003	DCL0	DC POWER <CPF>		DC PANEL POWER FROM <CPF>		
				<PD>	PDTB	004	DCL0	DC POWER <CPF>		DC PANEL POWER FROM <CPF>		
				<PD>	PDTB	005	AC1H	AC POWER <CPF>		AC PANEL POWER FROM <CPF>		
				<PD>	PDTB	006	AC1H	AC POWER <CPF>		AC PANEL POWER FROM <CPF>		
				<PD>	PDTB	007	AC1N	AC POWER <CPF>		AC PANEL POWER FROM <CPF>		
				<PD>	PDTB	008	AC1N	AC POWER <CPF>		AC PANEL POWER FROM <CPF>		
				<PD>	PDTB	009	AC2H	AC POWER <CPF>		AC PANEL POWER FROM <CPF>		
				<PD>	PDTB	010	AC2H	AC POWER <CPF>		AC PANEL POWER FROM <CPF>		
				<PD>	PDTB	011	AC2N	AC POWER <CPF>		AC PANEL POWER FROM <CPF>		
				<PD>	PDTB	012	AC2N	AC POWER <CPF>		AC PANEL POWER FROM <CPF>		
				<QD1>	DTBA	001	CI01	260A-1	NC	L260AH	CIM I	LUBE OIL HEADER HIGH TEMP ALARM
				<QD1>	DTBA	002	BUS_A	260A-1	NC	L260AH	CIM I	LUBE OIL HEADER HIGH TEMP ALARM
				<QD1>	DTBA	003	CI02			Q_QD1_CI02		
				<QD1>	DTBA	004	BUS_A			Q_QD1_CI02		
				<QD1>	DTBA	005	CI03	260TX	NO	L260TX	CIM I	LUBE OIL HEADER TEMPERATURE HIGH TRIP
				<QD1>	DTBA	006	BUS_A	260TX	NO	L260TX	CIM I	LUBE OIL HEADER TEMPERATURE HIGH TRIP
				<QD1>	DTBA	007	CI04	63HQ-1	NO	L63HQ1L	CIM I	Hydraulic supply pressure Low switch
				<QD1>	DTBA	008	BUS_A	63HQ-1	NO	L63HQ1L	CIM I	Hydraulic supply pressure Low switch
				<QD1>	DTBA	009	CI05	630A	NO	L630AL	CIM I	Low lube Oil pressure - Aux Pump Start
				<QD1>	DTBA	010	BUS_A	630A	NO	L630AL	CIM I	Low lube Oil pressure - Aux Pump Start
				<QD1>	DTBA	011	CI06			Q_QD1_CI06		
				<QD1>	DTBA	012	BUS_A			Q_QD1_CI06		
				<QD1>	DTBA	013	CI07	CA5E	NC	L43CA5E	CIM I	CABLE REMOTE EMERGENCY TRIP
				<QD1>	DTBA	014	BUS_A	CA5E	NC	L43CA5E	CIM I	CABLE REMOTE EMERGENCY TRIP
				<QD1>	DTBA	015	CI08			Q_QD1_CI08		

lines to 260A? ^{not connected}

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<QDI>	DTBA	016	BUS_A			Q_QDI_CI08		
				<QDI>	DTBA	017	CI09			Q_QDI_CI09		
				<QDI>	DTBA	018	BUS_A			Q_QDI_CI09		
				<QDI>	DTBA	019	CI10		NA	Q_QDI_CI10		
				<QDI>	DTBA	020	BUS_B		NA	Q_QDI_CI10		
				<QDI>	DTBA	021	CI11		NA	Q_QDI_CI11		
				<QDI>	DTBA	022	BUS_B		NA	Q_QDI_CI11		
				<QDI>	DTBA	023	CI12	26AA-1	NC	L26AAH	CIM_I	Atomizing Air Temp High
670A 107				<QDI>	DTBA	024	BUS_B	26AA-1	NC	L26AAH	CIM_I	Atomizing Air Temp High
				<QDI>	DTBA	025	CI13	63AD	NO	L63AD1L	CIM_I	Atom air comp diff press switch
2680 107				<QDI>	DTBA	026	BUS_B	63AD	NO	L63AD1L	CIM_I	Atom air comp diff press switch
				<QDI>	DTBA	027	CI14			Q_QDI_CI14		
				<QDI>	DTBA	028	BUS_B			Q_QDI_CI14		
				<QDI>	DTBA	029	CI15	33FL/ac	NC	L33FL1C	CIM_I	Liquid fuel stop valve limit switch
209 107				<QDI>	DTBA	030	BUS_B	33FL/ac	NC	L33FL1C	CIM_I	Liquid fuel stop valve limit switch
				<QDI>	DTBA	031	CI16		NO	Q_QDI_CI16		
				<QDI>	DTBA	032	BUS_B		NO	Q_QDI_CI16		
				<QDI>	DTBA	033	CI17	63FL-2	NO	L63FL2L	CIM_I	Liquid fuel pressure switch
208 107				<QDI>	DTBA	034	BUS_B	63FL-2	NO	L63FL2L	CIM_I	Liquid fuel pressure switch
				<QDI>	DTBA	035	CI18	63HL	NO	L63HL1L	CIM_I	Hyd oil trip circuit press - liquid fuel sys
649 107				<QDI>	DTBA	036	BUS_B	63HL	NO	L63HL1L	CIM_I	Hyd oil trip circuit press - liquid fuel sys
				<QDI>	DTBA	037	CI19		NA	Q_QDI_CI19		
				<QDI>	DTBA	038	BUS_C		NA	Q_QDI_CI19		
				<QDI>	DTBA	039	CI20	63FG	NO	L63FGL	CIM_I	Gas fuel pressure low switch
206 107				<QDI>	DTBA	040	BUS_C	63FG	NO	L63FGL	CIM_I	Gas fuel pressure low switch
				<QDI>	DTBA	041	CI21	63HG	NO	L63HG1L	CIM_I	Hyd trip ckt press low - gas fuel system
2654 107				<QDI>	DTBA	042	BUS_C	63HG	NO	L63HG1L	CIM_I	Hyd trip ckt press low - gas fuel system
				<QDI>	DTBA	043	CI22	52WC-1	NO	L52WC1	CIM	[88WC-1] MOTOR RUNNING CONTACT
4130 107				<QDI>	DTBA	044	BUS_C	52WC-1	NO	L52WC1	CIM	[88WC-1] MOTOR RUNNING CONTACT
				<QDI>	DTBA	045	CI23	52WC-2	NO	L52WC2	CIM	[88WC-2] MOTOR RUNNING CONTACT
4380 107				<QDI>	DTBA	046	BUS_C	52WC-2	NO	L52WC2	CIM	[88WC-2] MOTOR RUNNING CONTACT
				<QDI>	DTBA	047	CI24	71QL	NO	L71QL	CIM_I	Lube oil tank level- low alarm
2662 107				<QDI>	DTBA	048	BUS_C	71QL	NO	L71QL	CIM_I	Lube oil tank level- low alarm
				<QDI>	DTBA	049	CI25	71QH	NC	L71QH	CIM_I	Lube oil tank level - high alarm
2661 107				<QDI>	DTBA	050	BUS_C	71QH	NC	L71QH	CIM_I	Lube oil tank level - high alarm

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
4230	107			<QD1> <QD1>	DTBA DTBA	051 052	CI26 BUS_C	52FC-1 52FC-1	NO NO	L52FC1 L52FC1	CIM CIM	[88FC-1] MOTOR RUNNING STATUS [88FC-1] MOTOR RUNNING STATUS
4280	107			<QD1> <QD1>	DTBA DTBA	053 054	CI27 BUS_C	52FC-2 52FC-2	NO NO	L52FC2 L52FC2	CIM CIM	[88FC-2] MOTOR RUNNING STATUS [88FC-2] MOTOR RUNNING STATUS
634	107			<QD1> <QD1>	DTBA DTBA	055 056	CI28 BUS_D	71WL 71WL	NO NO	L71WL L71WL	CIM I CIM I	Low cooling water level Low cooling water level
644	107			<QD1> <QD1>	DTBA DTBA	057 058	CI29 BUS_D	26BA-1 26BA-1	NC NC	L26BTIH L26BTIH	CIM I CIM I	TURBINE COMPARTMENT HIGH TEMP - ALARM TURBINE COMPARTMENT HIGH TEMP - ALARM
4530	107			<QD1> <QD1>	DTBA DTBA	059 060	CI30 BUS_D	52HG 52HG	NO NO	L52HG L52HG	CIM CIM	23HG STATUS 23HG STATUS
114	107			<QD1> <QD1>	DTBA DTBA	061 062	CI31 BUS_D	33CB-3/bo 33CB-3/bo	NO NO	L33CB30 L33CB30	CIM CIM	COMPRESSOR BLEED VALVE #3 OPEN COMPRESSOR BLEED VALVE #3 OPEN
254	107			<QD1> <QD1>	DTBA DTBA	063 064	CI32 BUS_D	33CB-4/bo 33CB-4/bo	NC NC	L33CB40 L33CB40	CIM CIM	COMPRESSOR BLEED VALVE #4 OPEN COMPRESSOR BLEED VALVE #4 OPEN
255	107			<QD1> <QD1>	DTBA DTBA	065 066	CI33 BUS_D	33TV-1/bc 33TV-1/bc	NC NC	L33TV1C L33TV1C	CIM CIM	Turbine compressor inlet guide vane limit switch Turbine compressor inlet guide vane limit switch
4580	107			<QD1> <QD1>	DTBA DTBA	067 068	CI34 BUS_D	52VG 52VG	NO NO	L52VG L52VG	CIM CIM	[88VG] LOAD GEAR COMPT VENT FAN MOTOR STATUS [88VG] LOAD GEAR COMPT VENT FAN MOTOR STATUS
4657	107			<QD1> <QD1>	DTBA DTBA	069 070	CI35 BUS_D	49HA 49HA	NC NC	L49HA L49HA	CIM I CIM I	ACCESSORY COMPT SPACE HEATER OVERLOAD ACCESSORY COMPT SPACE HEATER OVERLOAD
676	107			<QD1> <QD1>	DTBA DTBA	071 072	CI36 BUS_D	Q_QD1 CI36 Q_QD1 CI36				
2569	107			<QD1> <QD1>	DTBA DTBA	073 074	CI37 BUS_E	Q_QD1 CI37 Q_QD1 CI37				
4331	107			<QD1> <QD1>	DTBA DTBA	075 076	CI38 BUS_E	27MC-1 27MC-1	NO NO	L27MCIN L27MCIN	CIM CIM	Motor control center bus 1 voltage normal Motor control center bus 1 voltage normal
5917	107			<QD1> <QD1>	DTBA DTBA	077 078	CI39 BUS_E	49QE 49QE	NC NC	L49QE L49QE	CIM I CIM I	[88QE] EMERGENCY LUBE OIL PUMP MOTOR OVERLOAD [88QE] EMERGENCY LUBE OIL PUMP MOTOR OVERLOAD
4332	107			<QD1> <QD1>	DTBA DTBA	079 080	CI40 BUS_E	52FD-1/AUX 52FD-1/AUX	NC NC	L52FD1AUX L52FD1AUX	CIM I CIM I	52FD-1 CIRCUIT BREAKER CLOSED 52FD-1 CIRCUIT BREAKER CLOSED
4333?	107			<QD1> <QD1>	DTBA DTBA	081 082	CI41 BUS_E	49BA 49BA	NC NC	L49BA L49BA	CIM I CIM I	[88BA] TURBINE COMPT COOLING FAN OVERLOAD [88BA] TURBINE COMPT COOLING FAN OVERLOAD
				<QD1> <QD1>	DTBA DTBA	083 084	CI42 BUS_E	49FD-1 49FD-1	NC NC	L49FD1 L49FD1	CIM I CIM I	[88FD] DIST FUEL FWD PUMP MOTOR OVERLOAD [88FD] DIST FUEL FWD PUMP MOTOR OVERLOAD
				<QD1>	DTBA	085	CI43	49QC	NC	L49QC	CIM I	[88QC] COOLDOWN LUBE OIL PUMP MOTOR OVERLOAD

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
		107		<QD1>	DTBA	086	BUS_E	49QC	NC	L49QC	CIM_I	[88QC] COOLDOWN LUBE OIL PUMP MOTOR OVERLOAD
		4382 107		<QD1>	DTBA	087	CI44	49FD-2	NC	L49FD2	CIM_I	[88FD-2] MOTOR OVERLOAD RELAY
		2624 107		<QD1>	DTBA	088	BUS_E	49FD-2	NC	L49FD2	CIM_I	[88FD-2] MOTOR OVERLOAD RELAY
				<QD1>	DTBA	089	CI45	27D	NO	L27D	CIM_I	BATTERY CHARGER ALARMS
				<QD1>	DTBA	090	BUS_E	27D	NO	L27D	CIM_I	BATTERY CHARGER ALARMS
		4381 107		<QD1>	DTBA	091	CI46	52FD-2/AUX	NC	L52FD2AUX	CIM_I	52FD-2 CIRCUIT BREAKER CLOSED
				<QD1>	DTBA	092	BUS_E	52FD-2/AUX	NC	L52FD2AUX	CIM_I	52FD-2 CIRCUIT BREAKER CLOSED
				<QD1>	DTBA	093	SPARE					
				<QD1>	DTBA	094	SPARE					
				<QD1>	DTBA	095	SPARE					
				<QD1>	DTBA	096	SPARE					
				<QD1>	DTBB	001	CI47		NA	Q_QD1_C147		
				<QD1>	DTBB	002	BUS_A		NA	Q_QD1_C147		
		660 107		<QD1>	DTBB	003	CI48	63GF	NC	L63GFH	CIM_I	Generator air inlet filter excessive diff
				<QD1>	DTBB	004	BUS_A	63GF	NC	L63GFH	CIM_I	Generator air inlet filter excessive diff
		7606 107		<QD1>	DTBB	005	CI49	39FC-1	NC	L39FC1	CIM_I	COOLING FAN #1 VIBRATION SWITCH
				<QD1>	DTBB	006	BUS_A	39FC-1	NC	L39FC1	CIM_I	COOLING FAN #1 VIBRATION SWITCH
		7607 107		<QD1>	DTBB	007	CI50	39FC-2	NC	L39FC2	CIM_I	COOLING FAN #2 VIBRATION SWITCH
				<QD1>	DTBB	008	BUS_A	39FC-2	NC	L39FC2	CIM_I	COOLING FAN #2 VIBRATION SWITCH
		1684 107		<QD1>	DTBB	009	CI51	63WC-1	NO	L63WC1L	CIM_I	COOLING WATER PRESSURE LOW
				<QD1>	DTBB	010	BUS_A	63WC-1	NO	L63WC1L	CIM_I	COOLING WATER PRESSURE LOW
		934 107		<QD1>	DTBB	011	CI52	63QT	NC	L63QTIL	CIM	LUBE OIL PRESSURE LOW TRIP
				<QD1>	DTBB	012	BUS_A	63QT	NC	L63QTIL	CIM	LUBE OIL PRESSURE LOW TRIP
		7160 107		<QD1>	DTBB	013	CI53	63PG-1	NO	L63PGL	CIM_I	PURGE GAS PRESSURE LOW
				<QD1>	DTBB	014	BUS_A	63PG-1	NO	L63PGL	CIM_I	PURGE GAS PRESSURE LOW
		9126 107		<QD1>	DTBB	015	CI54	33PG-1/33PG-3	NO	L33PGIC	CIM	PURGE GAS VALVE CLOSED LIMIT SWITCH
				<QD1>	DTBB	016	BUS_A	33PG-1/33PG-3	NO	L33PGIC	CIM	PURGE GAS VALVE CLOSED LIMIT SWITCH
		9128 107		<QD1>	DTBB	017	CI55	33PG-2/33PG-4	NC	L33PG20	CIM_I	PURGE GAS VALVE OPEN LIMIT SWITCH
				<QD1>	DTBB	018	BUS_A	33PG-2/33PG-4	NC	L33PG20	CIM_I	PURGE GAS VALVE OPEN LIMIT SWITCH
				<QD1>	DTBB	019	CI56		NC	Q_QD1_C156		
				<QD1>	DTBB	020	BUS_A		NC	Q_QD1_C156		
				<QD1>	DTBB	021	CI57		NC	Q_QD1_C157		
				<QD1>	DTBB	022	BUS_B		NC	Q_QD1_C157		
		678 107		<QD1>	DTBB	023	CI58	27B-1(NO)x27B-2(NO)	NO	L27BN	CIM	Bus undervoltage relay
				<QD1>	DTBB	024	BUS_B	27B-1(NO)x27B-2(NO)	NO	L27BN	CIM	Bus undervoltage relay

Cable Num	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
	2194 107		<QD1> <QD1>	DTBB DTBB	025 026	CI59 BUS_B	27B-1(NC)x27B-2(NC) 27B-1(NC)x27B-2(NC)	NC NC	L27BZ L27BZ	CIM CIM	Bus undervoltage relay Bus undervoltage relay
	2137 107		<QD1> <QD1>	DTBB DTBB	027 028	CI60 BUS_B	63WN-1 63WN-1	NO NO	L63WNIL L63WNIL	CIM_I CIM_I	WATER INJECTION PRESSURE LOW WATER INJECTION PRESSURE LOW
	4830 107		<QD1> <QD1>	DTBB DTBB	029 030	CI61 BUS_B	43S/MAN 43S/MAN	NO NO	L43SGMAN L43SGMAN	CIM CIM	GCP - MANUAL SYNCHRONIZING ENABLED GCP - MANUAL SYNCHRONIZING ENABLED
	4824 107		<QD1> <QD1>	DTBB DTBB	031 032	CI62 BUS_B	43S/AUTO 43S/AUTO	NO NO	L43SGAUTO L43SGAUTO	CIM CIM	GCP - AUTO SYNCHRONIZING ENABLED GCP - AUTO SYNCHRONIZING ENABLED
	4144 107		<QD1> <QD1>	DTBB DTBB	033 034	CI63 BUS_B	52G/CS/CLOSE 52G/CS/CLOSE	NO NO	L52G_CLOSE L52G_CLOSE	CIM CIM	GENERATOR BREAKER CLOSE COMMAND GENERATOR BREAKER CLOSE COMMAND
	299 107		<QD1> <QD1>	DTBB DTBB	035 036	CI64 BUS_B	52GX 52GX	NO NO	L52GX1 L52GX1	CIM CIM	Generator breaker status Generator breaker status
			<QD1> <QD1>	DTBB DTBB	037 038	CI65 BUS_B	Q_QD1_CI65 Q_QD1_CI65		Q_QD1_CI65 Q_QD1_CI65		
	288 107		<QD1> <QD1>	DTBB DTBB	039 040	CI66 BUS_B	70R4/CS/RAISE 70R4/CS/RAISE	NO NO	L70R4CSR L70R4CSR	CIM CIM	Raise speed setpoint Raise speed setpoint
	286 107		<QD1> <QD1>	DTBB DTBB	041 042	CI67 BUS_C	70R4/CS/LOWER 70R4/CS/LOWER	NO NO	L70R4CSL L70R4CSL	CIM CIM	Lower speed setpoint Lower speed setpoint
	4178 107		<QD1> <QD1>	DTBB DTBB	043 044	CI68 BUS_C	90R4/CS/RAISE 90R4/CS/RAISE	NO NO	L90R4CSR L90R4CSR	CIM CIM	GCP - AUTO VOLTAGE REGULATOR RAISE GCP - AUTO VOLTAGE REGULATOR RAISE
	4179 107		<QD1> <QD1>	DTBB DTBB	045 046	CI69 BUS_C	90R4/CS/LOWER 90R4/CS/LOWER	NO NO	L90R4CSL L90R4CSL	CIM CIM	GCP - AUTO VOLTAGE REGULATOR LOWER GCP - AUTO VOLTAGE REGULATOR LOWER
	657 107		<QD1> <QD1>	DTBB DTBB	047 048	CI70 BUS_C	86G/HR 86G/HR	NC NC	L86GT L86GT	CIM_I CIM_I	GENERATOR DIFFERENTIAL TRIP GENERATOR DIFFERENTIAL TRIP
	696 107		<QD1> <QD1>	DTBB DTBB	049 050	CI71 BUS_C	86T/HR 86T/HR	NC NC	L86T L86T	CIM_I CIM_I	TRANSFORMER DIFF. LOCKOUT - FIRED SHUTDOWN TRANSFORMER DIFF. LOCKOUT - FIRED SHUTDOWN
	5RED 5BLK		<QD1> <QD1>	DTBB DTBB	051 052	CI72 BUS_C	45CP 45CP	NO NO	L45CP_ALM L45CP_ALM	CIM_I CIM_I	FIRE PROT PRESS SW TRIP-CO2 RELEASED FIRE PROT PRESS SW TRIP-CO2 RELEASED
	2659 107		<QD1> <QD1>	DTBB DTBB	053 054	CI73 BUS_C	33CL-1,2 33CL-1,2	NO NO	L33CL L33CL	CIM_I CIM_I	CO2 SKID SHUTOFF VALVES CO2 SKID SHUTOFF VALVES
	661 107		<QD1> <QD1>	DTBB DTBB	055 056	CI74 BUS_C	33AF/bc 33AF/bc	NC NC	L33AFO L33AFO	CIM_I CIM_I	INLET AIR FILTER IMPLOSION DOOR OPEN INLET AIR FILTER IMPLOSION DOOR OPEN
	1661		<QD1>	DTBB	059	CI76	63TF	NC	L63TF1H	CIM_I	INLET AIR FILTER HOUSE DIFF PRESSURE HIGH

Cable Num	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
	107		<QD1>	DTBB	060	BUS_C	63TF	NC	L63TF1H	CIM_I	INLET AIR FILTER HOUSE DIFF PRESSURE HIGH
4010	107		<QD1>	DTBB	061	CI77	45FTX-2	NC	L45FTX2	CIM_I	FIRE INDICATION AUXILIARY RELAY
			<QD1>	DTBB	062	BUS_D	45FTX-2	NC	L45FTX2	CIM_I	FIRE INDICATION AUXILIARY RELAY
4011	107		<QD1>	DTBB	063	CI78	45FGX-2	NC	L45FGX2	CIM_I	26EH/26GH AUXILIARY RELAY
			<QD1>	DTBB	064	BUS_D	45FGX-2	NC	L45FGX2	CIM_I	26EH/26GH AUXILIARY RELAY
2685	107		<QD1>	DTBB	065	CI79	52WN-1	NO	L52WN1	CIM	WATER INJECTION PUMP MOTOR STATUS
			<QD1>	DTBB	066	BUS_D	52WN-1	NO	L52WN1	CIM	WATER INJECTION PUMP MOTOR STATUS
2684	107		<QD1>	DTBB	067	CI80	49WN-1	NC	L49WN1	CIM_I	WATER INJECTION PUMP MOTOR OVERLOAD
			<QD1>	DTBB	068	BUS_D	49WN-1	NC	L49WN1	CIM_I	WATER INJECTION PUMP MOTOR OVERLOAD
2654	107		<QD1>	DTBB	069	CI81	30CC	NC	L30CC	CIM_I	FIRE PROTECTION PANEL - GENERAL ALARM
			<QD1>	DTBB	070	BUS_D	30CC	NC	L30CC	CIM_I	FIRE PROTECTION PANEL - GENERAL ALARM
2610	107		<QD1>	DTBB	071	CI82	26FL-1	NC	L26FL1H	CIM_I	LIQUID FUEL TEMPERATURE HIGH (IF USED)
			<QD1>	DTBB	072	BUS_D	26FL-1	NC	L26FL1H	CIM_I	LIQUID FUEL TEMPERATURE HIGH (IF USED)
2604	107		<QD1>	DTBB	073	CI83	45PR-1	NC	L45PR1	CIM_I	FIRE PROTECTION PRE-RELEASE ALARM
			<QD1>	DTBB	074	BUS_D	45PR-1	NC	L45PR1	CIM_I	FIRE PROTECTION PRE-RELEASE ALARM
2609	107		<QD1>	DTBB	075	CI84	63FD-1	NC	L63FD1L	CIM_I	LIQUID FUEL FWD PUMP PRESSURE LOW
			<QD1>	DTBB	076	BUS_D	63FD-1	NC	L63FD1L	CIM_I	LIQUID FUEL FWD PUMP PRESSURE LOW
1695	107		<QD1>	DTBB	077	CI85	63FD-2	NC	L63FD2L	CIM_I	LIQUID FUEL FWD PUMP PRESSURE LOW
			<QD1>	DTBB	078	BUS_D	63FD-2	NC	L63FD2L	CIM_I	LIQUID FUEL FWD PUMP PRESSURE LOW
			<QD1>	DTBB	079	CI86			Q_QD1-C186		
			<QD1>	DTBB	080	BUS_D			Q_QD1-C186		
4930	107		<QD1>	DTBB	081	CI87	74-1/-2	NO	L74_1_2	CIM_I	LOSS OF DC POWER SR-489 & 86G
			<QD1>	DTBB	082	BUS_E	74-1/-2	NO	L74_1_2	CIM_I	LOSS OF DC POWER SR-489 & 86G
4931	107		<QD1>	DTBB	083	CI88	30-24A/46A	NO	L30_24A_46A	CIM_I	SR489 24A & 46A ALARM
			<QD1>	DTBB	084	BUS_E	30-24A/46A	NO	L30_24A_46A	CIM_I	SR489 24A & 46A ALARM
4932	107		<QD1>	DTBB	085	CI89	30-SR489ST	NO	L30SR489 ST	CIM_I	SR489 SELF TEST ALARM
			<QD1>	DTBB	086	BUS_E	30-SR489ST	NO	L30SR489 ST	CIM_I	SR489 SELF TEST ALARM
4933	107		<QD1>	DTBB	087	CI90	30-SR489TRIPS	NO	L30SR489 T	CIM_I	SR489 TRIP ALARMS
			<QD1>	DTBB	088	BUS_E	30-SR489TRIPS	NO	L30SR489 T	CIM_I	SR489 TRIP ALARMS
4934	107		<QD1>	DTBB	089	CI91	30-SEL300TRIPS	NO	L30SEL TRIP	CIM_I	SEL-300 TRIP ALARMS
			<QD1>	DTBB	090	BUS_E	30-SEL300TRIPS	NO	L30SEL TRIP	CIM_I	SEL-300 TRIP ALARMS
4935	107		<QD1>	DTBB	091	CI92	30-SEL300-24A/46A	NO	L30SEL 24A	CIM_I	SEL-300 24A & 46A ALARM
			<QD1>	DTBB	092	BUS_E	30-SEL300-24A/46A	NO	L30SEL 24A	CIM_I	SEL-300 24A & 46A ALARM
4936	107		<QD1>	DTBB	093	CI93	30-SEL300-DC	NO	L30SEL DC	CIM_I	SEL-300 DC UNDER/OVER-VOLTAGE
			<QD1>	DTBB	094	BUS_E	30-SEL300-DC	NO	L30SEL DC	CIM_I	SEL-300 DC UNDER/OVER-VOLTAGE

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
4937	107			<Q01>	DTBB	095	CI94	30-SEL300ST	NO	L30SEL_ST	CIM_I	SEL-300 SELT TEST ALARM
				<Q01>	DTBB	096	BUS_E	30-SEL300ST	NO	L30SEL_ST	CIM_I	SEL-300 SELT TEST ALARM
				<Q01>	DTBB	097	CI95			Q_Q01_CI95		
				<Q01>	DTBB	098	BUS_E			Q_Q01_CI95		
				<Q01>	DTBB	099	CI96			Q_Q01_CI96		
				<Q01>	DTBB	100	BUS_E			Q_Q01_CI96		
				<Q01>	DTBB	101	SPARE					
				<Q01>	DTBB	102	SPARE					
108Q				<Q01>	DTBC	001	C001S0	20AA	NO	L20AA	LOG	ATOMIZING AIR COMP BYPASS [UNLOADING] VLV - SOL VLV
211				<Q01>	DTBC	002	C001N0	20AA	NO	L20AA	LOG	ATOMIZING AIR COMP BYPASS [UNLOADING] VLV - SOL VLV
NA				<Q01>	DTBC	003	C001C	20AA	NO	L20AA	LOG	ATOMIZING AIR COMP BYPASS [UNLOADING] VLV - SOL VLV
NA				<Q01>	DTBC	004	C001NC	20AA	NO	L20AA	LOG	ATOMIZING AIR COMP BYPASS [UNLOADING] VLV - SOL VLV
108Q				<Q01>	DTBC	005	C002S0	20TU	NO	L20TU	LOG	TORQUE CONVERTER UNLOAD (DRAIN) SOLENOID VALVE
NA				<Q01>	DTBC	006	C002N0	20TU	NO	L20TU	LOG	TORQUE CONVERTER UNLOAD (DRAIN) SOLENOID VALVE
214				<Q01>	DTBC	007	C002C	20TU	NO	L20TU	LOG	TORQUE CONVERTER UNLOAD (DRAIN) SOLENOID VALVE
NA				<Q01>	DTBC	008	C002NC	20TU	NO	L20TU	LOG	TORQUE CONVERTER UNLOAD (DRAIN) SOLENOID VALVE
108Q				<Q01>	DTBC	009	C003S0	20WN-1	NO	L20WN1	LOG	WATER INJECTION STOP VALVE
2124				<Q01>	DTBC	010	C003N0	20WN-1	NO	L20WN1	LOG	WATER INJECTION STOP VALVE
NA				<Q01>	DTBC	011	C003C	20WN-1	NO	L20WN1	LOG	WATER INJECTION STOP VALVE
NA				<Q01>	DTBC	012	C003NC	20WN-1	NO	L20WN1	LOG	WATER INJECTION STOP VALVE
				<Q01>	DTBC	013	C004S0	4DEY-RTU	NO	L4DEY_RTU	LOG	DIESEL FAILURE TO TRIP - RTU
				<Q01>	DTBC	014	C004N0	4DEY-RTU	NO	L4DEY_RTU	LOG	DIESEL FAILURE TO TRIP - RTU
				<Q01>	DTBC	015	C004C	4DEY-RTU	NO	L4DEY_RTU	LOG	DIESEL FAILURE TO TRIP - RTU
				<Q01>	DTBC	016	C004NC	4DEY-RTU	NO	L4DEY_RTU	LOG	DIESEL FAILURE TO TRIP - RTU
108Q				<Q01>	DTBC	017	C005S0	20PL-1	NO	L20PL1X	LOG	Liquid fuel system purge sol vlv
219				<Q01>	DTBC	018	C005N0	20PL-1	NO	L20PL1X	LOG	Liquid fuel system purge sol vlv
NA				<Q01>	DTBC	019	C005C	20PL-1	NO	L20PL1X	LOG	Liquid fuel system purge sol vlv
NA				<Q01>	DTBC	020	C005NC	20PL-1	NO	L20PL1X	LOG	Liquid fuel system purge sol vlv
				<Q01>	DTBC	021	C006S0	630D-RTU	NO	L630D_RTU	LOG	DIESEL I.O. PRESSURE LOW - RTU
				<Q01>	DTBC	022	C006N0	630D-RTU	NO	L630D_RTU	LOG	DIESEL I.O. PRESSURE LOW - RTU
				<Q01>	DTBC	023	C006C	630D-RTU	NO	L630D_RTU	LOG	DIESEL I.O. PRESSURE LOW - RTU
				<Q01>	DTBC	024	C006NC	630D-RTU	NO	L630D_RTU	LOG	DIESEL I.O. PRESSURE LOW - RTU
108Q				<Q01>	DTBC	025	C007S0	20TV-1	NO	L20TV1X	LOG	Turb cprsr IGV sol vlv
238				<Q01>	DTBC	026	C007N0	20TV-1	NO	L20TV1X	LOG	Turb cprsr IGV sol vlv
NA				<Q01>	DTBC	027	C007C	20TV-1	NO	L20TV1X	LOG	Turb cprsr IGV sol vlv
NA				<Q01>	DTBC	028	C007NC	20TV-1	NO	L20TV1X	LOG	Turb cprsr IGV sol vlv
2223				<Q01>	DTBC	029	C008S0	20VG-1	NO	L20VG1X	LOG	Gas fuel vent valve solenoid
2222				<Q01>	DTBC	030	C008N0	20VG-1	NO	L20VG1X	LOG	Gas fuel vent valve solenoid
NA				<Q01>	DTBC	031	C008C	20VG-1	NO	L20VG1X	LOG	Gas fuel vent valve solenoid
NA				<Q01>	DTBC	032	C008NC	20VG-1	NO	L20VG1X	LOG	Gas fuel vent valve solenoid

Cable Num	Wire Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
		247		<QD1>	DTBC	033	CO09SO	20PG-1	NO	L20PG1	LOG	GAS PURGE SOLENOID VALVE
		108		<QD1>	DTBC	034	CO09NO	20PG-1	NO	L20PG1	LOG	GAS PURGE SOLENOID VALVE
		NA		<QD1>	DTBC	035	CO09C	20PG-1	NO	L20PG1	LOG	GAS PURGE SOLENOID VALVE
		NA		<QD1>	DTBC	036	CO09NC	20PG-1	NO	L20PG1	LOG	GAS PURGE SOLENOID VALVE
		276		<QD1>	DTBC	037	CO10SO	20PG-2	NO	L20PG2	LOG	GAS PURGE SOLENOID VALVE
		108		<QD1>	DTBC	038	CO10NO	20PG-2	NO	L20PG2	LOG	GAS PURGE SOLENOID VALVE
		NA		<QD1>	DTBC	039	CO10C	20PG-2	NO	L20PG2	LOG	GAS PURGE SOLENOID VALVE
		NA		<QD1>	DTBC	040	CO10NC	20PG-2	NO	L20PG2	LOG	GAS PURGE SOLENOID VALVE
		299		<QD1>	DTBC	041	CO11SO	20VG-4	NO	L20VG4	LOG	GAS PURGE VENT SOLENOID VALVE
		108		<QD1>	DTBC	042	CO11NO	20VG-4	NO	L20VG4	LOG	GAS PURGE VENT SOLENOID VALVE
		NA		<QD1>	DTBC	043	CO11C	20VG-4	NO	L20VG4	LOG	GAS PURGE VENT SOLENOID VALVE
		NA		<QD1>	DTBC	044	CO11NC	20VG-4	NO	L20VG4	LOG	GAS PURGE VENT SOLENOID VALVE
				<QD1>	DTBC	045	CO12SO	30HR-RTU	NO	L30HR RTU	LOG	RATCHET TROUBLE - RTU
				<QD1>	DTBC	046	CO12NO	30HR-RTU	NO	L30HR RTU	LOG	RATCHET TROUBLE - RTU
				<QD1>	DTBC	047	CO12C	30HR-RTU	NO	L30HR RTU	LOG	RATCHET TROUBLE - RTU
				<QD1>	DTBC	048	CO12NC	30HR-RTU	NO	L30HR RTU	LOG	RATCHET TROUBLE - RTU
		NA		<QD1>	DTBC	049	CO13SO	4QCZ	NC	L4QCZ	LOG	[880C] COOLDOWN LUBE OIL PUMP MOTOR
		NA		<QD1>	DTBC	050	CO13NO	4QCZ	NC	L4QCZ	LOG	[880C] COOLDOWN LUBE OIL PUMP MOTOR
		516		<QD1>	DTBC	051	CO13C	4QCZ	NC	L4QCZ	LOG	[880C] COOLDOWN LUBE OIL PUMP MOTOR
		518		<QD1>	DTBC	052	CO13NC	4QCZ	NC	L4QCZ	LOG	[880C] COOLDOWN LUBE OIL PUMP MOTOR
				<QD1>	DTBC	053	CO14SO	30CD-RTU	NO	L30CD RTU	LOG	COOLDOWN TROUBLE -RTU
				<QD1>	DTBC	054	CO14NO	30CD-RTU	NO	L30CD RTU	LOG	COOLDOWN TROUBLE -RTU
				<QD1>	DTBC	055	CO14C	30CD-RTU	NO	L30CD RTU	LOG	COOLDOWN TROUBLE -RTU
				<QD1>	DTBC	056	CO14NC	30CD-RTU	NO	L30CD RTU	LOG	COOLDOWN TROUBLE -RTU
				<QD1>	DTBC	057	CO15SO	86GV-RTU	NO	L86GV RTU	LOG	INLET GUIDE VANED TROUBLE - RTU
				<QD1>	DTBC	058	CO15NO	86GV-RTU	NO	L86GV RTU	LOG	INLET GUIDE VANED TROUBLE - RTU
				<QD1>	DTBC	059	CO15C	86GV-RTU	NO	L86GV RTU	LOG	INLET GUIDE VANED TROUBLE - RTU
				<QD1>	DTBC	060	CO15NC	86GV-RTU	NO	L86GV RTU	LOG	INLET GUIDE VANED TROUBLE - RTU
		108Q		<QD1>	DTBC	061	CO16SO	20CB-1	NO	L20CB1X	LOG	Compressor bleed sol 3 way vlv
		238		<QD1>	DTBC	062	CO16NO	20CB-1	NO	L20CB1X	LOG	Compressor bleed sol 3 way vlv
		NA		<QD1>	DTBC	063	CO16C	20CB-1	NO	L20CB1X	LOG	Compressor bleed sol 3 way vlv
		NA		<QD1>	DTBC	064	CO16NC	20CB-1	NO	L20CB1X	LOG	Compressor bleed sol 3 way vlv
		NA		<QD1>	DTBC	065	CO17SO		Q_QD1	CO17	LOG	No longer using this point for DC power to drive fuel finding stop sol valve. Using AC powered device instead. Moved to <QD1> DTBD C048.
		NA		<QD1>	DTBC	066	CO17NO		NO	L20FDX	LOG	
		NA		<QD1>	DTBC	067	CO17C	20FD-1	NO	L20FDX	LOG	
		NA		<QD1>	DTBC	068	CO17NC	20FD-1	NO	L20FDX	LOG	
		108Q		<QD1>	DTBC	069	CO18SO	20CF-1	NO	L20CF1X	LOG	Fuel clutch solenoid 3 way valve
		218		<QD1>	DTBC	070	CO18NO	20CF-1	NO	L20CF1X	LOG	Fuel clutch solenoid 3 way valve
		NA		<QD1>	DTBC	071	CO18C	20CF-1	NO	L20CF1X	LOG	Fuel clutch solenoid 3 way valve
		NA		<QD1>	DTBC	072	CO18NC	20CF-1	NO	L20CF1X	LOG	Fuel clutch solenoid 3 way valve
		NA		<QD1>	DTBC	073	CO19NO	40EZ	NC	L40EZ	LOG	Master control - emergency lube pump
		934		<QD1>	DTBC	074	CO19C	40EZ	NC	L40EZ	LOG	Master control - emergency lube pump

Cable Num	Wire Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
		930		<Q01>	DTBC	075	C019NC	4QE2	NC	L4QE2	LOG	Master control - emergency lube pump
		NA		<Q01>	DTBC	076	C020NO	94QE	NC	L94QE	LOG	[88QE] EMERGENCY LUBE OIL PUMP MOTOR
		934		<Q01>	DTBC	077	C020C	94QE	NC	L94QE	LOG	[88QE] EMERGENCY LUBE OIL PUMP MOTOR
		931		<Q01>	DTBC	078	C020NC	94QE	NC	L94QE	LOG	[88QE] EMERGENCY LUBE OIL PUMP MOTOR
		NA		<Q01>	DTBC	079	C021NO	4HR_QE	NO	L4HR_QE	LOG	[88QE] EMERG LUBE OIL PUMP MOTOR - RATCHETING
		935		<Q01>	DTBC	080	C021C	4HR_QE	NO	L4HR_QE	LOG	[88QE] EMERG LUBE OIL PUMP MOTOR - RATCHETING
		934		<Q01>	DTBC	081	C021NC	4HR_QE	NO	L4HR_QE	LOG	[88QE] EMERG LUBE OIL PUMP MOTOR - RATCHETING
		NA		<Q01>	DTBC	082	C022NO	4QC-QE	NO	L4QC_QE	LOG	[88QE] PIGGY BACK EMERGENCY LUBE OIL PUMP MOTOR
		...		<Q01>	DTBC	083	C022C	4QC-QE	NO	L4QC_QE	LOG	[88QE] PIGGY BACK EMERGENCY LUBE OIL PUMP MOTOR
		...		<Q01>	DTBC	084	C022NC	4QC-QE	NO	L4QC_QE	LOG	[88QE] PIGGY BACK EMERGENCY LUBE OIL PUMP MOTOR
		4260		<Q01>	DTBC	085	C023NO	4FCZ2	NC	L4FCZ2	LOG	[88FC-2] COOLING WATER FAN MOTOR
		4265		<Q01>	DTBC	086	C023C	4FCZ2	NC	L4FCZ2	LOG	[88FC-2] COOLING WATER FAN MOTOR
		NA		<Q01>	DTBC	087	C023NC	4FCZ2	NC	L4FCZ2	LOG	[88FC-2] COOLING WATER FAN MOTOR
		4210		<Q01>	DTBC	088	C024NO	4FCZ1	NC	L4FCZ1	LOG	[88FC-1] COOLING WATER FAN MOTOR
		4215		<Q01>	DTBC	089	C024C	4FCZ1	NC	L4FCZ1	LOG	[88FC-1] COOLING WATER FAN MOTOR
		NA		<Q01>	DTBC	090	C024NC	4FCZ1	NC	L4FCZ1	LOG	[88FC-1] COOLING WATER FAN MOTOR
		4565		<Q01>	DTBC	091	C025NO	4VG	NC	L4VGZ	LOG	[88VG] LOAD GEAR COMPT VENT FAN
		4560		<Q01>	DTBC	092	C025C	4VG	NC	L4VGZ	LOG	[88VG] LOAD GEAR COMPT VENT FAN
		NA		<Q01>	DTBC	093	C025NC	4VG	NC	L4VGZ	LOG	[88VG] LOAD GEAR COMPT VENT FAN
		NA		<Q01>	DTBC	094	C026NO	4WCZ1	NC	L4WCZ1	LOG	[88WC-1] WATER INJECTION PUMP MOTOR
		4110		<Q01>	DTBC	095	C026C	4WCZ1	NC	L4WCZ1	LOG	[88WC-1] WATER INJECTION PUMP MOTOR
		4115		<Q01>	DTBC	096	C026NC	4WCZ1	NC	L4WCZ1	LOG	[88WC-1] WATER INJECTION PUMP MOTOR
		NA		<Q01>	DTBC	097	C027NO	4WCZ2	NC	L4WCZ2	LOG	[88WC-2] WATER INJECTION PUMP MOTOR
		4160		<Q01>	DTBC	098	C027C	4WCZ2	NC	L4WCZ2	LOG	[88WC-2] WATER INJECTION PUMP MOTOR
		4165		<Q01>	DTBC	099	C027NC	4WCZ2	NC	L4WCZ2	LOG	[88WC-2] WATER INJECTION PUMP MOTOR
		950		<Q01>	DTBC	100	C028NO	63QTX-2	NO	L63QTX_QE	LOG	88QE COOLDOWN SUPPORT
		951		<Q01>	DTBC	101	C028C	63QTX-2	NO	L63QTX_QE	LOG	88QE COOLDOWN SUPPORT
		NA		<Q01>	DTBC	102	C028NC	63QTX-2	NO	L63QTX_QE	LOG	88QE COOLDOWN SUPPORT
		4315		<Q01>	DTBC	103	C029NO	4FD-1	NO	L4FD1	LOG	Master control - dist fuel forwarding pump #1
		4310		<Q01>	DTBC	104	C029C	4FD-1	NO	L4FD1	LOG	Master control - dist fuel forwarding pump #1
		NA		<Q01>	DTBC	105	C029NC	4FD-1	NO	L4FD1	LOG	Master control - dist fuel forwarding pump #1
		4365		<Q01>	DTBC	106	C030NO	4FD-2	NO	L4FD2	LOG	MASTER CONTROL - DIST FUEL FORWARDING PUMP #2
		4360		<Q01>	DTBC	107	C030C	4FD-2	NO	L4FD2	LOG	MASTER CONTROL - DIST FUEL FORWARDING PUMP #2
		NA		<Q01>	DTBC	108	C030NC	4FD-2	NO	L4FD2	LOG	MASTER CONTROL - DIST FUEL FORWARDING PUMP #2
				<Q01>	DTBD	001	C031SO	30TX-RTU	NO	L30TX_RTU	LOG	EXHAUST TEMPERATURE HIGH - RTU
				<Q01>	DTBD	002	C031NO	30TX-RTU	NO	L30TX_RTU	LOG	EXHAUST TEMPERATURE HIGH - RTU
				<Q01>	DTBD	003	C031C	30TX-RTU	NO	L30TX_RTU	LOG	EXHAUST TEMPERATURE HIGH - RTU
				<Q01>	DTBD	004	C031NC	30TX-RTU	NO	L30TX_RTU	LOG	EXHAUST TEMPERATURE HIGH - RTU
				<Q01>	DTBD	005	C032SO	30SPA-RTU	NO	L30SPA_RTU	LOG	COMBUSTION TROUBLE - RTU

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<QD1>	DTBD	006	CO32NO	30SPA-RTU	NO	I30SPA RTU	LOG	COMBUSTION TROUBLE - RTU
				<QD1>	DTBD	007	CO32C	30SPA-RTU	NO	I30SPA RTU	LOG	COMBUSTION TROUBLE - RTU
				<QD1>	DTBD	008	CO32NC	30SPA-RTU	NO	I30SPA RTU	LOG	COMBUSTION TROUBLE - RTU
				<QD1>	DTBD	009	CO33SO	3LFL-RTU	NO	I3LFL RTU	LOG	L1Q. FUEL TROUBLE - RTU
				<QD1>	DTBD	010	CO33NO	3LFL-RTU	NO	I3LFL RTU	LOG	L1Q. FUEL TROUBLE - RTU
				<QD1>	DTBD	011	CO33C	3LFL-RTU	NO	I3LFL RTU	LOG	L1Q. FUEL TROUBLE - RTU
				<QD1>	DTBD	012	CO33NC	3LFL-RTU	NO	I3LFL RTU	LOG	L1Q. FUEL TROUBLE - RTU
		NA		<QD1>	DTBD	013	CO34SO	4BTZ	NC	I4BTZ	LOG	[88BA] MASTER CONTROL
		NA		<QD1>	DTBD	014	CO34NO	4BTZ	NC	I4BTZ	LOG	[88BA] MASTER CONTROL
		1512		<QD1>	DTBD	015	CO34C	4BTZ	NC	I4BTZ	LOG	[88BA] MASTER CONTROL
		1511		<QD1>	DTBD	016	CO34NC	4BTZ	NC	I4BTZ	LOG	[88BA] MASTER CONTROL
		NA		<QD1>	DTBD	017	CO35SO	4WNIX	NC	I4WNIX	LOG	WATER INJECTION SKID MASTER CONTROL
		7599		<QD1>	DTBD	018	CO35NO	4WNIX	NC	I4WNIX	LOG	WATER INJECTION SKID MASTER CONTROL
		7598		<QD1>	DTBD	019	CO35C	4WNIX	NC	I4WNIX	LOG	WATER INJECTION SKID MASTER CONTROL
		NA		<QD1>	DTBD	020	CO35NC	4WNIX	NC	I4WNIX	LOG	WATER INJECTION SKID MASTER CONTROL
				<QD1>	DTBD	021	CO36SO	52GX-RTU	NO	I52GX RTU	LOG	GENERATOR BREAKER TRIPPED - RTU <i>NOT USED</i>
				<QD1>	DTBD	022	CO36NO	52GX-RTU	NO	I52GX RTU	LOG	GENERATOR BREAKER TRIPPED - RTU
				<QD1>	DTBD	023	CO36C	52GX-RTU	NO	I52GX RTU	LOG	GENERATOR BREAKER TRIPPED - RTU
				<QD1>	DTBD	024	CO36NC	52GX-RTU	NO	I52GX RTU	LOG	GENERATOR BREAKER TRIPPED - RTU
				<QD1>	DTBD	025	CO37SO	45FA-RTU	NO	I45FA RTU	LOG	FIRE PROTECTION SYSTEM INOPERATIVE - RTU
				<QD1>	DTBD	026	CO37NO	45FA-RTU	NO	I45FA RTU	LOG	FIRE PROTECTION SYSTEM INOPERATIVE - RTU
				<QD1>	DTBD	027	CO37C	45FA-RTU	NO	I45FA RTU	LOG	FIRE PROTECTION SYSTEM INOPERATIVE - RTU
				<QD1>	DTBD	028	CO37NC	45FA-RTU	NO	I45FA RTU	LOG	FIRE PROTECTION SYSTEM INOPERATIVE - RTU
				<QD1>	DTBD	029	CO38SO	30SPTS-RTU	NO	I30SPTS RTU	LOG	EXCESSIVE COMBUSTION TROUBLE - RTU
				<QD1>	DTBD	030	CO38NO	30SPTS-RTU	NO	I30SPTS RTU	LOG	EXCESSIVE COMBUSTION TROUBLE - RTU
				<QD1>	DTBD	031	CO38C	30SPTS-RTU	NO	I30SPTS RTU	LOG	EXCESSIVE COMBUSTION TROUBLE - RTU
				<QD1>	DTBD	032	CO38NC	30SPTS-RTU	NO	I30SPTS RTU	LOG	EXCESSIVE COMBUSTION TROUBLE - RTU
				<QD1>	DTBD	033	CO39SO	3MP-RTU	NO	I3MP RTU	LOG	MASTER PROTECTIVE START CHECK ETR FAULT - RTU
				<QD1>	DTBD	034	CO39NO	3MP-RTU	NO	I3MP RTU	LOG	MASTER PROTECTIVE START CHECK ETR FAULT - RTU
				<QD1>	DTBD	035	CO39C	3MP-RTU	NO	I3MP RTU	LOG	MASTER PROTECTIVE START CHECK ETR FAULT - RTU
				<QD1>	DTBD	036	CO39NC	3MP-RTU	NO	I3MP RTU	LOG	MASTER PROTECTIVE START CHECK ETR FAULT - RTU
				<QD1>	DTBD	037	CO40SO	3WFL-RTU	NO	I3WFL RTU	LOG	WATER INJ. FLOW SENSOR TROUBLE - RTU
				<QD1>	DTBD	038	CO40NO	3WFL-RTU	NO	I3WFL RTU	LOG	WATER INJ. FLOW SENSOR TROUBLE - RTU
				<QD1>	DTBD	039	CO40C	3WFL-RTU	NO	I3WFL RTU	LOG	WATER INJ. FLOW SENSOR TROUBLE - RTU
				<QD1>	DTBD	040	CO40NC	3WFL-RTU	NO	I3WFL RTU	LOG	WATER INJ. FLOW SENSOR TROUBLE - RTU
				<QD1>	DTBD	041	CO41SO	86HD-RTU	NO	I86HD RTU	LOG	HYDRAULIC PROTECTIVE TROUBLE
				<QD1>	DTBD	042	CO41NO	86HD-RTU	NO	I86HD RTU	LOG	HYDRAULIC PROTECTIVE TROUBLE
				<QD1>	DTBD	043	CO41C	86HD-RTU	NO	I86HD RTU	LOG	HYDRAULIC PROTECTIVE TROUBLE
				<QD1>	DTBD	044	CO41NC	86HD-RTU	NO	I86HD RTU	LOG	HYDRAULIC PROTECTIVE TROUBLE
		TBF-12		<QD1>	DTBD	045	CO42SO	45FAN SD	NO	I45FAN SD	LOG	FIRE-VENT FAN SHUTDOWN <i>TO CPIM R3</i>
		TBF-11		<QD1>	DTBD	046	CO42NO	45FAN SD	NO	I45FAN SD	LOG	FIRE-VENT FAN SHUTDOWN
				<QD1>	DTBD	047	CO42C	45FAN SD	NO	I45FAN SD	LOG	FIRE-VENT FAN SHUTDOWN

Cable Num	Wire Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<QD1>	DTBD	048	CO42NC	45FAN_SD	NO	L45FAN_SD	LOG	FIRE-VENT FAN SHUTDOWN
				<QD1>	DTBD	049	CO43SO	45SD		L45SD RTU	LOG	SMOKE DETECTOR ALARM-RTU INDICATION
				<QD1>	DTBD	050	CO43NO	45SD		L45SD RTU	LOG	SMOKE DETECTOR ALARM-RTU INDICATION
				<QD1>	DTBD	051	CO43C	45SD		L45SD RTU	LOG	SMOKE DETECTOR ALARM-RTU INDICATION
				<QD1>	DTBD	052	CO43NC	45SD		L45SD RTU	LOG	SMOKE DETECTOR ALARM-RTU INDICATION
				<QD1>	DTBD	053	CO44SO			Q_QD1_CO44		
				<QD1>	DTBD	054	CO44NO			Q_QD1_CO44		
				<QD1>	DTBD	055	CO44C			Q_QD1_CO44		
				<QD1>	DTBD	056	CO44NC			Q_QD1_CO44		
				<QD1>	DTBD	057	CO45SO			Q_QD1_CO45		
				<QD1>	DTBD	058	CO45NO			Q_QD1_CO45		
				<QD1>	DTBD	059	CO45C			Q_QD1_CO45		
				<QD1>	DTBD	060	CO45NC			Q_QD1_CO45		
				<QD1>	DTBD	061	CO46SO			Q_QD1_CO46		
				<QD1>	DTBD	062	CO46NO			Q_QD1_CO46		
				<QD1>	DTBD	063	CO46C			Q_QD1_CO46		
				<QD1>	DTBD	064	CO46NC			Q_QD1_CO46		
				<QD1>	DTBD	065	CO47SO	95TR-A/-B	NO	L2TVX1	LOG	Ignition transformer
176				<QD1>	DTBD	066	CO47NO	95TR-A/-B	NO	L2TVX1	LOG	Ignition transformer
177				<QD1>	DTBD	067	CO47C			Q_QD1_CO47		
				<QD1>	DTBD	068	CO47NC			Q_QD1_CO47		
				<QD1>	DTBD	069	CO48SO	20FD-1	NO	L20FDX	LOG	AC Powered fuel forwarding stop sol valve
				<QD1>	DTBD	070	CO48NO	20FD-1	NO	L20FDX	LOG	AC Powered fuel forwarding stop sol valve
				<QD1>	DTBD	071	CO48C	RESERVED-IGN. XFRMR		Q_QD1_CO48		Reserved for Ignition Transformer #2
				<QD1>	DTBD	072	CO48NC	RESERVED-IGN. XFRMR		Q_QD1_CO48		Reserved for Ignition Transformer #2
				<QD1>	DTBD	073	CO49NO			Q_QD1_CO49		
				<QD1>	DTBD	074	CO49C			Q_QD1_CO49		
				<QD1>	DTBD	075	CO49NC			Q_QD1_CO49		
				<QD1>	DTBD	076	CO50NO			Q_QD1_CO50		
				<QD1>	DTBD	077	CO50C			Q_QD1_CO50		
				<QD1>	DTBD	078	CO50NC			Q_QD1_CO50		
				<QD1>	DTBD	079	CO51NO			Q_QD1_CO51		
				<QD1>	DTBD	080	CO51C			Q_QD1_CO51		
				<QD1>	DTBD	081	CO51NC			Q_QD1_CO51		
				<QD1>	DTBD	082	CO52NO	81RE	NO	L81RE	LOG	REVERSE ENERGIZATION CONTROL
4940				<QD1>	DTBD	083	CO52C	81RE	NO	L81RE	LOG	REVERSE ENERGIZATION CONTROL
4941				<QD1>	DTBD	084	CO52NC	81RE	NO	L81RE	LOG	REVERSE ENERGIZATION CONTROL
NA				<QD1>	DTBD	085	CO53NO	52GT	NO	L52GT TC	LOG	TURBINE CONTROL PANEL 52G TRIP SIGNAL
1156				<QD1>	DTBD	086	CO53C	52GT	NO	L52GT TC	LOG	TURBINE CONTROL PANEL 52G TRIP SIGNAL
1157				<QD1>	DTBD	087	CO53NC	52GT	NO	L52GT TC	LOG	TURBINE CONTROL PANEL 52G TRIP SIGNAL
NA				<QD1>	DTBD							

Cable Num	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
	1157		<QD1>	DTBD	088	C054NO	43R-GT	NC	L43R GT	LOG	REMOTE SEL-CONTACT TO 52G/TC CIRCUIT
	1160		<QD1>	DTBD	089	C054C	43R-GT	NC	L43R GT	LOG	REMOTE SEL-CONTACT TO 52G/TC CIRCUIT
	NA		<QD1>	DTBD	090	C054NC	43R-GT	NC	L43R GT	LOG	REMOTE SEL-CONTACT TO 52G/TC CIRCUIT
			<QD1>	DTBD	091	C055NO			Q_QD1_C055		
			<QD1>	DTBD	092	C055C			Q_QD1_C055		
			<QD1>	DTBD	093	C055NC			Q_QD1_C055		
			<QD1>	DTBD	094	C056NO			Q_QD1_C056		
			<QD1>	DTBD	095	C056C			Q_QD1_C056		
			<QD1>	DTBD	096	C056NC			Q_QD1_C056		
			<QD1>	DTBD	097	C057NO			Q_QD1_C057		
			<QD1>	DTBD	098	C057C			Q_QD1_C057		
			<QD1>	DTBD	099	C057NC			Q_QD1_C057		
			<QD1>	DTBD	100	C058NO			Q_QD1_C058		
			<QD1>	DTBD	101	C058C			Q_QD1_C058		
			<QD1>	DTBD	102	C058NC			Q_QD1_C058		
			<QD1>	DTBD	103	C059NO			Q_QD1_C059		
			<QD1>	DTBD	104	C059C			Q_QD1_C059		
			<QD1>	DTBD	105	C059NC			Q_QD1_C059		
			<QD1>	DTBD	106	C060NO			Q_QD1_C060		
			<QD1>	DTBD	107	C060C			Q_QD1_C060		
			<QD1>	DTBD	108	C060NC			Q_QD1_C060		
340			<R>	QTBA	001	LVD01E	96GC-1/RED			VRMS	LVD1 #1 EXCITATION FUEL GAS CONTROL VALVE
341			<R>	QTBA	002	LVD01L	96GC-1/BLK			VRMS	LVD1 #1 EXCITATION FUEL GAS CONTROL VALVE
344			<R>	QTBA	003	LVD02E	96GC-2/RED			VRMS	LVD1 #2 EXCITATION FUEL GAS CONTROL VALVE
345			<R>	QTBA	004	LVD02L	96GC-2/BLK			VRMS	LVD1 #2 EXCITATION FUEL GAS CONTROL VALVE
			<R>	QTBA	005	LVD03E					
			<R>	QTBA	006	LVD03L					
			<R>	QTBA	007	LVD04E					
			<R>	QTBA	008	LVD04L					
			<R>	QTBA	009	LVD05E					
			<R>	QTBA	010	LVD05L					
			<R>	QTBA	011	LVD06E					
			<R>	QTBA	012	LVD06L					
			<R>	QTBA	013	LVD07E					
			<R>	QTBA	014	LVD07L					
			<R>	QTBA	015	LVD08E					
			<R>	QTBA	016	LVD08L					
			<R>	QTBA	017	SPARE					
			<R>	QTBA	018	SPARE					
340			<R>	QTBA	019	TTL1H				VRMS	LVD1 #1 EXCITATION STOP/SPEED RATIO VALVE
341			<R>	QTBA	020	TTL1L				VRMS	LVD1 #1 EXCITATION STOP/SPEED RATIO VALVE
			<R>	QTBA	021	TTL1P					
			<R>	QTBA	022	TTL1N					

Cable Num	Wire Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<R>	QTBA	023	TTL2H			Q_Q TTL2		
				<R>	QTBA	024	TTL2L			Q_Q TTL2		
				<R>	QTBA	025	TTL2P			Q_Q TTL2		
				<R>	QTBA	026	TTL2N			Q_Q TTL2		
				<R>	QTBA	027	SV01	90SR-1/WHIT		FPRGOUT	PRESS	Stop/speed ratio valve servo command
				<R>	QTBA	028	SV0X1	90SR-1/GRN		FPRGOUT	PRESS	Stop/speed ratio valve servo command
				<R>	QTBA	029	SV0R1	90SR-1/YEL/RED		FPRGOUT	PRESS	Stop/speed ratio valve servo command
				<R>	QTBA	030	SV02	65GC-1/WHIT		FSROUT	PCT	Gas control valve servo command
				<R>	QTBA	031	SV0X2	65GC-1/GRN		FSROUT	PCT	Gas control valve servo command
				<R>	QTBA	032	SV0R2	65GC-1/YEL&RED		FSROUT	PCT	Gas control valve servo command
				<R>	QTBA	033	SV03	65FP-1/WHIT		FOROUT	PCT	Liquid fuel bypass valve servo command
				<R>	QTBA	034	SV0X3	65FP-1/GRN		FOROUT	PCT	Liquid fuel bypass valve servo command
				<R>	QTBA	035	SV0R3	65FP-1/YEL&RED		FOROUT	PCT	Liquid fuel bypass valve servo command
				<R>	QTBA	036	SV04			Q_Q SV04		
				<R>	QTBA	037	SV0X4			Q_Q SV04		
				<R>	QTBA	038	SV0R4			Q_Q SV04		
				<R>	QTBA	039	SV05			Q_Q SV05		
				<R>	QTBA	040	SV0X5			Q_Q SV05		
				<R>	QTBA	041	SV0R5			Q_Q SV05		
				<R>	QTBA	042	SV06			Q_Q SV06		
				<R>	QTBA	043	SV0X6			Q_Q SV06		
				<R>	QTBA	044	SV0R6			Q_Q SV06		
				<R>	QTBA	045	SV07			Q_Q SV07		
				<R>	QTBA	046	SV0X7			Q_Q SV07		
				<R>	QTBA	047	SV0R7			Q_Q SV07		
				<R>	QTBA	048	SV08			Q_Q SV08		
				<R>	QTBA	049	SV0X8			Q_Q SV08		
				<R>	QTBA	050	SV0R8			Q_Q SV08		
				<R>	QTBA	051	MPU1H	77NH-1		TNH1	PCT	Q QTBA- 51 HP Speed probe #1
				<R>	QTBA	052	MPU1L	77NH-1		TNH1	PCT	Q QTBA- 51 HP Speed probe #1
				<R>	QTBA	053	MPU2H	77NH-2		TNH2	PCT	HP speed probe #2
				<R>	QTBA	054	MPU2L	77NH-2		TNH2	PCT	HP speed probe #2
				<R>	QTBA	055	MPU3H	77FD-1		FOL1	PCT	Flow divider mag pickup-speed
				<R>	QTBA	056	MPU3L	77FD-1		FOL1	PCT	Flow divider mag pickup-speed
				<R>	QTBA	057	MPU4H	77FD-2		FOL2	PCT	[77FD-2] FLOW DIVIDER MAG PICKUP-SPEED
				<R>	QTBA	058	MPU4L	77FD-2		FOL2	PCT	[77FD-2] FLOW DIVIDER MAG PICKUP-SPEED
				<R>	QTBA	059	MPU5H			Q_Q MPU5		
				<R>	QTBA	060	MPU5L			Q_Q MPU5		

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Cable Num	Wire Pnt	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
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			<R>	TBOA	026	TC13N			R_R_TC13		
			<R>	TBOA	027	TC14P			R_R_TC14		
			<R>	TBOA	028	TC14N			R_R_TC14		
			<R>	TBOA	029	TC15P			R_R_TC15		
			<R>	TBOA	030	TC15N			R_R_TC15		
			<R>	TBOA	031	TC16P	NOT AVAILABLE		S_R_TC16		<S> Thermocouple Input #1
			<R>	TBOA	032	TC16N	NOT AVAILABLE		S_R_TC16		<S> Thermocouple Input #1
			<R>	TBOA	033	TC17P	NOT AVAILABLE		S_R_TC17		<S> Thermocouple Input #2
			<R>	TBOA	034	TC17N	NOT AVAILABLE		S_R_TC17		<S> Thermocouple Input #2
			<R>	TBOA	035	TC18P	NOT AVAILABLE		S_R_TC18		<S> Thermocouple Input #3
			<R>	TBOA	036	TC18N	NOT AVAILABLE		S_R_TC18		<S> Thermocouple Input #3
			<R>	TBOA	037	TC19P	NOT AVAILABLE		S_R_TC19		<S> Thermocouple Input #4
			<R>	TBOA	038	TC19N	NOT AVAILABLE		S_R_TC19		<S> Thermocouple Input #4
			<R>	TBOA	039	TC20P	NOT AVAILABLE		S_R_TC20		<S> Thermocouple Input #5
			<R>	TBOA	040	TC20N	NOT AVAILABLE		S_R_TC20		<S> Thermocouple Input #5
			<R>	TBOA	041	TC21P	NOT AVAILABLE		S_R_TC21		<S> Thermocouple Input #6
			<R>	TBOA	042	TC21N	NOT AVAILABLE		S_R_TC21		<S> Thermocouple Input #6
			<R>	TBOA	043	TC22P	NOT AVAILABLE		S_R_TC22		<S> Thermocouple Input #7
			<R>	TBOA	044	TC22N	NOT AVAILABLE		S_R_TC22		<S> Thermocouple Input #7
			<R>	TBOA	045	TC23P	NOT AVAILABLE		S_R_TC23		<S> Thermocouple Input #8
			<R>	TBOA	046	TC23N	NOT AVAILABLE		S_R_TC23		<S> Thermocouple Input #8
			<R>	TBOA	047	TC24P	NOT AVAILABLE		S_R_TC24		<S> Thermocouple Input #9
			<R>	TBOA	048	TC24N	NOT AVAILABLE		S_R_TC24		<S> Thermocouple Input #9
			<R>	TBOA	049	TC25P	NOT AVAILABLE		S_R_TC25		<S> Thermocouple Input #10
			<R>	TBOA	050	TC25N	NOT AVAILABLE		S_R_TC25		<S> Thermocouple Input #10
			<R>	TBOA	051	TC26P	NOT AVAILABLE		S_R_TC26		<S> Thermocouple Input #11
			<R>	TBOA	052	TC26N	NOT AVAILABLE		S_R_TC26		<S> Thermocouple Input #11
			<R>	TBOA	053	TC27P	NOT AVAILABLE		S_R_TC27		<S> Thermocouple Input #12
			<R>	TBOA	054	TC27N	NOT AVAILABLE		S_R_TC27		<S> Thermocouple Input #12
			<R>	TBOA	055	TC28P	NOT AVAILABLE		S_R_TC28		<S> Thermocouple Input #13
			<R>	TBOA	056	TC28N	NOT AVAILABLE		S_R_TC28		<S> Thermocouple Input #13
			<R>	TBOA	057	TC29P	NOT AVAILABLE		S_R_TC29		<S> Thermocouple Input #14
			<R>	TBOA	058	TC29N	NOT AVAILABLE		S_R_TC29		<S> Thermocouple Input #14
			<R>	TBOA	059	TC30P	NOT AVAILABLE		S_R_TC30		<S> Thermocouple Input #15
			<R>	TBOA	060	TC30N	NOT AVAILABLE		S_R_TC30		<S> Thermocouple Input #15

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				<R>	TBOA	061	TC31P	NOT AVAILABLE		T R TC31		<T> Thermocouple Input #1
				<R>	TBOA	062	TC31N	NOT AVAILABLE		T_R_TC31		<T> Thermocouple Input #1
				<R>	TBOA	063	TC32P	NOT AVAILABLE		T R TC32		<T> Thermocouple Input #2
				<R>	TBOA	064	TC32N	NOT AVAILABLE		T_R_TC32		<T> Thermocouple Input #2
				<R>	TBOA	065	TC33P	NOT AVAILABLE		T R TC33		<T> Thermocouple Input #3
				<R>	TBOA	066	TC33N	NOT AVAILABLE		T_R_TC33		<T> Thermocouple Input #3
				<R>	TBOA	067	TC34P	NOT AVAILABLE		T R TC34		<T> Thermocouple Input #4
				<R>	TBOA	068	TC34N	NOT AVAILABLE		T_R_TC34		<T> Thermocouple Input #4
				<R>	TBOA	069	TC35P	NOT AVAILABLE		T R TC35		<T> Thermocouple Input #5
				<R>	TBOA	070	TC35N	NOT AVAILABLE		T_R_TC35		<T> Thermocouple Input #5
				<R>	TBOA	071	TC36P	NOT AVAILABLE		T R TC36		<T> Thermocouple Input #6
				<R>	TBOA	072	TC36N	NOT AVAILABLE		T_R_TC36		<T> Thermocouple Input #6
				<R>	TBOA	073	TC37P	NOT AVAILABLE		T R TC37		<T> Thermocouple Input #7
				<R>	TBOA	074	TC37N	NOT AVAILABLE		T_R_TC37		<T> Thermocouple Input #7
				<R>	TBOA	075	TC38P	NOT AVAILABLE		T R TC38		<T> Thermocouple Input #8
				<R>	TBOA	076	TC38N	NOT AVAILABLE		T_R_TC38		<T> Thermocouple Input #8
				<R>	TBOA	077	TC39P	NOT AVAILABLE		T R TC39		<T> Thermocouple Input #9
				<R>	TBOA	078	TC39N	NOT AVAILABLE		T_R_TC39		<T> Thermocouple Input #9
				<R>	TBOA	079	TC40P	NOT AVAILABLE		T R TC40		<T> Thermocouple Input #10
				<R>	TBOA	080	TC40N	NOT AVAILABLE		T_R_TC40		<T> Thermocouple Input #10
				<R>	TBOA	081	TC41P	NOT AVAILABLE		T R TC41		<T> Thermocouple Input #11
				<R>	TBOA	082	TC41N	NOT AVAILABLE		T_R_TC41		<T> Thermocouple Input #11
				<R>	TBOA	083	TC42P	NOT AVAILABLE		T R TC42		<T> Thermocouple Input #12
				<R>	TBOA	084	TC42N	NOT AVAILABLE		T_R_TC42		<T> Thermocouple Input #12
				<R>	TBOA	085	TC43P	NOT AVAILABLE		T R TC43		<T> Thermocouple Input #13
				<R>	TBOA	086	TC43N	NOT AVAILABLE		T_R_TC43		<T> Thermocouple Input #13
				<R>	TBOA	087	TC44P	NOT AVAILABLE		T R TC44		<T> Thermocouple Input #14
				<R>	TBOA	088	TC44N	NOT AVAILABLE		T_R_TC44		<T> Thermocouple Input #14
				<R>	TBOA	089	TC45P	NOT AVAILABLE		T R TC45		<T> Thermocouple Input #15
				<R>	TBOA	090	TC45N	NOT AVAILABLE		T_R_TC45		<T> Thermocouple Input #15
384				<R>	TBOB	001	CPDRPP	96CD-1/WHT		CPD	PRESS	Compressor disch press transmitter
385				<R>	TBOB	002	CPDRPN	96CD-1/GN		CPD	PRESS	Compressor disch press transmitter
386				<R>	TBOB	003	CPDRP	96CD-1/RED		CPD	PRESS	Compressor disch press transmitter
387				<R>	TBOB	004	CPDRN	96CD-1/BLK		CPD	PRESS	Compressor disch press transmitter
				<R>	TBOB	005	CPDSPP			Q R CPD		
				<R>	TBOB	006	CPDSPN			Q R CPD		
				<R>	TBOB	007	CPDSP			Q_R_CPD		

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
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				<R>	TB0B	008	CPDSN			Q_R_CPD		
				<R>	TB0B	009	CPDTPP			Q_R_CPD		
				<R>	TB0B	010	CPDTPN			Q_R_CPD		
				<R>	TB0B	011	CPDTP			Q_R_CPD		
				<R>	TB0B	012	CPDTN			Q_R_CPD		
				<R>	TB0B	013	MPU7QH			Q_R_MPU7Q		
				<R>	TB0B	014	MPU7QL			Q_R_MPU7Q		
				<R>	TB0B	015	TTL3QP			Q_R_TTL3Q		
				<R>	TB0B	016	TTL3QN			Q_R_TTL3Q		
				<R>	TB0B	017	TTL3QH			Q_R_TTL3Q		
				<R>	TB0B	018	TTL3QL			Q_R_TTL3Q		
				<R>	TB0B	019	TTL4QP			Q_R_TTL4Q		
				<R>	TB0B	020	TTL4QN			Q_R_TTL4Q		
				<R>	TB0B	021	TTL4QH			Q_R_TTL4Q		
				<R>	TB0B	022	TTL4QL			Q_R_TTL4Q		
322				<R>	TB0B	023	VDC1RP	96FG-2/WH		FP62	PRESS	Interstage fuel gas press xmitter
323				<R>	TB0B	024	VDC1RN	96FG-2/GRN		FP62	PRESS	Interstage fuel gas press xmitter
324				<R>	TB0B	025	VDC1RH	96FG-2/RED		FP62	PRESS	Interstage fuel gas press xmitter
325				<R>	TB0B	026	VDC1RL	96FG-2/BLK		FP62	PRESS	Interstage fuel gas press xmitter
				<R>	TB0B	027	VDC1SP			Q_R_VDC1		
				<R>	TB0B	028	VDC1SN			Q_R_VDC1		
				<R>	TB0B	029	VDC1SH			Q_R_VDC1		
				<R>	TB0B	030	VDC1SL			Q_R_VDC1		
				<R>	TB0B	031	VDC1TP			Q_R_VDC1		
				<R>	TB0B	032	VDC1TN			Q_R_VDC1		
				<R>	TB0B	033	VDC1TH			Q_R_VDC1		
				<R>	TB0B	034	VDC1TL			Q_R_VDC1		
				<R>	TB0B	035	VDC2RP			Q_R_VDC2		
				<R>	TB0B	036	VDC2RN			Q_R_VDC2		
				<R>	TB0B	037	VDC2RH			Q_R_VDC2		
				<R>	TB0B	038	VDC2RL			Q_R_VDC2		
				<R>	TB0B	039	VDC2SP			Q_R_VDC2		
				<R>	TB0B	040	VDC2SN			Q_R_VDC2		
				<R>	TB0B	041	VDC2SH			Q_R_VDC2		
				<R>	TB0B	042	VDC2SL			Q_R_VDC2		
				<R>	TB0B	043	VDC2TP			Q_R_VDC2		
				<R>	TB0B	044	VDC2TN			Q_R_VDC2		
				<R>	TB0B	045	VDC2TH			Q_R_VDC2		
				<R>	TB0B	046	VDC2TL			Q_R_VDC2		
				<R>	TB0B	047	VDC3QH			Q_R_VDC3		
				<R>	TB0B	048	VDC3QL			Q_R_VDC3		
				<R>	TB0B	049	VDC4QH			Q_R_VDC4		
				<R>	TB0B	050	VDC4QL			Q_R_VDC4		
260				<R>	TB0B	051	VIB01H	39V-1/WH		BB1	VIBVL	Vibration sensor

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
		261		<R>	TBQB	052	VIB01L	39V-1/BLK		BB1	VIBVL	Vibration sensor
		262		<R>	TBQB	053	VIB02H			Q_R_VIB02		
		263		<R>	TBQB	054	VIB02L			Q_R_VIB02		
		264		<R>	TBQB	055	VIB03H			Q_R_VIB03		
		265		<R>	TBQB	056	VIB03L			Q_R_VIB03		
				<R>	TBQB	057	VIB04H	39V-4/WHT		BB4	VIBVL	Vibration sensor
				<R>	TBQB	058	VIB04L	39V-4/BLK		BB4	VIBVL	Vibration sensor
				<R>	TBQB	059	VIB05H			Q_R_VIB05		
				<R>	TBQB	060	VIB05L			Q_R_VIB05		
				<R>	TBQB	061	VIB06H			Q_R_VIB06		
				<R>	TBQB	062	VIB06L			Q_R_VIB06		
				<R>	TBQB	063	VIB07H	39V-7/WHT		BB7	VIBVL	Vibration sensor
				<R>	TBQB	064	VIB07L	39V-7/BLK		BB7	VIBVL	Vibration sensor
				<R>	TBQB	065	VIB08H			Q_R_VIB08		
				<R>	TBQB	066	VIB08L			Q_R_VIB08		
				<R>	TBQB	067	VIB09H			Q_R_VIB09		
				<R>	TBQB	068	VIB09L			Q_R_VIB09		
				<R>	TBQB	069	VIB10H			Q_R_VIB10		
				<R>	TBQB	070	VIB10L			Q_R_VIB10		
				<R>	TBQB	071	VIB11H			Q_R_VIB11		
				<R>	TBQB	072	VIB11L			Q_R_VIB11		
				<R>	TBQB	073	VIB12H			Q_R_VIB12		
				<R>	TBQB	074	VIB12L			Q_R_VIB12		
				<R>	TBQB	075	SPARE					
				<R>	TBQB	076	SPARE					
				<R>	TBQB	077	SPARE					
				<R>	TBQB	078	SPARE					
		328		<R>	TBQC	001	POS01H	96SR-1/BLU		FSGR	PCT	Position fdbck srv (high value selected)
		329		<R>	TBQC	002	POS01L	96SR-1/YEL		FSGR	PCT	Position fdbck srv (high value selected)
				<R>	TBQC	003	POS02H			Q_R_POS02		
				<R>	TBQC	004	POS02L			Q_R_POS02		
		342		<R>	TBQC	005	POS03H	96GC-1/BLU		FSG	PCT	Position fdbck gas control valve (hi val selected)
		343		<R>	TBQC	006	POS03L	96GC-1/YEL		FSG	PCT	Position fdbck gas control valve (hi val selected)
		346		<R>	TBQC	007	POS04H	96GC-2/BLU		FSG B	PCT	Position fdbck primary gas control valve
		347		<R>	TBQC	008	POS04L	96GC-2/YEL		FSG B	PCT	Position fdbck primary gas control valve

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
				<R>	TBQC	009	POS05H			Q_R_POS05		
				<R>	TBQC	010	POS05L			Q_R_POS05		
				<R>	TBQC	011	POS06H			Q_R_POS06		
				<R>	TBQC	012	POS06L			Q_R_POS06		
				<R>	TBQC	013	POS07H			Q_R_POS07		
				<R>	TBQC	014	POS07L			Q_R_POS07		
				<R>	TBQC	015	POS08H			Q_R_POS08		
				<R>	TBQC	016	POS08L			Q_R_POS08		
				<R>	TBQC	017	POS09H			Q_R_POS09		
				<R>	TBQC	018	POS09L			Q_R_POS09		
				<R>	TBQC	019	POS10H			Q_R_POS10		
				<R>	TBQC	020	POS10L			Q_R_POS10		
				<R>	TBQC	021	POS11H			Q_R_POS11		
				<R>	TBQC	022	POS11L			Q_R_POS11		
				<R>	TBQC	023	POS12H			Q_R_POS12		
				<R>	TBQC	024	POS12L			Q_R_POS12		
				<R>	TBQC	025	POS13H			Q_R_POS13		
				<R>	TBQC	026	POS13L			Q_R_POS13		
				<R>	TBQC	027	POS14H			Q_R_POS14		
				<R>	TBQC	028	POS14L			Q_R_POS14		
				<R>	TBQC	029	POS15H			Q_R_POS15		
				<R>	TBQC	030	POS15L			Q_R_POS15		
				<R>	TBQC	031	POS16H			Q_R_POS16		
				<R>	TBQC	032	POS16L			Q_R_POS16		
				<R>	TBQC	033	SPARE					
				<R>	TBQC	034	SPARE					
				<R>	TBQC	035	MAI01P	96GG-1		DVAR	MVAR	Generator VARs
				<R>	TBQC	036	MAI01N	96GG-1		DVAR	MVAR	Generator VARs
				<R>	TBQC	037	MAI01E	96GG-1		DVAR	MVAR	Generator VARs
				<R>	TBQC	038	MAI02E			Q_R_MAI02		
				<R>	TBQC	039	MAI02P			Q_R_MAI02		
				<R>	TBQC	040	MAI02N			Q_R_MAI02		
				<R>	TBQC	041	MAI03P			Q_R_MAI03		
				<R>	TBQC	042	MAI03N			Q_R_MAI03		
				<R>	TBQC	043	MAI03E			Q_R_MAI03		
				<R>	TBQC	044	MAI04E			Q_R_MAI04		

1716
1749
NA

Generator VARs
Generator VARs
Generator VARs

Cable Num	Wire Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
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		045	MAI04P		TBQC					Q R MAI04		
		046	MAI04N	<R>	TBQC					Q R MAI04		
		047	MAI05P	<R>	TBQC			96WN-2		WSG	PCT	WATER INJECTION SKID CONTROL VALVE POSITION
8375		048	MAI05N	<R>	TBQC			96WN-2		WSG	PCT	WATER INJECTION SKID CONTROL VALVE POSITION
8374		049	MAI05E	<R>	TBQC			96WN-2		WSG	PCT	WATER INJECTION SKID CONTROL VALVE POSITION
		050	MAI06E	<R>	TBQC			95GF		FOGM	LB S	FUEL GAS MASS FLOW METER
		051	MAI06P	<R>	TBQC			95GF		FOGM	LB S	FUEL GAS MASS FLOW METER
4701		052	MAI06N	<R>	TBQC			95GF		FOGM	LB S	FUEL GAS MASS FLOW METER
4700												
		053	MAI07P	<R>	TBQC					Q R MAI07		
		054	MAI07N	<R>	TBQC					Q R MAI07		
		055	MAI07E	<R>	TBQC					Q R MAI07		
		056	MAI08E	<R>	TBQC			77WN-1		WOP1	PCT	WATER INJECTION SKID FLOW VALVE SPEED XDUCER #1
NA		057	MAI08P	<R>	TBQC			77WN-1		WOP1	PCT	WATER INJECTION SKID FLOW VALVE SPEED XDUCER #1
1309		058	MAI08N	<R>	TBQC			77WN-1		WOP1	PCT	WATER INJECTION SKID FLOW VALVE SPEED XDUCER #1
1310												
1312		059	MAI09P	<R>	TBQC			77WN-2		WOP2	PCT	WATER INJECTION SKID FLOW VALVE SPEED XDUCER #2
1311		060	MAI09N	<R>	TBQC			77WN-2		WOP2	PCT	WATER INJECTION SKID FLOW VALVE SPEED XDUCER #2
NA		061	MAI09E	<R>	TBQC			77WN-2		WOP2	PCT	WATER INJECTION SKID FLOW VALVE SPEED XDUCER #2
		062	MAI10E	<R>	TBQC					Q R MAI10		
		063	MAI10P	<R>	TBQC					Q R MAI10		
		064	MAI10N	<R>	TBQC					Q R MAI10		
		065	MAI11P	<R>	TBQC					Q R MAI11		
		066	MAI11N	<R>	TBQC					Q R MAI11		
		067	MAI11E	<R>	TBQC					Q R MAI11		
		068	MAI12E	<R>	TBQC					Q R MAI12		
		069	MAI12P	<R>	TBQC					Q R MAI12		
		070	MAI12N	<R>	TBQC					Q R MAI12		
		071	MAI13P	<R>	TBQC					Q R MAI13		
		072	MAI13N	<R>	TBQC					Q R MAI13		
		073	MAI13E	<R>	TBQC					Q R MAI13		
		074	MAI14E	<R>	TBQC					Q R MAI14		
		075	MAI14P	<R>	TBQC					Q R MAI14		
		076	MAI14N	<R>	TBQC					Q R MAI14		
		077	MAI15P	<R>	TBQC					Q R MAI15		
		078	MAI15N	<R>	TBQC					Q R MAI15		
		079	MAI15E	<R>	TBQC					Q R MAI15		
		080	SPARE	<R>	TBQC							
		081	MAO01H	<R>	TBQC			90WN-1		WSROUT	PCT	WATER INJECTION CONTROL VALVE
3515		082	MAO01L	<R>	TBQC			90WN-1		WSROUT	PCT	WATER INJECTION CONTROL VALVE
3516												

Cable Num	Pnt	Wire Num	Interpos'g Term Board	Core Name	Term Board	Screw Num	I/O Abbrev	Device name	Contact Sense	Signal Name	Scale Type	Nomenclature
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<R>	TEQC	083	MA002H							Q_R MA002		
<R>	TEQC	084	MA002L							Q_R MA002		

Date: 04/

DROP#	SIGNAL NAME	ALARM TEXT
0	L30DIAG_C	DIAGNOSTIC ALARM <C><Q>
1	L30FORCED	FORCED LOGIC SIGNAL DETECTED
2	LWLX4MIN	INJECTION TO FUEL RATIO LOW: 4 MIN AVG
3	LWLXHR	INJECTION TO FUEL RATIO LOW: HOURLY AVG
4	L30TXA_C	EXHAUST TEMPERATURE HIGH <C>
5	L86TXT_C	EXHAUST OVERTEMPERATURE TRIP <C>
32	L64D	BATTERY 125 V DC GROUND
33	L27DZ_ALM	BATTERY DC UNDERVOLTAGE
34	L43DIAG_ALM	OFFLINE DIAGNOSTICS RUNNING
35	L43MAINT	MAINTENANCE - FORCING MODE ENABLED
36	L5E_ALM	MANUAL TRIP - LOCAL
37	L86MP	MASTER PROTECTIVE STARTUP LOCKOUT
38	L12H	ELECTRICAL OVERSPEED TRIP - HP
39	L12HFD_C	CONTROL SPEED SIGNAL TROUBLE - HP
40	L12H_P_ALM	PROTECTIVE MODULE OVERSPEED TRIP - HP
41	L12HFD_P	PROTECTIVE SPEED SIGNAL TROUBLE - HP
42	L12H_ACC_ALM	PROTECTIVE MODULE ACCELERATION TRIP- HP
43	L83HOST	OVERSPEED TEST MODE SELECTED - HP
44	L12HBLT_ALM	OVERSPEED BOLT TRIP - HP
45	L12L	ELECTRICAL OVERSPEED TRIP - LP
46	L12LFD_C	CONTROL SPEED SIGNAL TROUBLE - LP
47	L12L_P_ALM	PROTECTIVE MODULE OVERSPEED TRIP - LP
48	L12LFD_P	PROTECTIVE SPEED SIGNAL TROUBLE - LP
49	L12L_ACC_ALM	PROTECTIVE MODULE ACCELERATION TRIP- LP
50	L83LOST	OVERSPEED TEST MODE SELECTED - LP
51	L12LF	CONTROL SPEED SIGNAL LOSS - LP
52	L12LBLT_ALM	OVERSPEED BOLT TRIP - LP
53	L3A	TURBINE UNDERSPEED
54	L4CT_ALM	CUSTOMER TRIP
55	L3CP_ALM	CUSTOMER START INHIBIT
56	L48	TURBINE INCOMPLETE SEQUENCE
57	L62TT2_ALM	FAILURE TO START
58	L30FD_ALM	FAILURE TO IGNITE
59	L28FD_ALM	FLAME DETECTOR TROUBLE
60	L28FDT	LOSS OF FLAME TRIP
61	L28FD_SD	CHAMBER FLAMED OUT DURING SHUTDOWN
62	L3COM_B_ALM	COMMON IO COMMUNICATION LOSS
63	L2SFT	STARTUP FUEL FLOW EXCESSIVE TRIP
64	L60FSRG	FSR GAG NOT AT MAX LIMIT
65	L3DWRF	LOSS OF EXTERNAL SETPOINT LOAD SIGNAL
66	L3TFLT	LOSS OF COMPRESSOR DISCHARGE PRESS BIAS
67	L30TFX	TURBINE AIR INLET TROUBLE
68	L63TF1H_ALM	TURBINE AIR INLET DIFF PRESSURE ALARM
69	L63TFH_ALM	TURBINE AIR INLET DIFF PRESS SHUTDOWN
70	L63TFH_SENSR	TURBINE AIR INLET DIFF PRESS SW TROUBLE
71	L52QA_ALM	AUX LUBE OIL PUMP MOTOR RUNNING
72	L72QEZ_ALM	EMERGENCY LUBE OIL PUMP MOTOR RUNNING
73	L63QQ1H_ALM	MAIN LUBE OIL FILTER DIFF PRESSURE HIGH
74	L63QTX	LOW LUBE OIL PRESSURE TRIP
75	L63QAL_ALM	LUBE OIL PRESSURE LOW
76	L63QT_SENSR	LUBE OIL PRESSURE SWITCH TROUBLE
77	L71QH_ALM	LUBE OIL LEVEL HIGH
78	L71QL_ALM	LUBE OIL LEVEL LOW
79	L26QN_ALM	LUBE OIL TANK TEMPERATURE LOW
80	L26QA_ALM	LUBE OIL HEADER TEMPERATURE HIGH

81		L26QT_ALM		LUBE OIL HEADER TEMPERATURE HIGH TRIP
82		L26QT_SENSR		LUBE OIL TEMPERATURE SWITCH TROUBLE
83		L63HQ1L_ALM		HYDRAULIC SUPPLY PRESSURE LOW
84		L63HF1H_ALM		HYDRAULIC FILTER DIFF PRESSURE HIGH
85		L86HD		HYDRAULIC PROTECTIVE TROUBLE
86		L52HQ_ALM		AUX HYDRAULIC OIL PUMP MOTOR RUNNING
87		L63HL_SENSR		LIQUID FUEL HYD PRESSURE SWITCH TROUBLE
88		L63HLL_ALM		LIQUID FUEL HYDRAULIC TRIP PRESSURE LOW
89		L63HGL_ALM		GAS FUEL HYDRAULIC TRIP PRESSURE LOW
90		L63HGL_SENSR		GAS FUEL HYD PRESSURE SWITCH TROUBLE
91		L3SMT		STARTING DEVICE TRIP
92		L48DSX		DIESEL FAILURE TO START
93		L2DWZ2		DIESEL FAILURE TO BREAK TURBINE AWAY
94		L4DT		STARTING DEVICE LOCKOUT
95		L4DEY_ALM		DIESEL FAILURE TO STOP
96		L63QDN_ALM		DIESEL LUBE OIL PRESSURE LOW
97		L26DWH_ALM		DIESEL ENGINE COOLING WATER TEMP HIGH
98		L86CRTX		STARTING MOTOR PROTECTIVE LOCKOUT
99		L49CR_ALM		STARTING MOTOR OVERLOAD
100		L4CRT		STARTING MOTOR BREAKER DID NOT PICK UP
101		L30HRX1		RATCHET TROUBLE
102		L30HRX2		RATCHET DID NOT START
103		L49HR1A_ALM		RATCHET MOTOR OVERLOAD
104		L30CD		COOLDOWN TROUBLE
105		L71WL_ALM		COOLING WATER LEVEL LOW
106		L52FC_ALM		COOLING FAN MOTOR BREAKER OPEN
107		L4IGVT		INLET GUIDE VANE CONTROL TROUBLE TRIP
108		L86GVA		INLET GUIDE VANE CONTROL TROUBLE ALARM
109		L3IGVFLT		INLET GUIDE VANE POSITION SERVO TROUBLE
110		L86TCI		COMPRESSOR INLET THERMOCOUPLES DISAGREE
111		L86CB1		COMPRESSOR BLEED VALVE POSITION TROUBLE
112		L83KU_ALM		TURB CPRSR ABRASIVE CLEANING SELECTED
113		L3WCTIM_ALM		ON LINE WATER WASH INHIBITED
114		L30TWW		WATER WASH INHIBIT-WHEELSPACE TEMP HIGH
115		L26CTH_ALM		CONTROL PANEL TEMPERATURE HIGH
116		L26BT1H_ALM		TURBINE COMPARTMENT TEMPERATURE HIGH
117		L63TK_ALM		EXHAUST FRAME COOLING AIR PRESSURE LOW
118		L63ETHX_ALM		EXHAUST PRESSURE SWITCH TROUBLE
119		L63EAH_ALM		EXHAUST PRESSURE HIGH ALARM
120		L30TXA		EXHAUST TEMPERATURE HIGH
121		L86TXT		EXHAUST OVERTEMPERATURE TRIP
122		L86TFB		EXHAUST THERMOCOUPLES OPEN TRIP
123		L30SPTA		EXHAUST THERMOCOUPLE TROUBLE
124		L30SPA		COMBUSTION TROUBLE
125		L30SPT		HIGH EXHAUST TEMPERATURE SPREAD TRIP
126		L39VD3_ALM		VIBRATION START INHIBIT
127		L39VTX_ALM		HIGH VIBRATION TRIP OR SHUTDOWN
128		L39VD1		VIBRATION SENSOR DISABLED
129		L39VF		VIBRATION TRANSDUCER FAULT
130		L39VA		HIGH VIBRATION ALARM
131		L39VDIFF		VIBRATION DIFFERENTIAL TROUBLE
132		L3GRVFLT		GAS RATIO VALVE POSITION SERVO TROUBLE
133		L3GCVFLT		GAS CONTROL VALVE SERVO TROUBLE
134		L3GFIVP		GAS FUEL INTERVALVE PRESSURE TROUBLE
135		L63FGL_ALM		GAS FUEL PRESSURE LOW
136		L3LFLT		LIQUID FUEL CONTROL FAULT
137		L33FL_ALM		LIQUID FUEL STOP VALVE FAILURE TO OPEN

138		L63LF1H_ALM		LIQUID FUEL FILTER DIFF PRESSURE HIGH
139		L63LF2H_ALM		DISTILLATE FUEL FILTER DIFF PRESS HIGH
140		L26FD1H_ALM		DISTILLATE FUEL TEMPERATURE HIGH
141		L63ADL_ALM		ATOMIZING AIR DIFFERENTIAL PRESSURE LOW
142		L26AAH_ALM		ATOMIZING AIR TEMPERATURE HIGH
143		L86S		AUTO SYNCHRONIZING LOCKOUT
144		L27BN_ALM		BUS UNDERVOLTAGE - NO AUTO SYNCH
145		L3Z		FAILURE TO SYNCHRONIZE
146		L26SFH_ALM		EXCITER RECTIFIER BRIDGE TEMP HIGH
147		L59EA_ALM		EXCITER OVERVOLTAGE ALARM
148		L49GH_ALM		GENERATOR STATOR TEMPERATURE HIGH
149		L86TGT_ALM		GENERATOR DIFFERENTIAL LOCKOUT TRIP
150		L52G_ALM		GENERATOR BREAKER TRIPPED
151		L64F_ALM		GENERATOR FIELD GROUND
152		L71WG_ALM		LIQUID DETECTED IN GENERATOR
153		L63BQL_ALM		GENERATOR BEARING VACUUM LOW
154		L63CA3L_ALM		GEN AIR FILTER CLEANER PRESSURE LOW
155		L63GFH_ALM		GENERATOR AIR FILTER HIGH PRESSURE DROP
156		L33GCC_ALM		GENERATOR CO2 DOOR TROUBLE
157		L94GEN		GENERATOR VENTILATION TROUBLE SHUTDOWN
158		L63CT5L_ALM		GENERATOR PURGE CO2 PRESSURE LOW
159		L72ESZ_ALM		EMERGENCY SEAL OIL PUMP RUNNING
160		L52QS_ALM		AUXILIARY SEAL OIL PUMP RUNNING
161		L63SAL_ALM		SEAL OIL DIFF. PRESSURE LOW
162		L63STX_ALM		SEAL OIL PRESS. SHUTDOWN SWITCH TROUBLE
163		L71SDH_ALM		SEAL OIL DRAIN LIQUID LEVEL HIGH
164		L71WGH_ALM		GENERATOR CASING LIQUID LEVEL HIGH
165		L43HPA_ALM		GEN PURGE SYSTEM ON MANUAL CONTROL
166		L27GHN_ALM		HYDROGEN CONTROL PANEL UNDERVOLTAGE
167		L63GKL_ALM		GENERATOR CASING HYDROGEN PRESS. LOW
168		L63GL_GH_ALM		HYDROGEN PRESSURE HIGH OR LOW (GEN)
169		L63HHL_ALM		HYDROGEN PRESSURE LOW (SKID)
170		L30HP		HYDROGEN PURITY TROUBLE
171		L94H_ALM		GENERATOR HYDROGEN PURGE SHUTDOWN
172		L33BS_ALM		#3 DRAIN VALVE POSITION TROUBLE
173		L30WSA1		WHEELSPACE TEMP DIFFERENTIAL HIGH
174		L30WSA2		WHEELSPACE TEMPERATURE HIGH
175		L45FAX_ALM		FIRE PROTECTION SYSTEM INOPERATIVE
176		L45FTX2_ALM		FIRE IN ZONE #1
177		L45FTX1_ALM		FIRE IN ZONE #2
178		L27MC1N_ALM		MCC UNDERVOLTAGE
179		L49X_ALM		AUXILIARY MOTOR OVERLOAD
180		L27QEL_ALM		DC MOTOR UNDERVOLTAGE (LUBE OIL)
181		L27ESL_ALM		DC MOTOR UNDERVOLTAGE (SEAL OIL)
182		L27BLN_ALM		BATTERY CHARGER AC UNDERVOLTAGE
183		L27VVN_ALM		BLACK START INVERTER TROUBLE
184		L26JS2H_ALM		WATER SKID ENCLOSURE TEMPERATURE HIGH
185		L26WR2L_ALM		WATER SKID ENCLOSURE TEMPERATURE LOW
186		L3WFLT_ALM		WATER FLOW SENSOR TROUBLE
187		L3WSFLT_ALM		WATER VALVE LVDT TROUBLE
188		L3WFD_ALM		WATER FLOW FEEDBACK TROUBLE
189		L60STLA_ALM		STEAM TEMPERATURE LOW
190		L60STLT_ALM		STEAM TEMPERATURE LOW LOCKOUT
191		L60STHA_ALM		STEAM TEMPERATURE HIGH
192		L60STHT_ALM		STEAM TEMPERATURE HIGH LOCKOUT
193		L60SPLA_ALM		STEAM PRESSURE LOW
194		L60SPLT_ALM		STEAM PRESSURE LOW LOCKOUT

195		L60SPHA_ALM		STEAM PRESSURE HIGH
196		L60SPHT_ALM		STEAM PRESSURE HIGH LOCKOUT
197		L60WL1_ALM		STEAM FLOW HIGH
198		L60WQPL_ALM		STEAM FLOW HIGH LOCKOUT
199		L3LFP_FLT		LIQUID FUEL PUMP CONTROL TROUBLE
200		L63QQ2H_ALM		TRIP OIL FILTER DIFF PRESSURE HIGH
201		L63QQ3H_ALM		COUPLING OIL FILTER DIFF PRESSURE HIGH
202		L63FLZ_ALM		LIQUID FUEL PRESSURE LOW
203		L63FLZ_FLT		FAILURE TO ESTABLISH LIQUID FUEL PRESS.
204		L94PGT		GAS FUEL NOZ PURGE SYSTEM TROUBLE TRIP
205		L63PGFT		GAS FUEL NOZ PURGE SYSTEM PRESSURE HIGH
206		L33PGFT		GAS FUEL NOZ PURGE VALVE FAIL TO CLOSE
207		L33PGO_ALM		GAS FUEL NOZ PURGE VALVE FAIL TO OPEN
208		L30HRX3		LOW HYDR. RATCHET FORWARD STROKE PRESS.
209		R5E_ALM		MANUAL TRIP - REMOTE
210		L90TKL		EXHAUST FRAME COOLING SYS TRBL - UNLOAD
211		L30AC_ALM		EVAPORATOR COOLER TROUBLE
212		L30AF_ALM		TURBINE INLET AIR TROUBLE
213		L52GA_ALM		GEN. IN. AIR DIRT SEPERATOR NOT RUNNING
214		L12HF		CONTROL SPEED SIGNAL LOSS - HP
215		L26GGF_ALM		GENERATOR RTD OUT OF LIMITS
216		L32DWF		GENERATOR WATTS TRANSDUCER FAILURE
217		L32DW_ALM		GENERATOR BREAKER TRIP - REVERSE POWER
218		L30EK_ALM		EXCITER RECT COOLING TROUBLE
219		L48WW		WATER WASH FLOW TROUBLE TRIP
220		L30WWX_ALM		WATER WASH COMPARTMENT TEMP HIGH/LOW
221		L86WWX_ALM		WATER WASH SKID CONTROL LOCKOUT
222		L30SPT5		EXCESSIVE COMBUSTION TROUBLE
223		L86GSVA		GAS SPLITTER VALVE CONTROL TROUBLE
224		L86GSVT		GAS SPLITTER VALVE TROUBLE - TRIP
225		L3GSVFLT		GAS SPLITTER VALVE POSITION TROUBLE
226		L86GTVA		GAS TRANSFER VALVE CONTROL TROUBLE
227		L86GTVT		GAS TRANSFER VALVE TROUBLE - TRIP
228		L3GTVFLT		GAS TRANSFER VALVE POSITION TROUBLE
229		L3GCVSFLT		SECONDARY GAS CONTROL VLV SERVO TROUBLE
230		L3GPVFLT		GAS PREMIX/TRIM VALVE SERVO TROUBLE
231		L86GPVA		GAS PREMIX/TRIM NOT TRACKING- ALARM
232		L86GPVT		GAS PREMIX/TRIM NOT TRACKING- TRIP
233		L3GCVQFLT		QUATENARY GAS CONTROL VLV SERVO TROUBLE
241		L12H_FLTALM		LOSS OF PROTECTIVE HP SPEED INPUTS
242		L3MP_ALM		MASTER PROTECTIVE START CHECK ETR FAULT
243		L4_FB_ALM		TCEA 4 RELAY CIRCUIT FDBK (EXTRNL TRIP)
244		L45FTX_ALM		FIRE!!!!!!!!!!!!
245		L33GCO_ALM		GEN FILTER BYPASS DOOR OR CO2 DOOR TRBL
246		L27GN_ALM		GENERATOR UNDERVOLTAGE
247		L2E_ALM		EXCITER UNDERVOLTAGE
248		L3COMBT_ALM		<C> TO <R> COMMUNICATIONS FAILURE TRIP
249		L86FQFBT_ALM		FLOW DIVIDER MAG PICKUP FAULT - TRIP
250		L3FQDIF_ALM		FLOW DIVIDER MAG PICKUP DIFF FAULT
251		L2SFTL_ALM		LIQUID FUEL FLOW EXCESSIVE TRIP
252		L2SFTG_ALM		GAS FUEL FLOW EXCESSIVE TRIP
253		L30TNH_DIF		TURBINE SPEED DIFF FAULT - ALARM
254		L86TVA_ALM		INLET GUIDE VANE POSITION TROUBLE ALARM
255		L86TVT_ALM		INLET GUIDE VANE POSITION TROUBLE TRIP
256		L86CBA_ALM		TURB COMP SURGE PROTECTION FAILURE-ALAR
257		L86CBT_ALM		TURB COMP SURGE PROTECTION FAILURE TRIP
258		L26BA1H_ALM		ACCESSORY COMPARTMENT TEMP HIGH ALARM

259		L74CR_ALM		DGP FAILURE - INITIATE SHUTDOWN
260		L74G1_ALM		DGP HAS TRIPPED 52G
261		L74A_ALM		DGP EXCESSIVE VOLTS PER HERTZ
262		L74B_ALM		DGP NEGATIVE SEQUENCING CURRENT
263		L74D_ALM		DGP SYSTEM OVERFREQUENCY
264		L74NC_ALM		DGP SELF TST FAILURE OR PWR SUPPLY TRBL
265		LVTFF_ALM		DGP VLTG XFMR FUSE FAIL-XFER TO MAN REG
266		L74G2_ALM		DGP SPARE LOGIC SIGNAL
267		L83DT1_ALM		DIESEL TEST MODE SELECTED
268		L30LTA		LUBE OIL BEARING DRAIN TEMPERATURE HIGH
269		Q_ALM_SP_269		
270		Q_ALM_SP_270		
271		L86DWSFLT		ISOCH LOAD SHARING FDBK FAULT LOCKOUT
272		L26HG_ALM		GENERATOR AUXILIARY COMPT TEMP HIGH
273		L86N2_ALM		NORMAL STOP ELECTRICAL TROUBLE
274		L27X_ALM		GENERATOR CONTROL PANEL UNDERVOLTAGE
275		L38QA1_ALM		TURBINE BEARING #1 DRAIN TEMP TROUBLE
276		L38QA2_ALM		TURBINE BEARING #2 DRAIN TEMP TROUBLE
277		L38QA3_ALM		GENERATOR BEARING DRAIN TEMP TROUBLE
278		L38LG_ALM		RED GEAR BEARING DRAIN TEMP TROUBLE
279		L38QA_ALM		TURBINE THRUST BEARING DRAIN TEMP HIGH
280		L71GH_ALM		CONDENSATE LEVEL HIGH
281		L86T_ALM		TRANSFORMER TROUBLE
282		L63_4FDY_ALM		FUEL SKID TROUBLE
283		L59VHZ_ALM		EXCESSIVE VOLTS PER HERTZ
284		L27M1_ALM		VOLTAGE UNBALANCE
285		L45HTX_ALM		HAZARDOUS GAS DETECTED
286		L27FP_ALM		FIRE PROTECTION CTRL CKT UNDERVOLTAGE
287		L33AF_ALM		TURBINE INLET AIR FILTER TROUBLE
288		LFUCV_ALM		EXCITER TROUBLE - BLOWN FUSE
289		LLSHH_765_AL		LIMIT SWITCH LLSHH_765 TRIP

INDIANOLA MUNICIPAL UTILITIES

TURBINE 8

CONTROL REPLACEMENT PROJECT

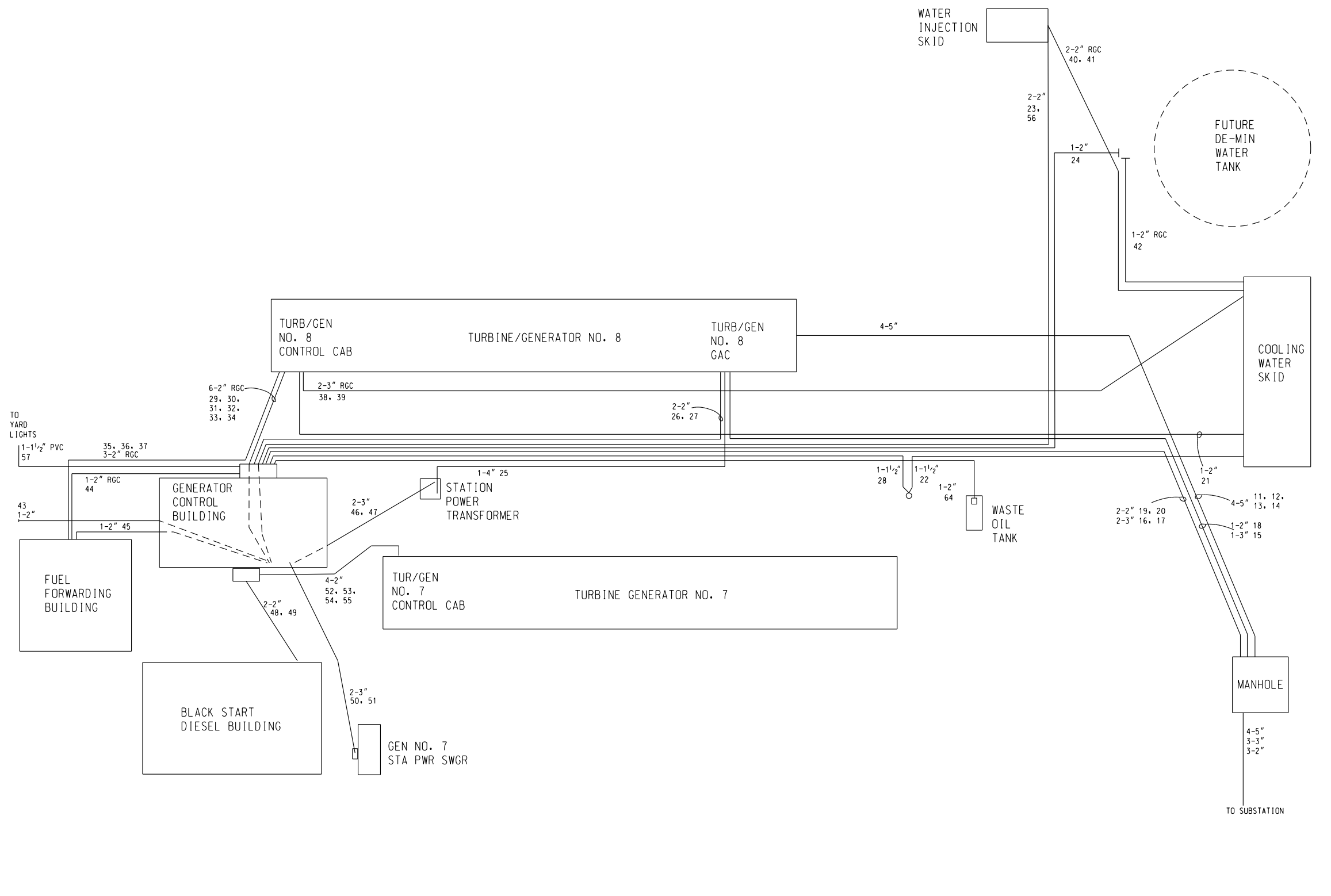
VOLUME 3

ORIGINAL INSTALLATION DRAWINGS



ISSUED FOR APPROVAL
OCTOBER 19, 2022

Appendix H - P & E Turbine Electrical Installation Drawings



	-	-						-	-										
	-	-						-	-										
	-	-						-	-										
	-	-						-	-										
REV	DATE	DES	DFTR	APP	DESCRIPTION					REV	DATE	DES	DFTR	APP	DESCRIPTION				

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

SCALE: NONE



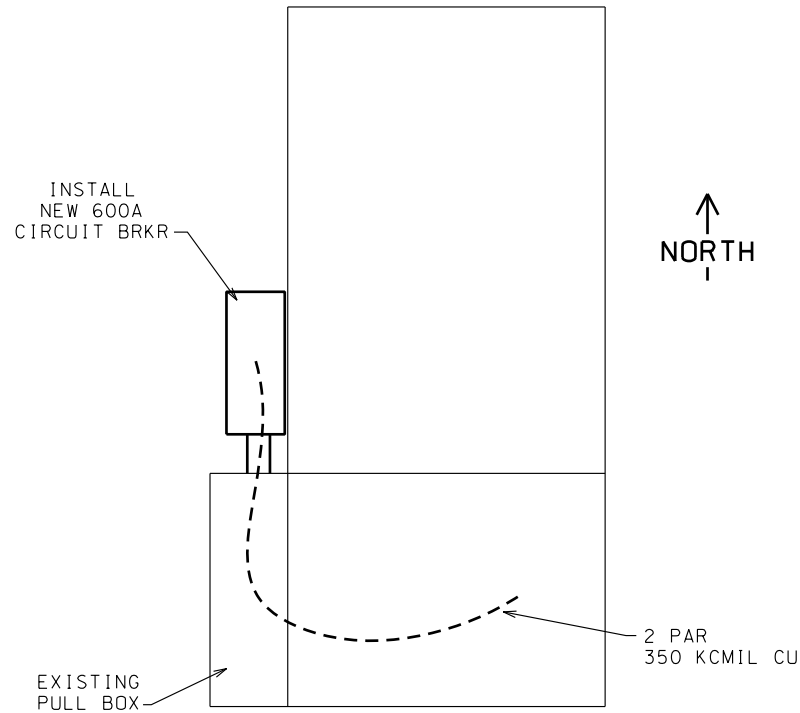
DATE 03-02-00
DESIGNED P&E
DRAWN P&E
APPROVED ARP
APPROVED

INDIANOLA MUNICIPAL UTILITIES

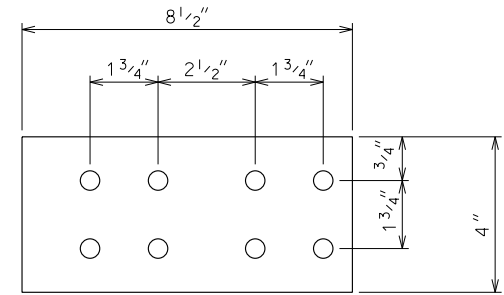
TURBINE GENERATOR NO. 8
CONDUIT SCHEMATIC

DWG NO

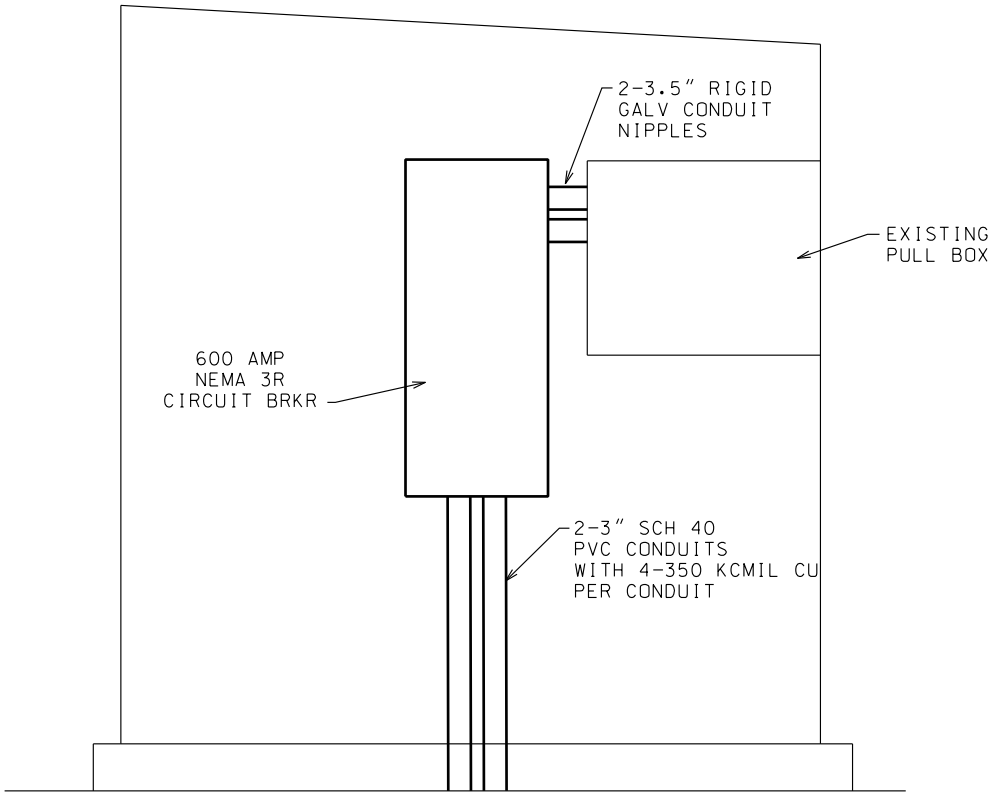
E-1



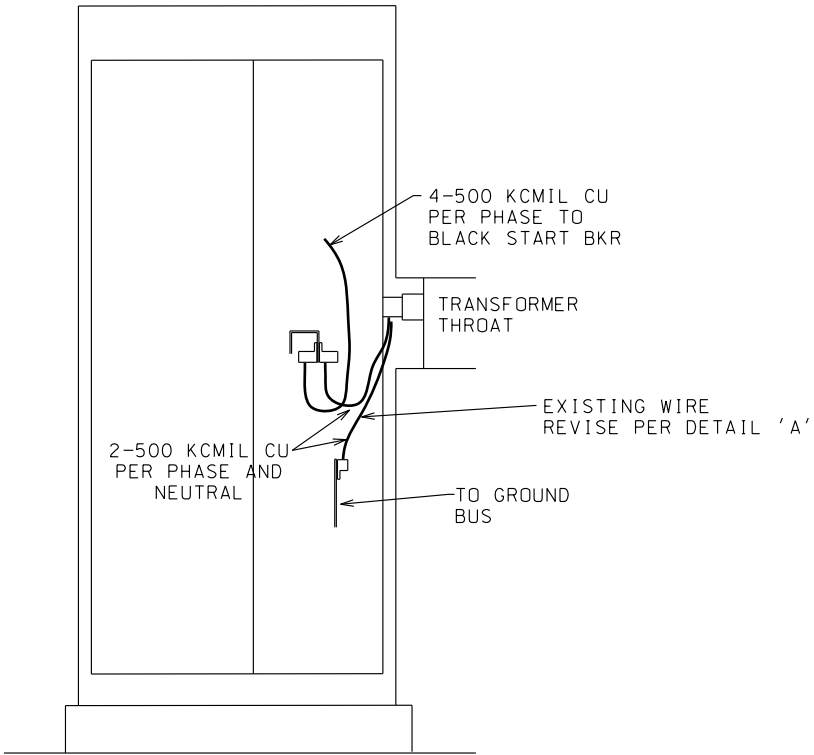
PLAN VIEW



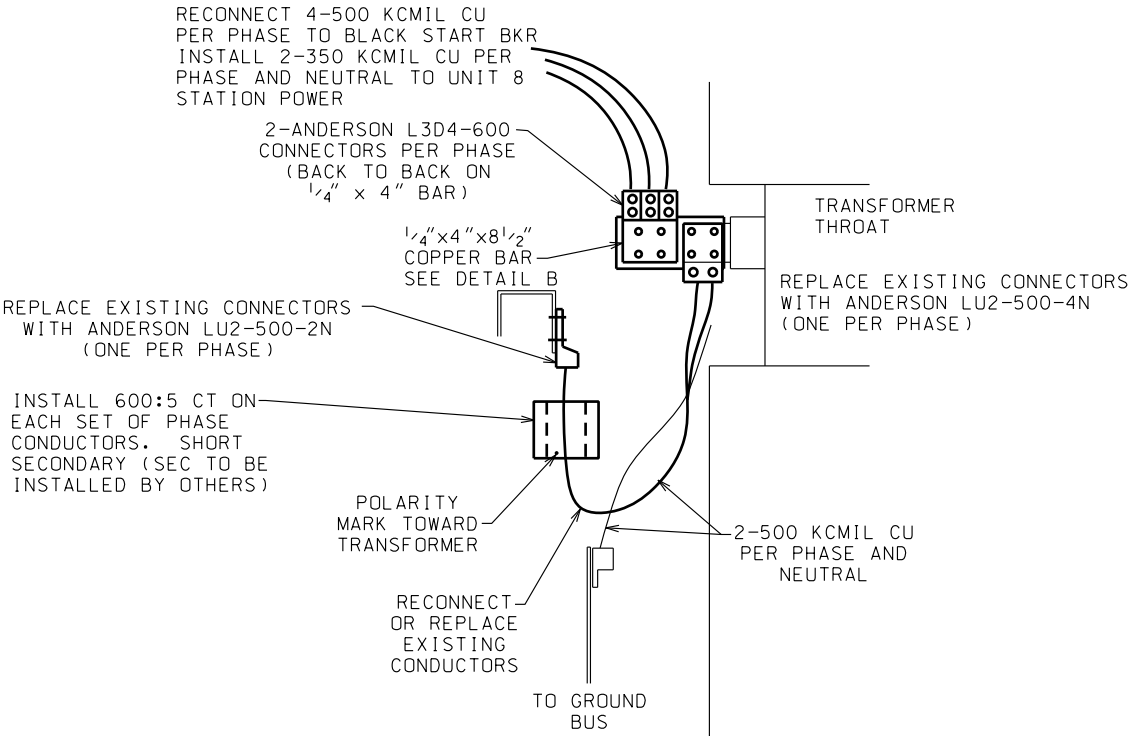
DETAIL B
BUS BAR DRILLING



ELEVATION VIEW
WEST SIDE



ELEVATION VIEW
SOUTH SIDE



DETAIL A
TRANSFORMER CONNECTIONS

INSTALLATION OF CIRCUIT BREAKER FOR TURBINE NO. 7 STATION POWER SWITCHGEAR

REV	DATE	DES	DFTR	APP	DESCRIPTION	REV	DATE	DES	DFTR	APP	DESCRIPTION
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
1	02-21-00	P&E	MRB	ARP	CHANGED 3.5" CONDUIT TO 3" CONDUIT						

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

SCALE N.T.S.

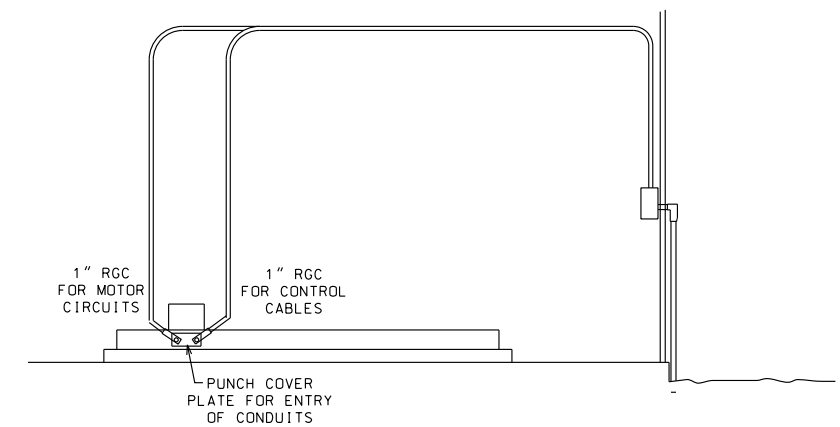
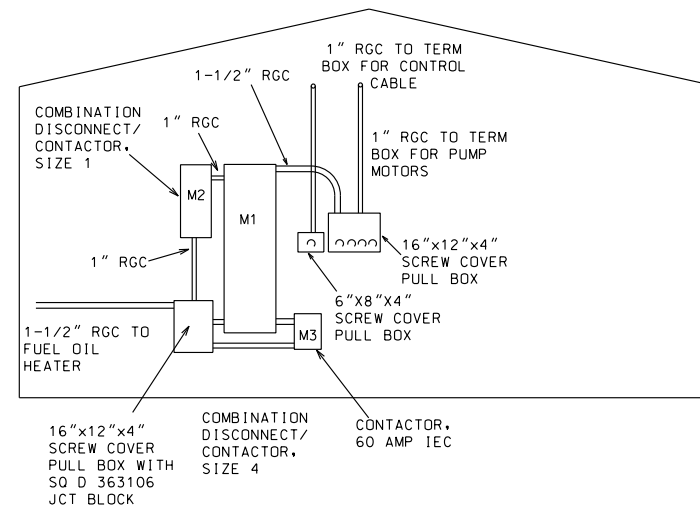
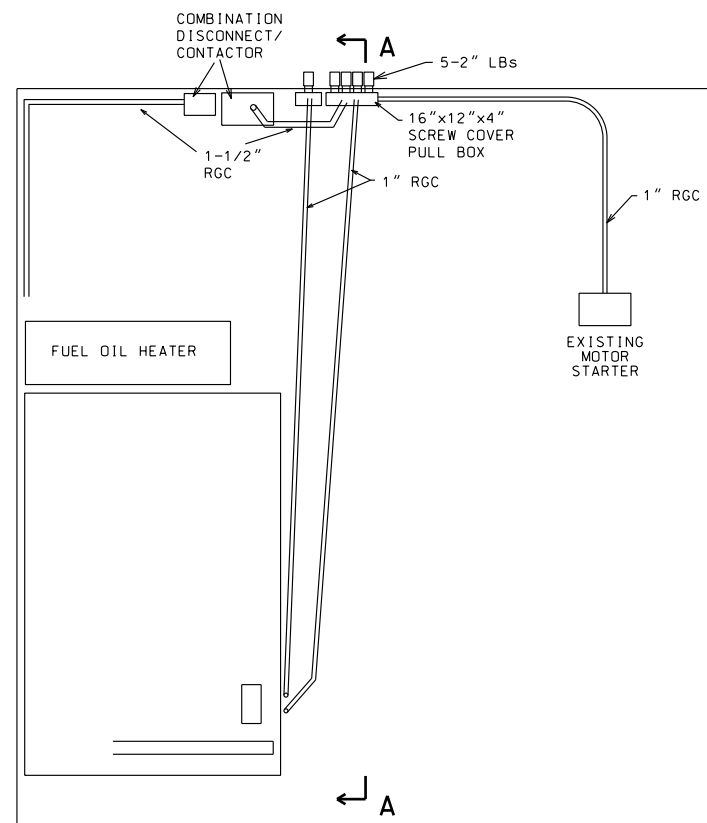


DATE 02-29-00
DESIGNED P&E
DRAWN P&E
APPROVED ARP
APPROVED ARP

INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR NO. 8
ELECTRICAL DETAILS

DWG NO

E-11



	-	-					-	-				
	-	-					-	-				
	-	-					02	10-31-00	P&E	MRB	ARP	AS CONSTRUCTED PER CONTRACTOR.
	-	-					01	05-09-00	P&E	ARP	ARP	ADDED CONTACTORS M2 AND M3
REV	DATE	DESG	DFTF	APP		DESCRIPTION	REV	DATE	DESG	DFTF	APP	DESCRIPTION

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

SCALE N.T.S.



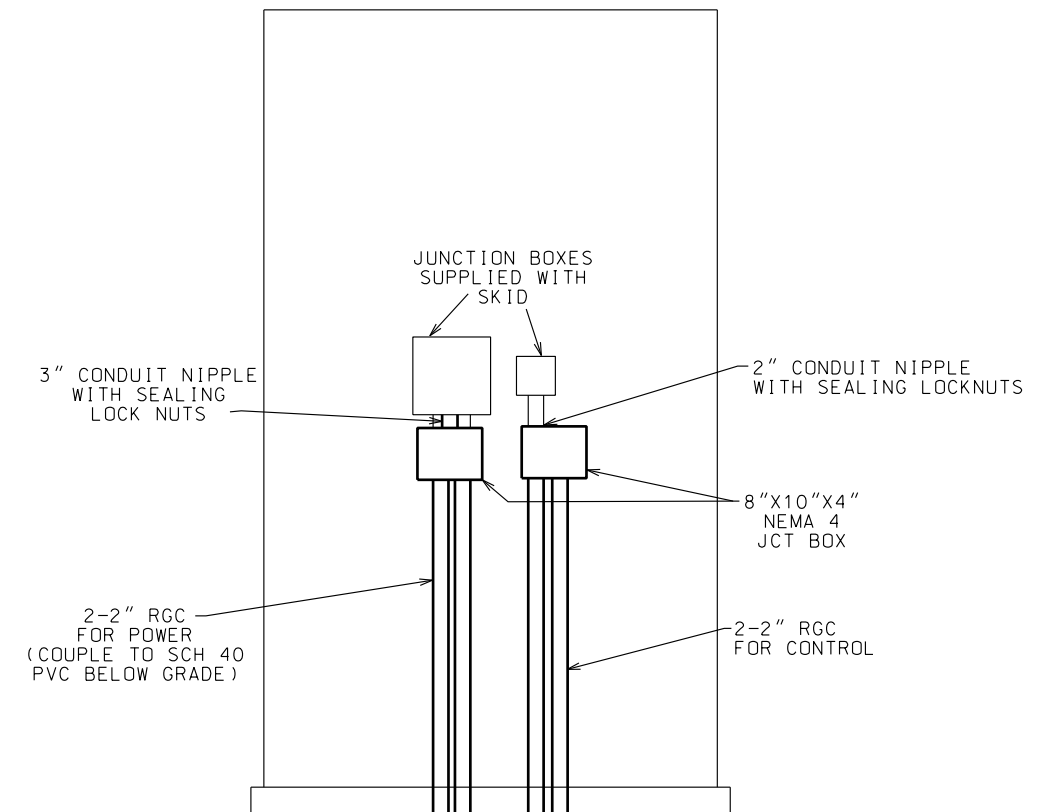
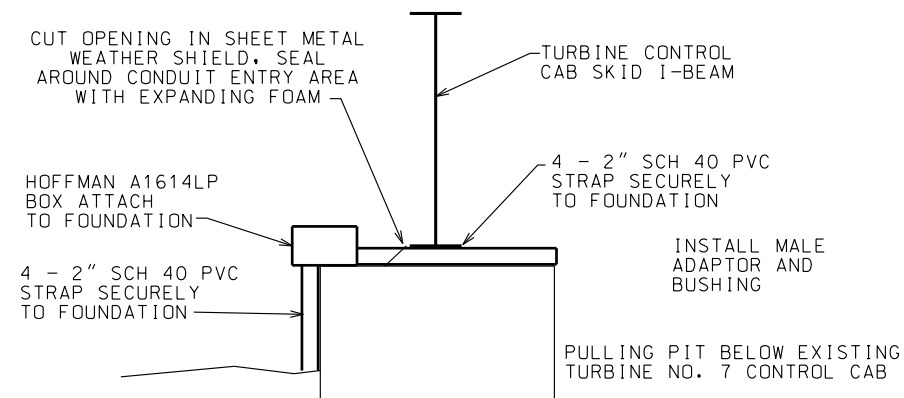
DATE	02-29-00
DESIGNED	P&E
DRAWN	P&E
APPROVED	ARP
APPROVED	

INDIANOLA MUNICIPAL UTILITIES

TURBINE GENERATOR NO. 8
ELECTRICAL DETAILS

DWG
NO

E-12



	-	-					-	-						
	-	-					-	-						
	-	-					-	-						
	-	-					-	-						
REV	DATE	DESIG	DFTR	APP		DESCRIPTION	REV	DATE	DESIG	DFTR	APP		DESCRIPTION	

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

SCALE N.T.S.



DATE	02-29-00
DESIGNED	P&E
DRAWN	P&E
APPROVED	ARP
APPROVED	

INDIANOLA MUNICIPAL UTILITIES

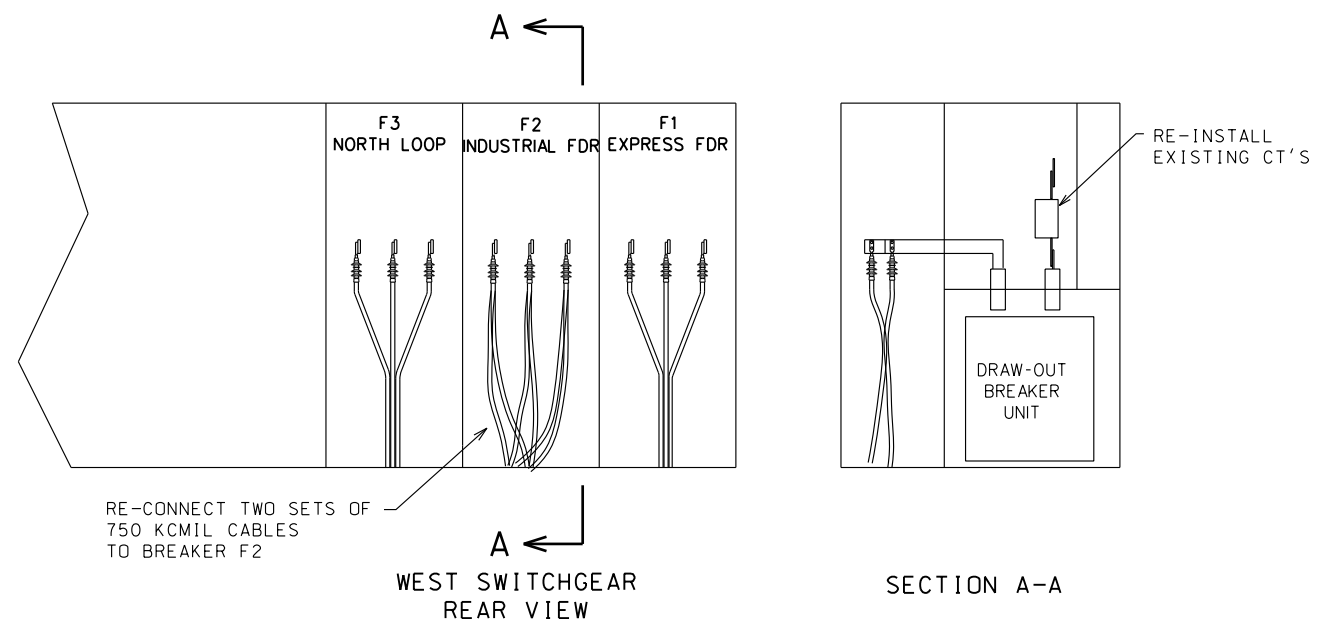
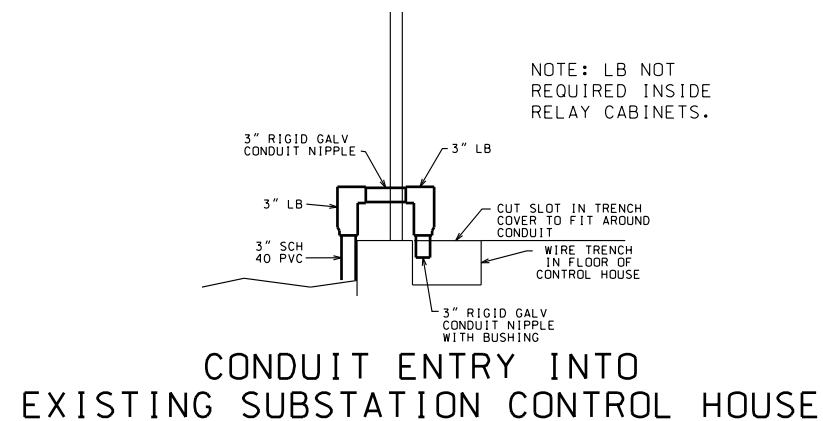
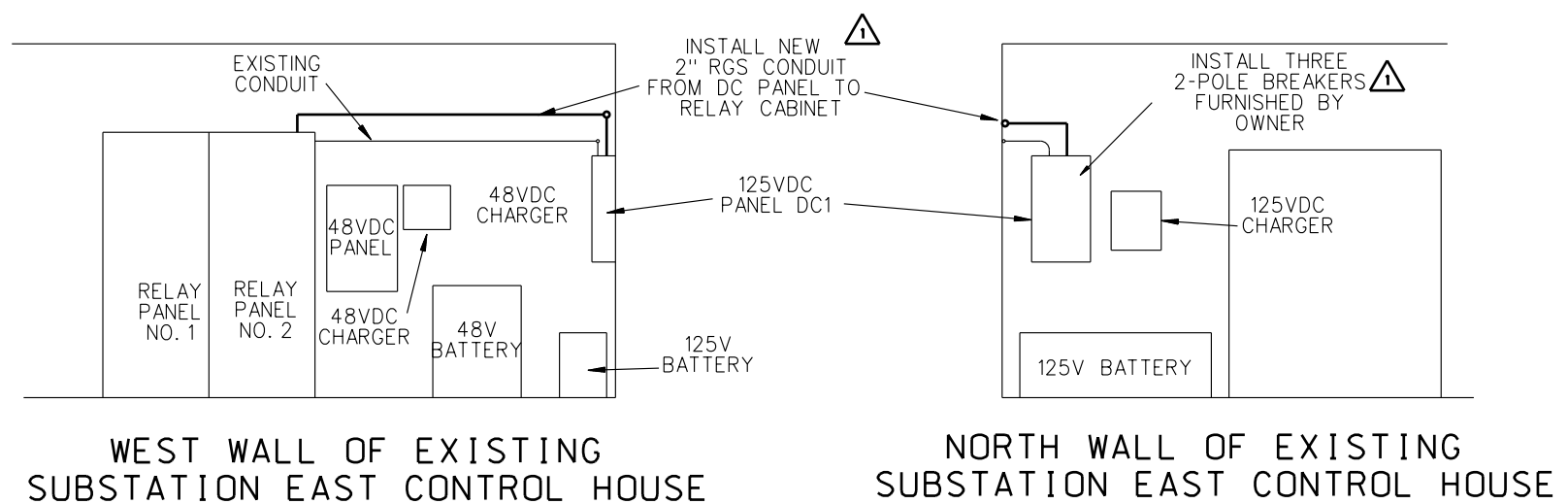
TURBINE GENERATOR NO. 8
ELECTRICAL DETAILS

DWG
NO

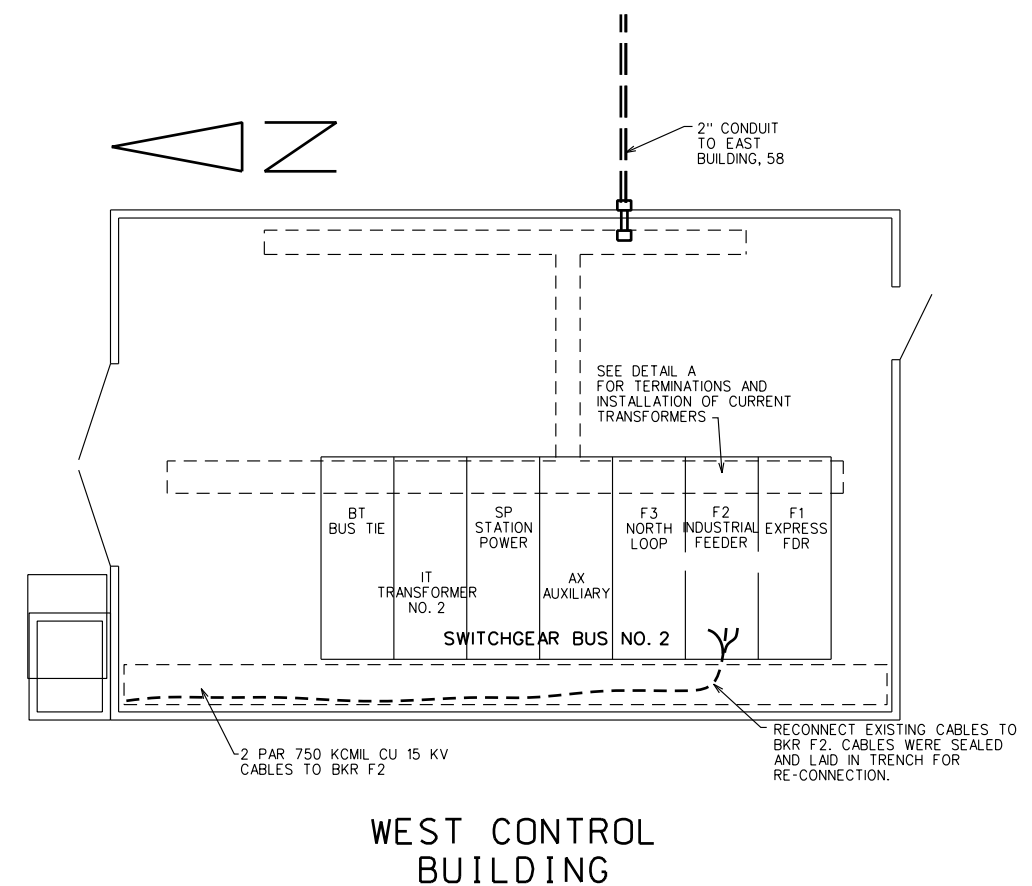
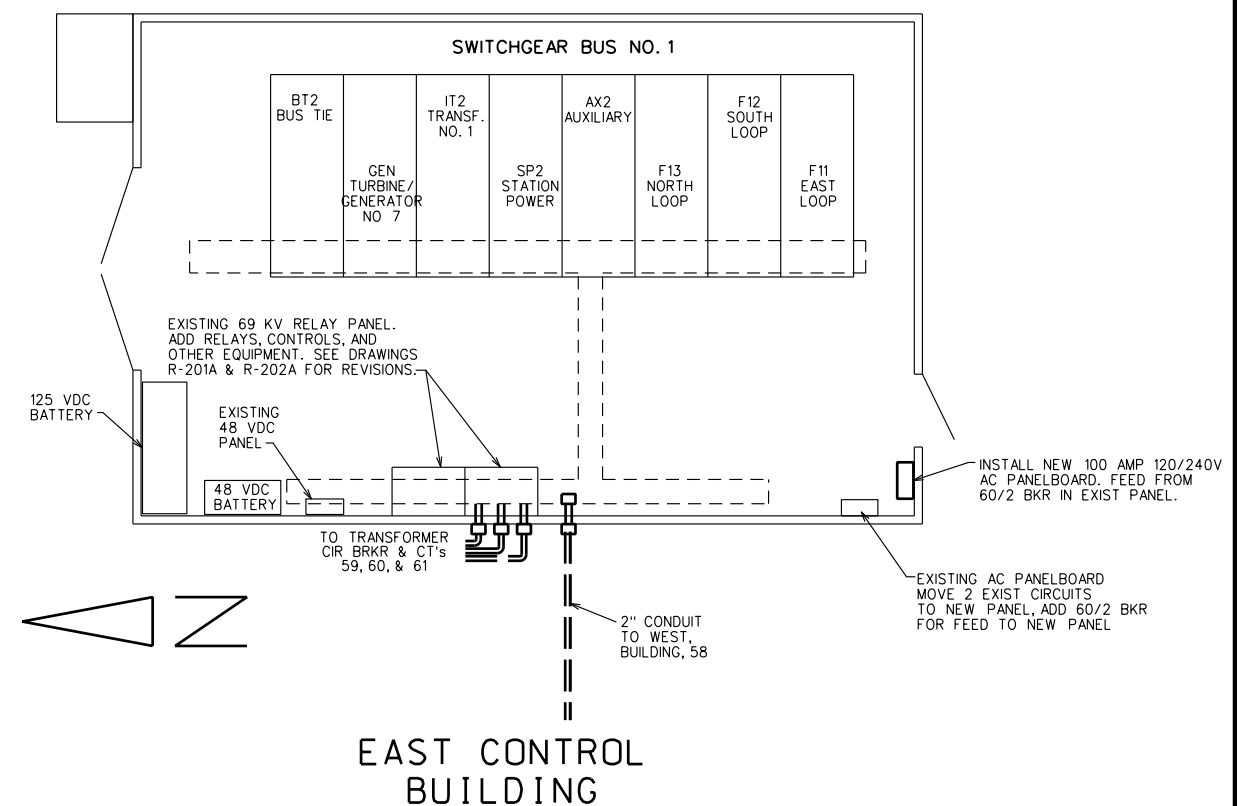
E-13



Page 34 of 41



**DETAIL A
WEST SWITCHGEAR
CABLE TERMINATION**



REV	DATE	DESG	DFTR	APP	DESCRIPTION	REV	DATE	DESG	DFTR	APP	DESCRIPTION
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
02	10-10-00	P&E	P&E	DLB	RECONNECT CABLES TO BRKR F2	01	05-22-00	P&E	P&E	DLB	ADD ELEVATIONS FOR EAST CONTROL HOUSE

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

SCALE: N.T.S.



DATE 03-01-00
DESIGNED P&E
DRAWN P&E
APPROVED ARP
APPROVED

INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR NO. 8
ELECTRICAL DETAILS
CONTROL BUILDINGS & SWITCHGEAR

DWG NO

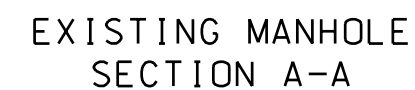
E-15



$\uparrow$ A



MAINTAIN 3" COVER OVER TOP
DUCT AT ENTRANCE TO MANHOLE.
THICKEN BOTTOM ENCASEMENT
AS NEEDED.



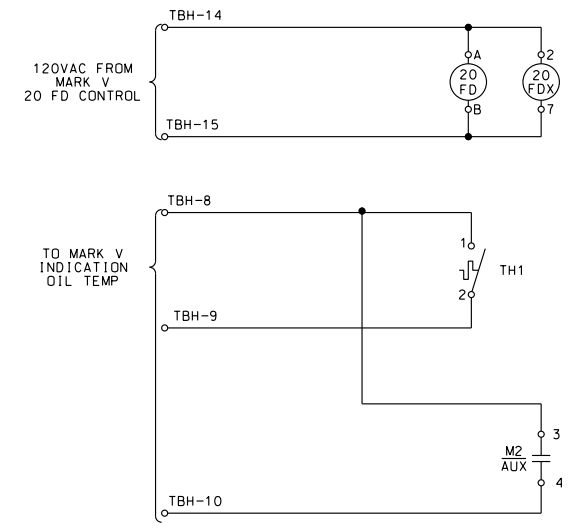
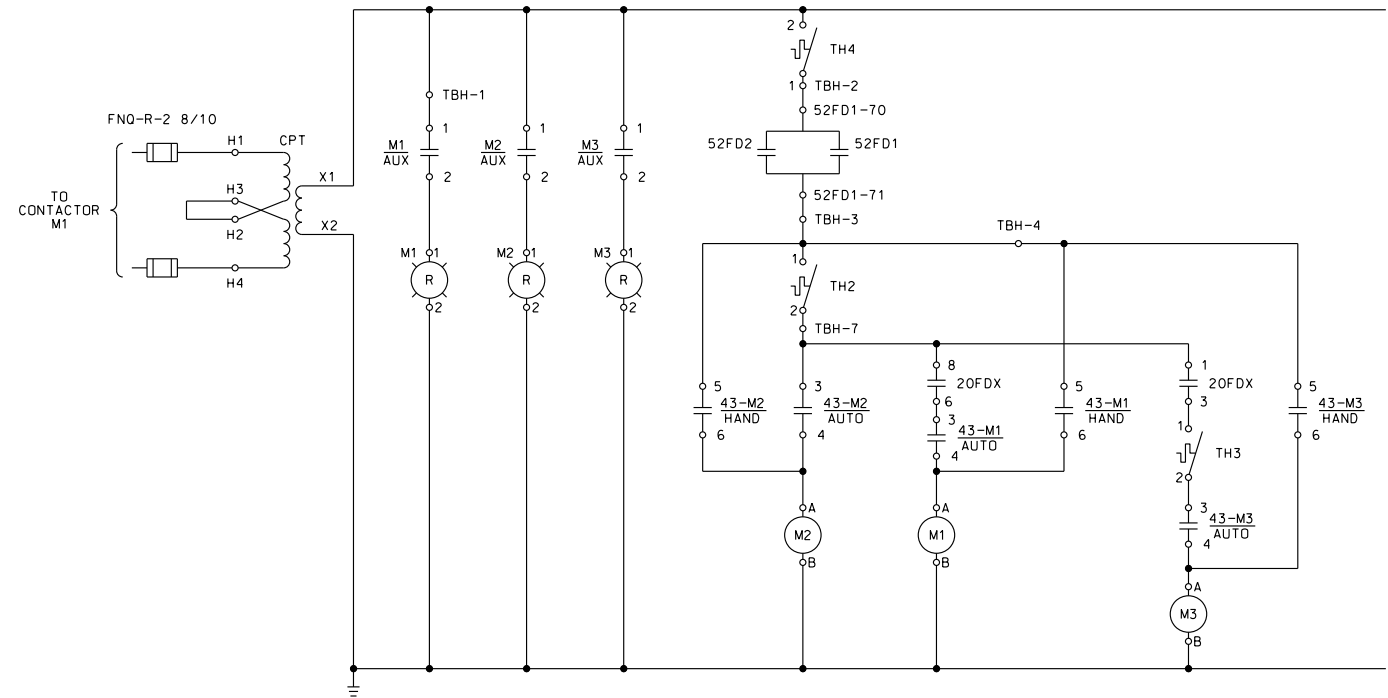
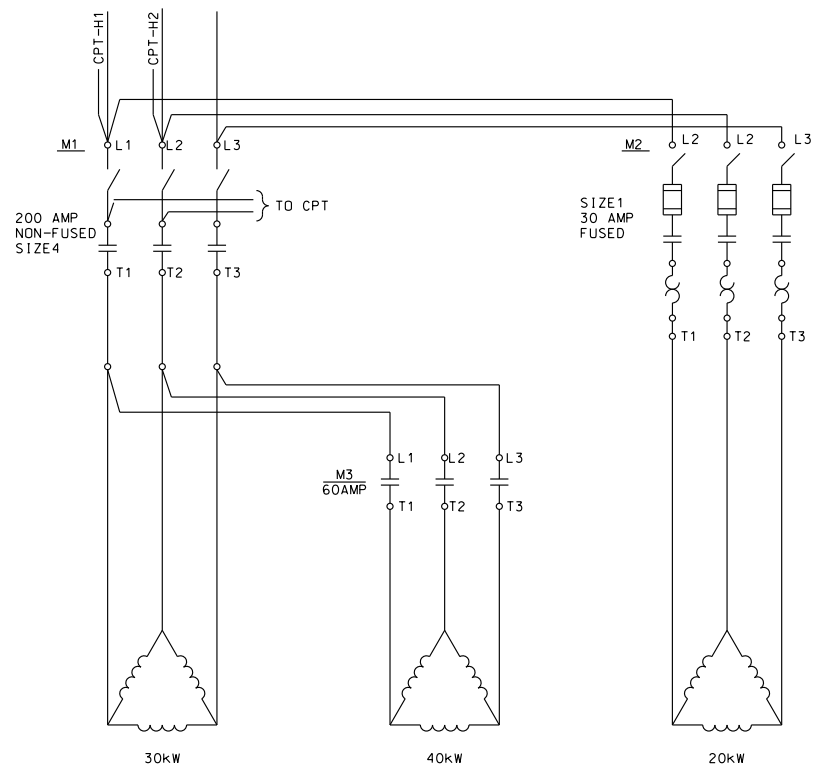
P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN



INDIANA MUNICIPAL UTILITIES
IMU
SUSTAINING THE QUALITY OF LIFE

DWG
NO

E-16



TH1 - THERMOSTAT AT HTR OUTLET
 25°
 TH2 - THERMOSTAT AT HTR OUTLET
 30°
 TH3 - THERMOSTAT AT HTR INLET
 0°
 TH4 - THERMOSTAT IN HEATER ENCLOSURE
 90°

SEE DWG E-55
FOR WIRING
DIAGRAM

REV	DATE	DES	DFTR	APP	DESCRIPTION	REV	DATE	DES	DFTR	APP	DESCRIPTION
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
02	10-31-00	P&E	MRB	ARP	AS CONSTRUCTED PER CONTRACTOR.	01	06-15-00	P&E	ARP	ARP	ADD THERMOSTAT TH4

P & E ENGINEERING CO.
 POWER SYSTEM ANALYSIS AND DESIGN
 SCALE



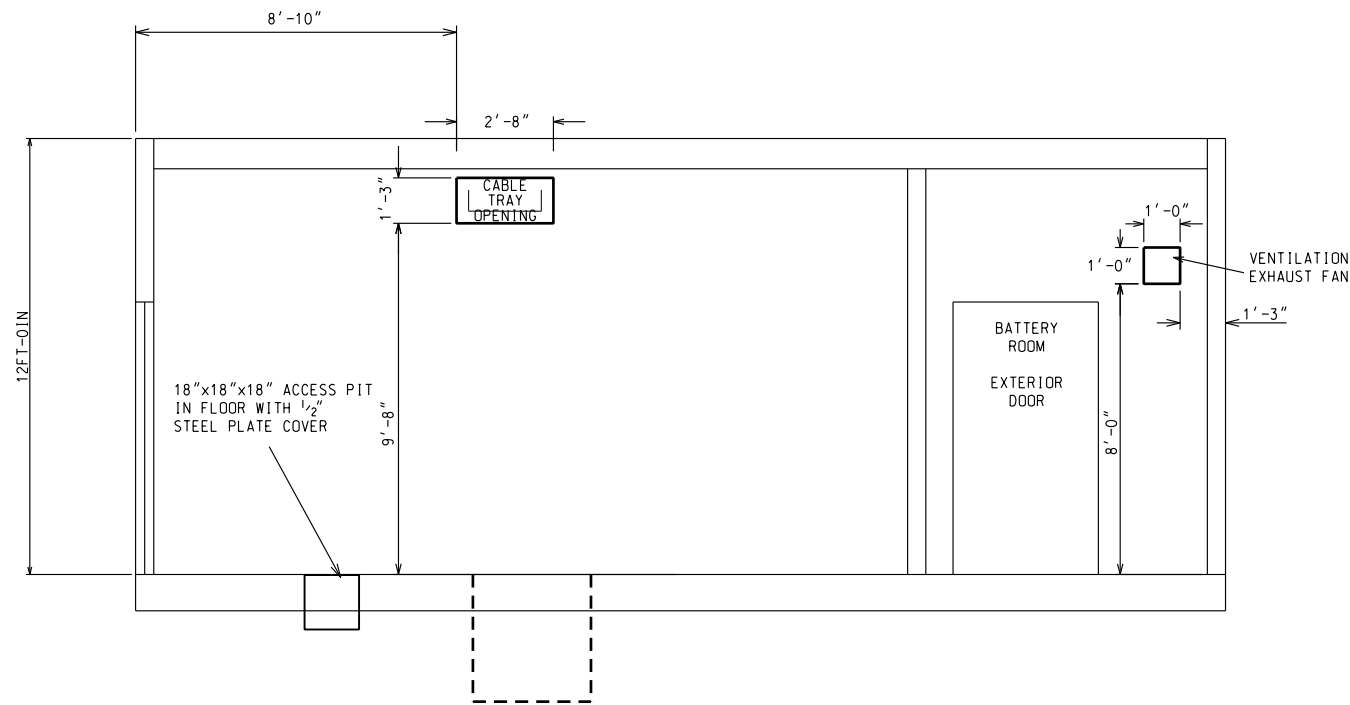
DATE 05-01-00
 DESIGNED P&E
 DRAWN MRB
 APPROVED ARP

INDIANOLA MUNICIPAL UTILITIES
 TURBINE GENERATOR NO 8
 FUEL OIL HEATER
 SCHEMATIC

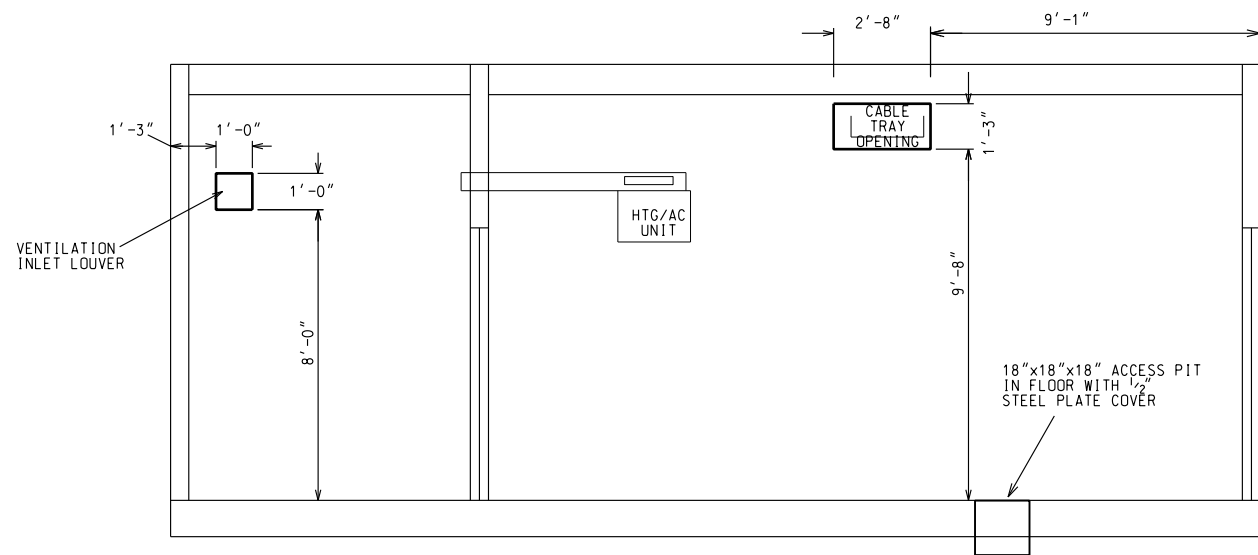
DWG NO
 E-19

E-20

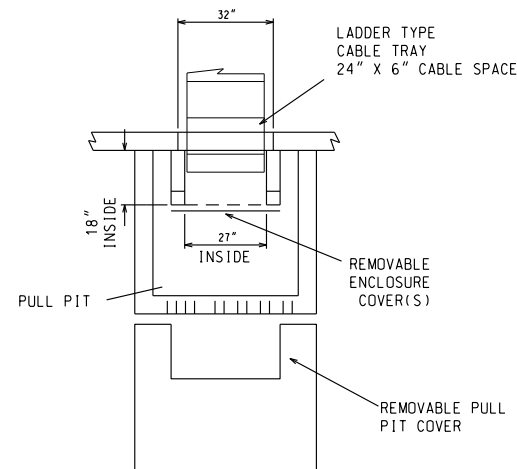




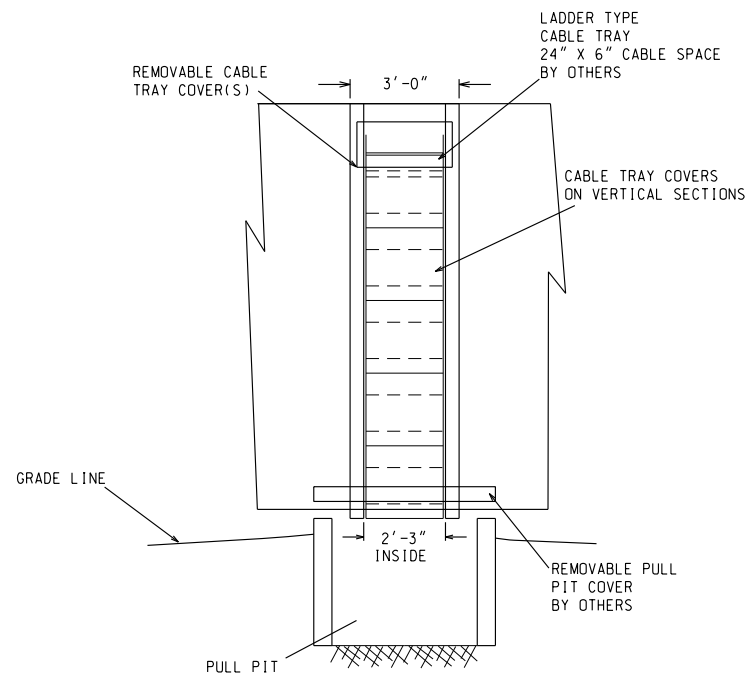
INSIDE SOUTH WALL
ELEVATION VIEW



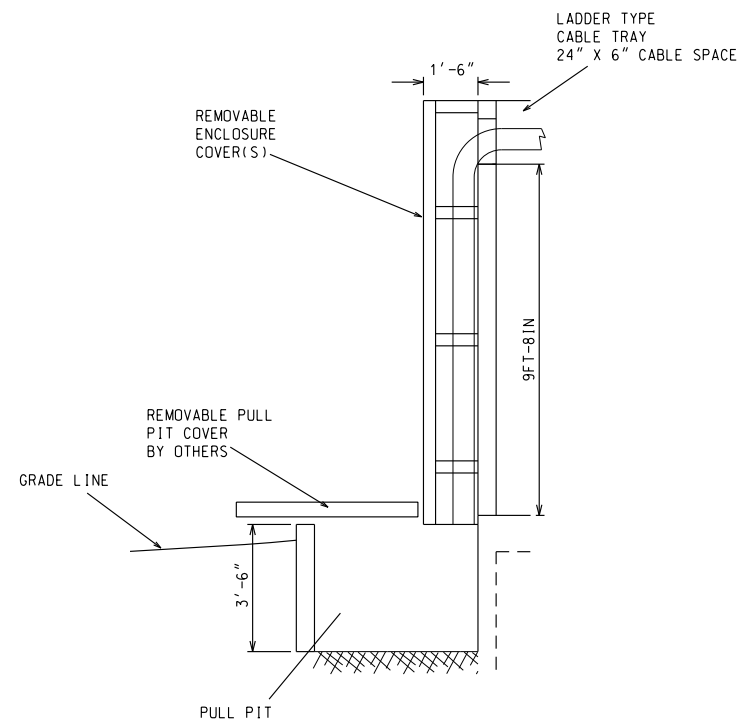
INSIDE NORTH WALL
ELEVATION VIEW



CABLE TRAY ENCLOSURE
DETAIL PLAN VIEW



CABLE TRAY ENCLOSURE
DETAIL FRONT ELEVATION VIEW



CABLE TRAY ENCLOSURE
DETAIL SIDE ELEVATION
SECTION VIEW

NOTES:

1. CABLE TRAY ENCLOSURE AND REMOVEABLE COVERS TO MATCH BUILDING EXTERIOR PANELS.
2. REMOVEABLE COVERS TO NOT EXCEED 45 LBS PER COVER SECTION.
3. BUILDING CONTRACTOR TO FRAME WALL OPENINGS FOR CABLE TRAY, EXHAUST FAN, INLET LOUVER, AND HTG/AC UNIT.

REV	DATE	DES	DFTR	APP	DESCRIPTION	REV	DATE	DES	DFTR	APP	DESCRIPTION
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
02	03-18-02	P&E	ARP	ARP	AS-BUILT REVISIONS	01	03-28-00	DLB	P&E		REVISE CABLE TRAY ELEVATION
01	03-28-00	DLB	P&E		REVISE CABLE TRAY ELEVATION						

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

SCALE 3/16" = 1' - 0"

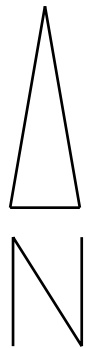
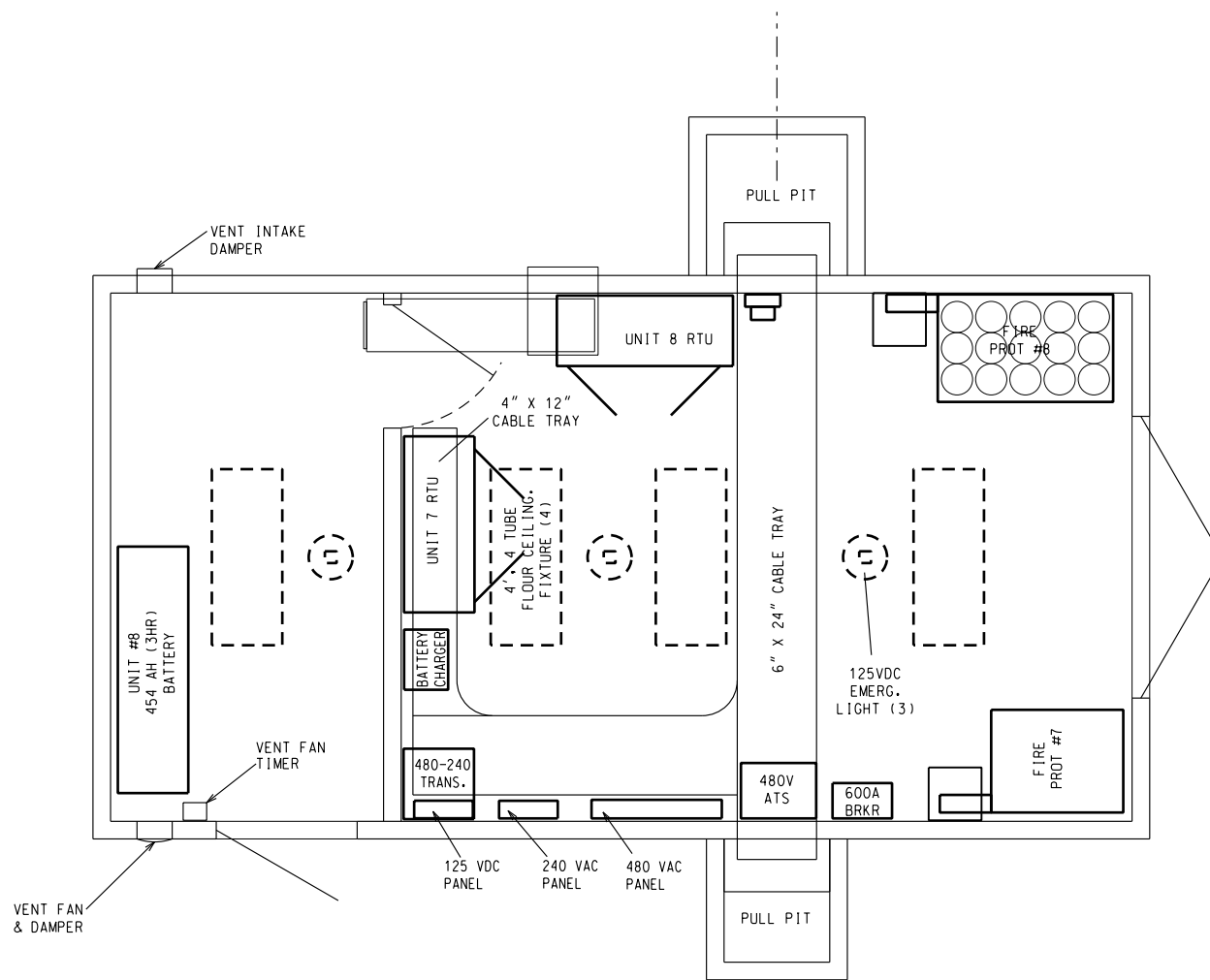


DATE 02-09-00
DESIGNED P&E
DRAWN RLW
APPROVED ARP
APPROVED

INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR CONTROL BUILDING
PHYSICAL ELEVATION & DETAILS

DWG NO

E-22



	-	-					-	-					
	-	-					-	-					
	-	-					-	-					
	-	-					01	03-18-02	P&E	ARP	ARP	AS-BUILT RECORD: WAS E-31	
REV	DATE	DESG	DFTR	APP	DESCRIPTION			REV	DATE	DESG	DFTR	APP	DESCRIPTION

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

SCALE 3/16" = 1'-0"

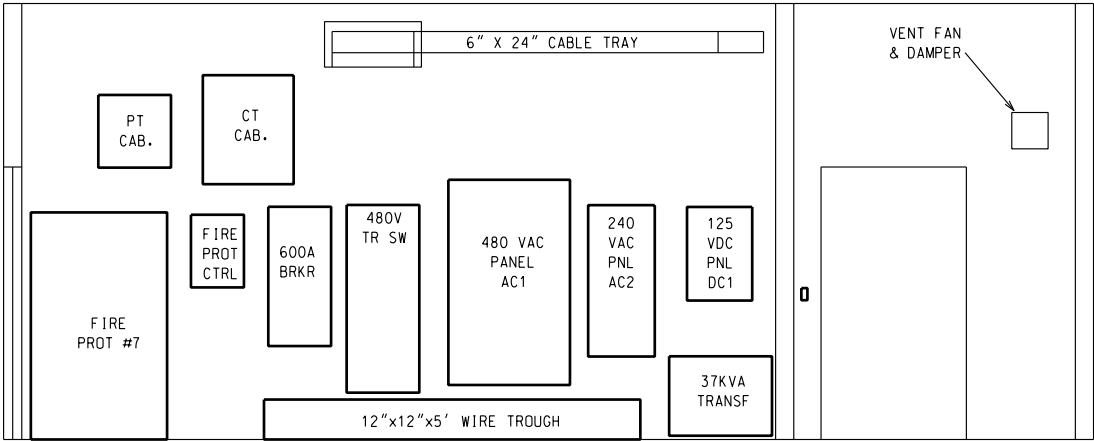


DATE	02-09-00
DESIGNED	P&E
DRAWN	RLW
APPROVED	ARP
APPROVED	

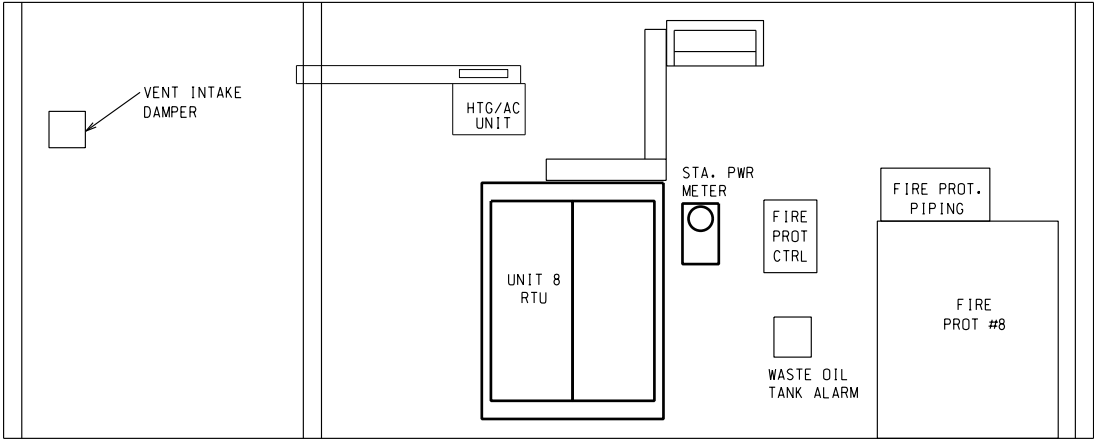
INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR NO 8
CONTROL BUILDING EQUIPMENT PLAN

DWG NO

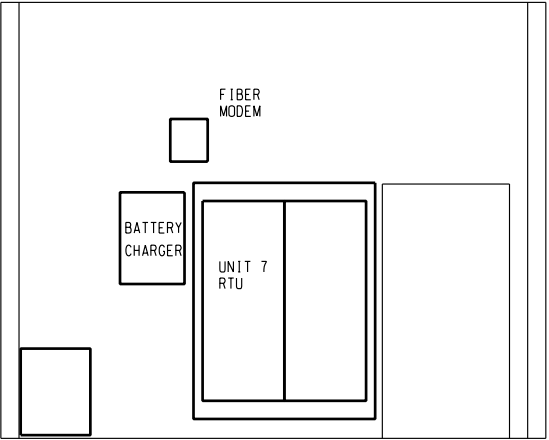
E-23



INSIDE SOUTH WALL
ELEVATION VIEW



INSIDE NORTH WALL
ELEVATION VIEW



EQUIPMENT ROOM WEST WALL
ELEVATION VIEW

	-	-					-	-						
	-	-					-	-						
	-	-					-	-						
	-	-					-	-						
REV	DATE	DESG	DFTR	APP		DESCRIPTION	REV	DATE	DESG	DFTR	APP		DESCRIPTION	

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

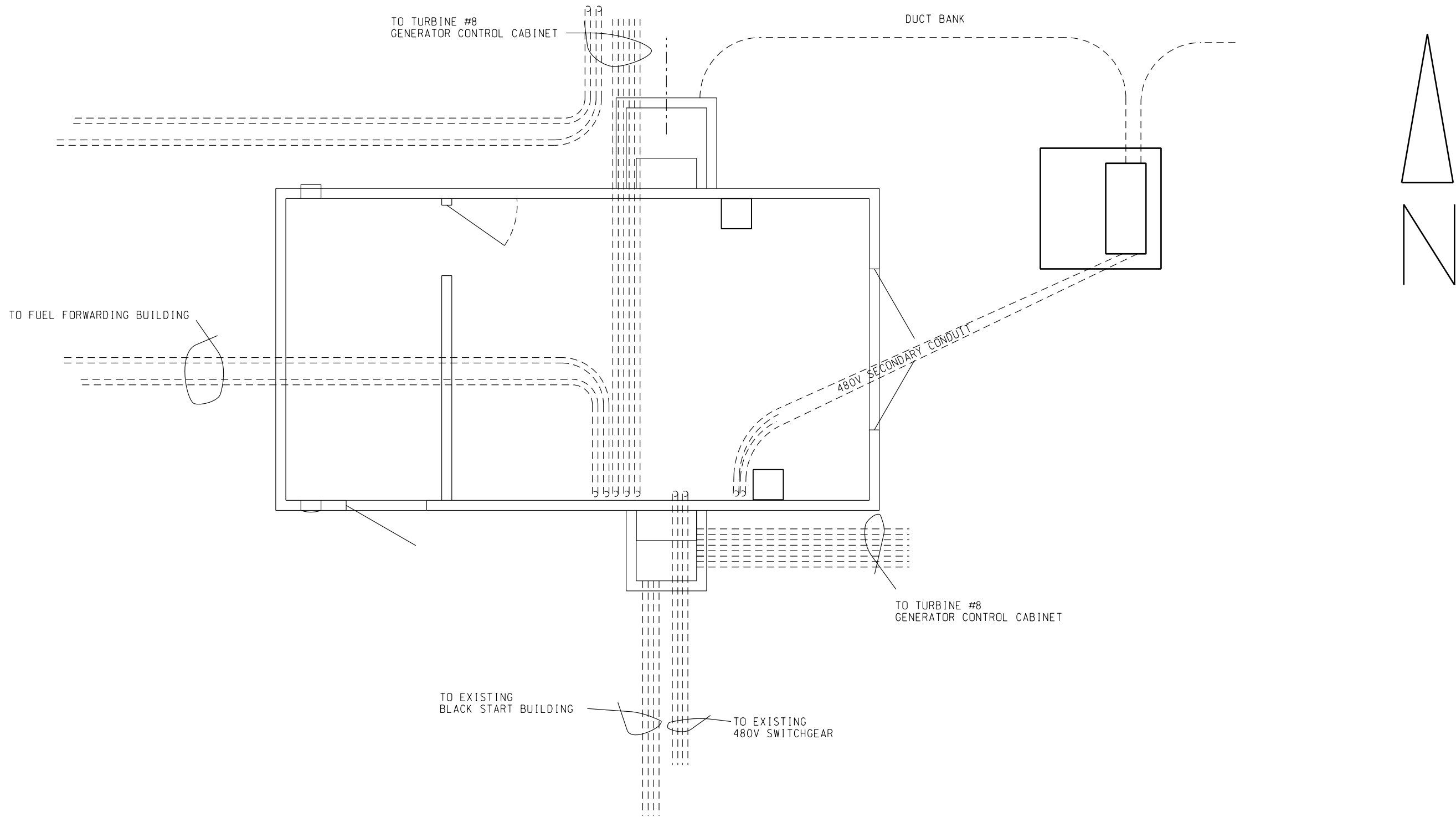


DATE 02-09-00
DESIGNED P&E
DRAWN RLW
APPROVED ARP
APPROVED

INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR CONTROL BUILDING
EQUIPMENT ELEVATIONS

DWG
NO

E-24



	-	-																	
	-	-																	
	-	-																	
	-	-																	
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P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

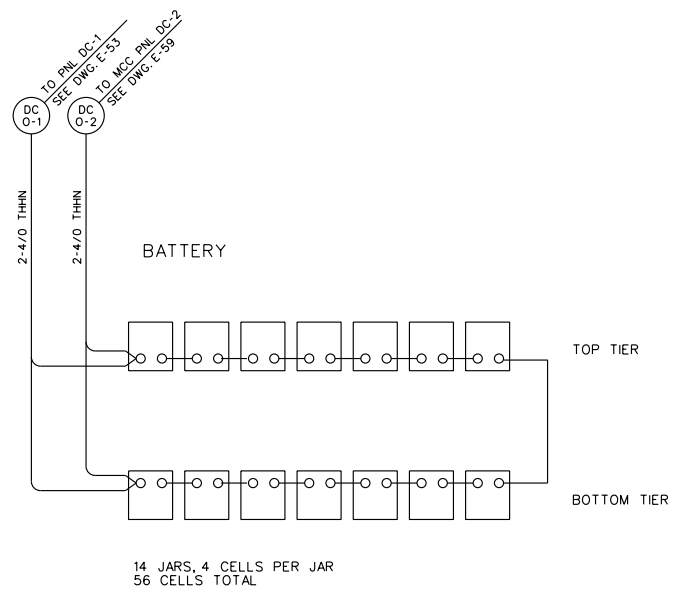
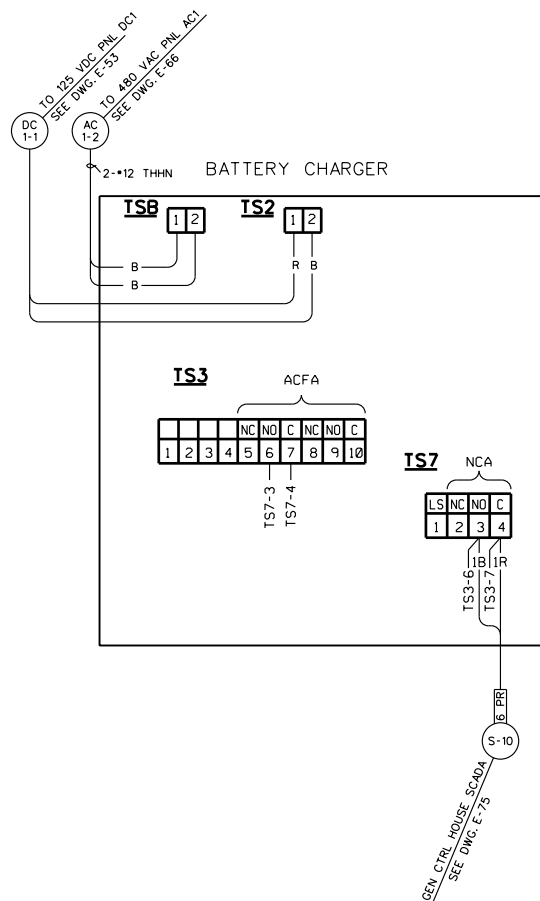
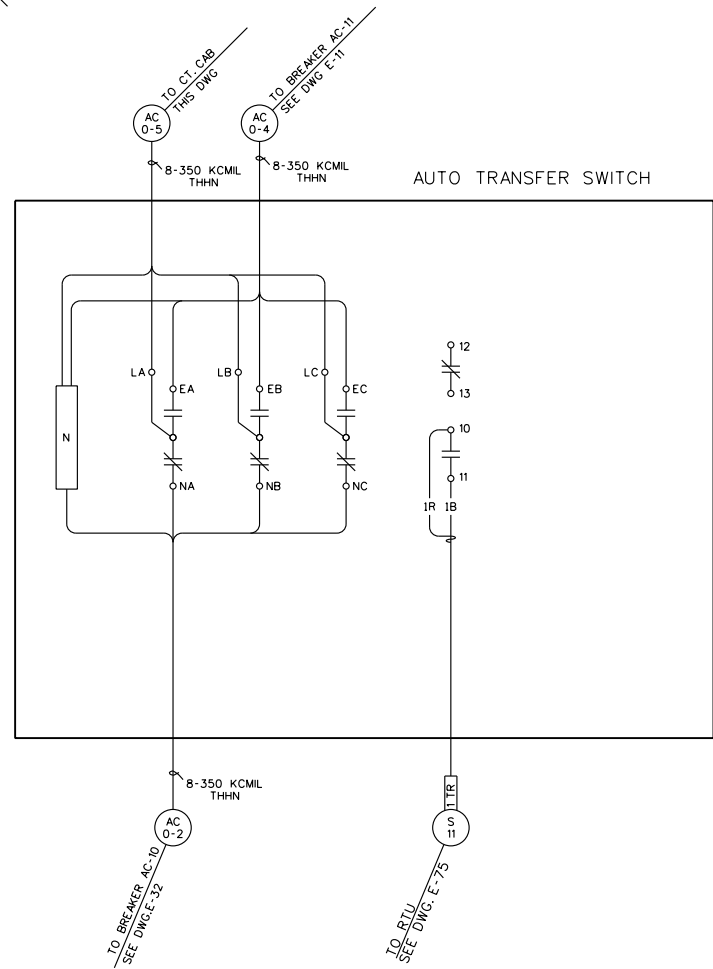
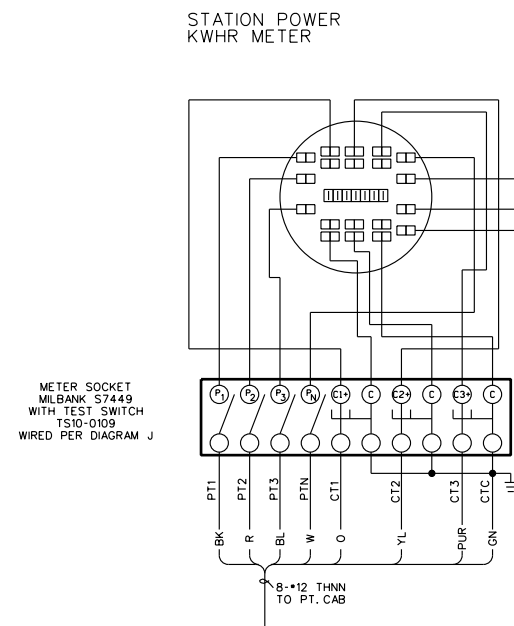
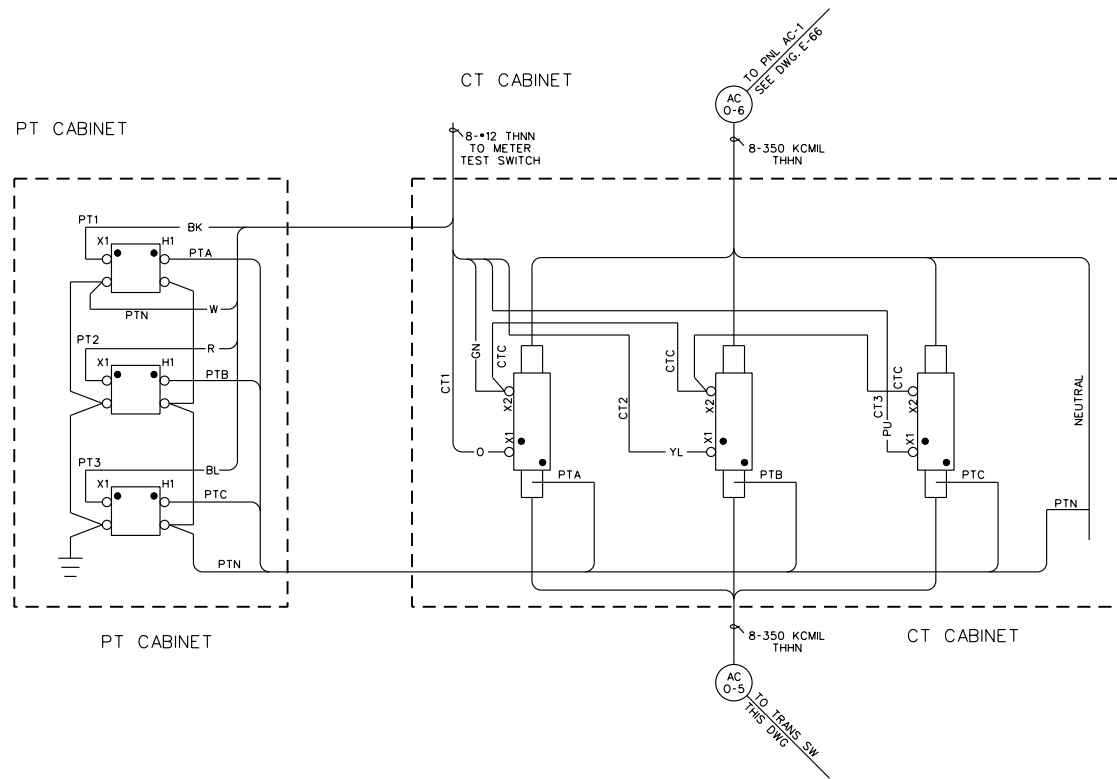


DATE 02-29-00
DESIGNED P&E
DRAWN RLW
APPROVED ARP
APPROVED

INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR CONTROL BUILDING
UNDERGROUND ELECTRICAL
& CONTROL CONDUIT LAYOUT

DWG
NO

E-35



REV	DATE	DES	DFTR	APP	DESCRIPTION	REV	DATE	DES	DFTR	APP	DESCRIPTION
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
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01	10-31-00	P&E	MRB	ARP	AS CONSTRUCTED PER CONTRACTOR						

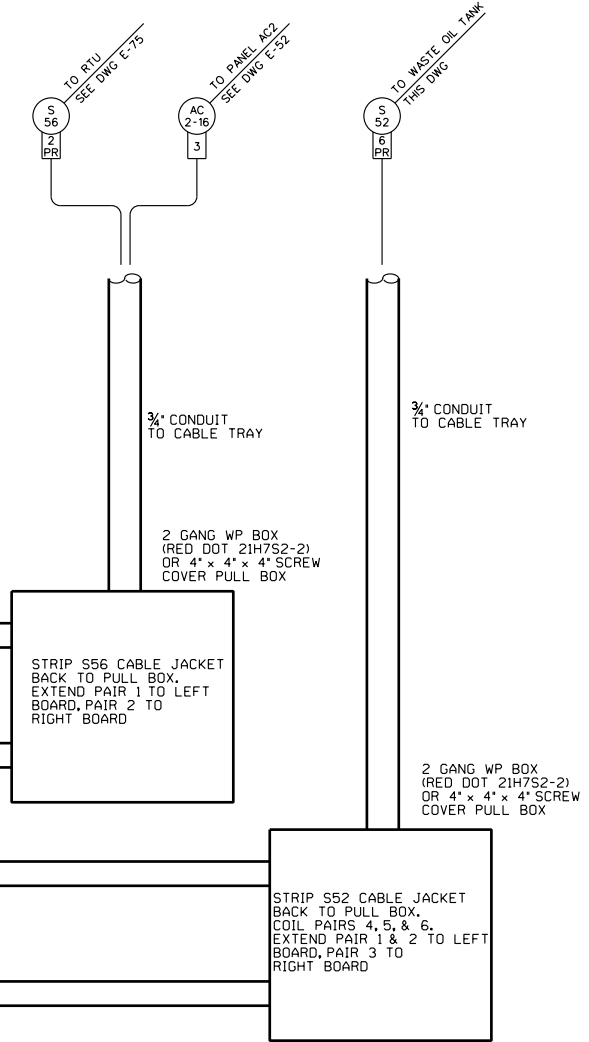
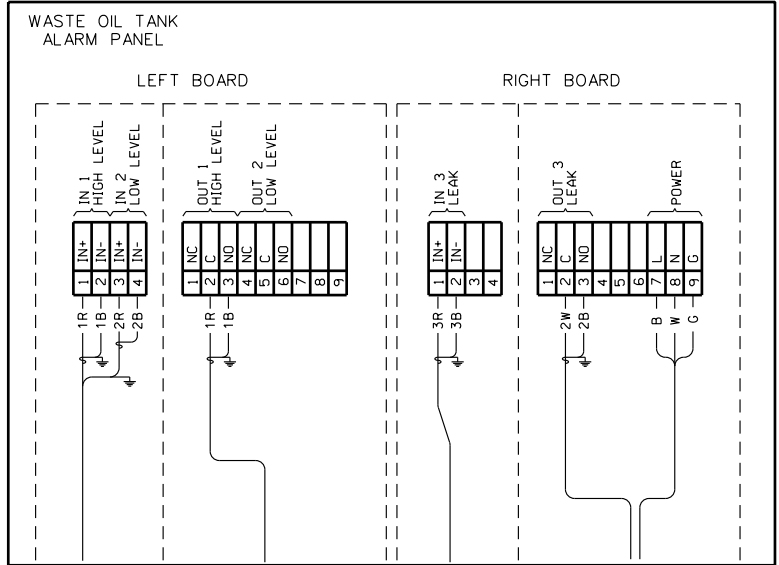
P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN
SCALE NONE



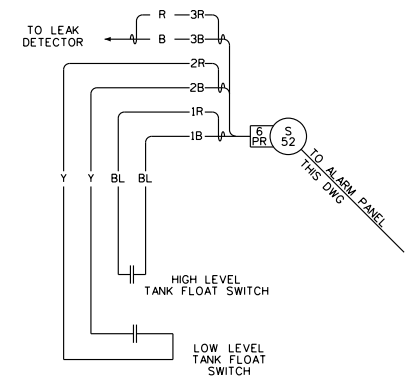
DATE 04-05-00
DESIGNED P&E
DRAWN MRB
APPROVED RLW
APPROVED

INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR NO 8
GENERATION CONTROL HOUSE
INTERCONNECTION WIRING DIAGRAM

DWG NO
E-51



ALARM PANEL



WASTE OIL TANK

REV	DATE	DESG	DFTR	APP	DESCRIPTION	REV	DATE	DESG	DFTR	APP	DESCRIPTION
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

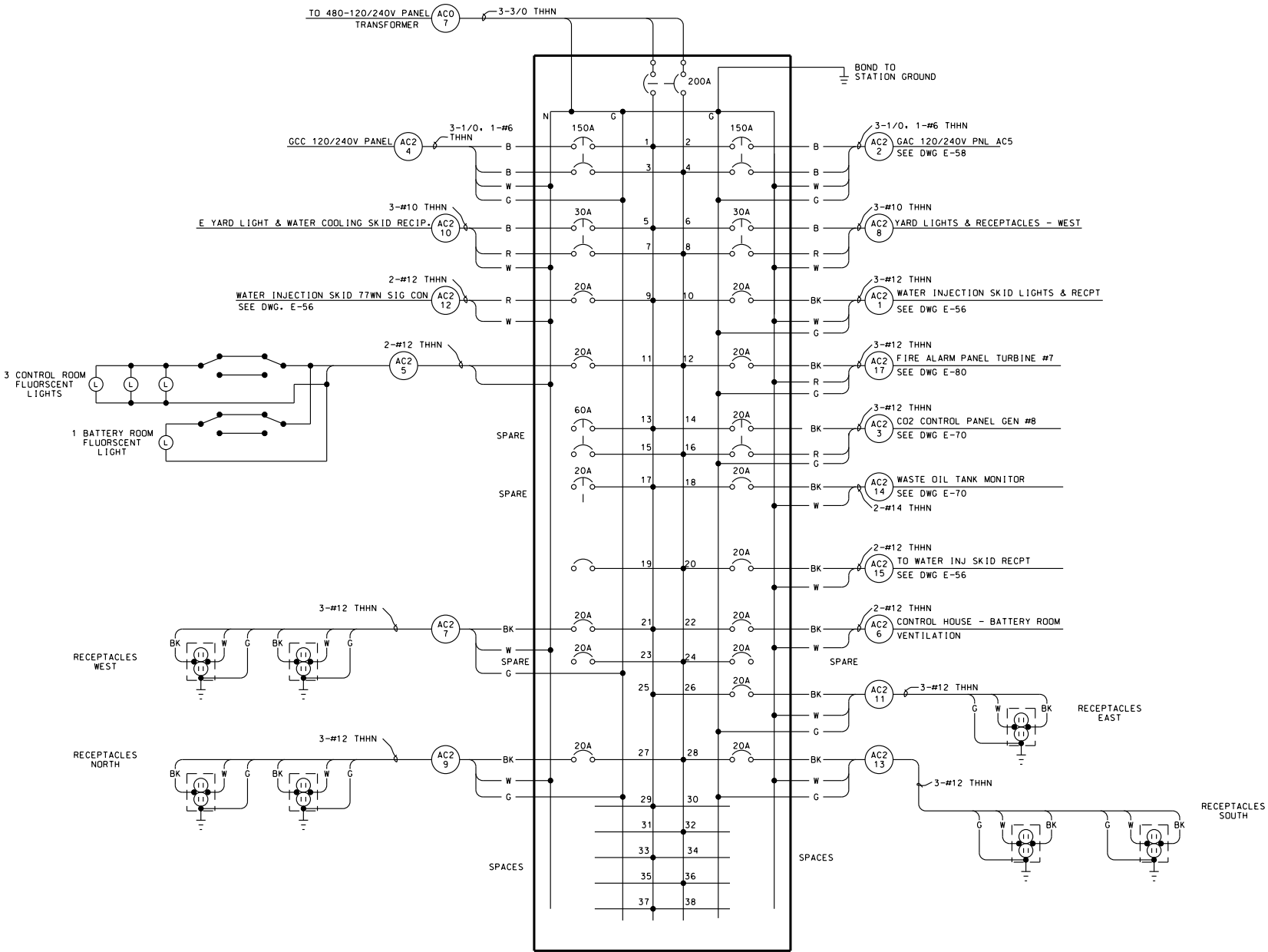
SCALE: NONE



DATE	05-27-00
DESIGNED	P&E
DRAWN	MRB
APPROVED	ARP
APPROVED	

INDIANOLA MUNICIPAL UTILITIES	DWG NO
TURBINE GENERATOR NO 8 WASTE OIL TANK ALARM PANEL INTERCONNECTION WIRING DIAGRAM	E-51A

120/240 VAC PANELBOARD
AC-2



REV	DATE	DES	DFTR	APP	DESCRIPTION	REV	DATE	DES	DFTR	APP	DESCRIPTION
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
01	10-31-00	P&E	MRB	ARP	AS CONSTRUCTED PER CONTRACTOR						

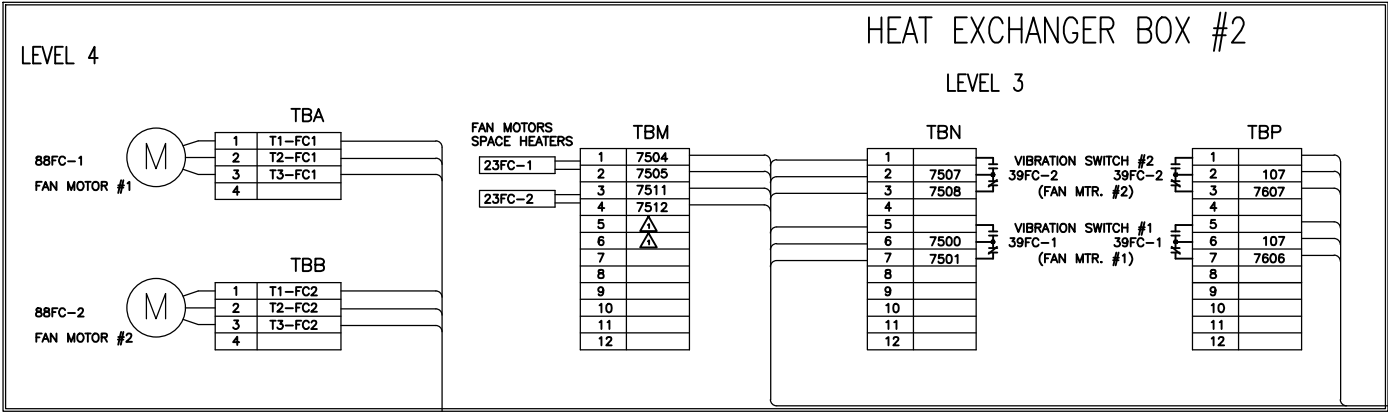
P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN
SCALE NONE



DATE 04-06-00
DESIGNED P&E
DRAWN MRB
APPROVED RLW
APPROVED ARP

INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR NO 8
GEN CTRL HOUSE - PANEL AC2
INTERCONNECTION WIRING DIAGRAMS

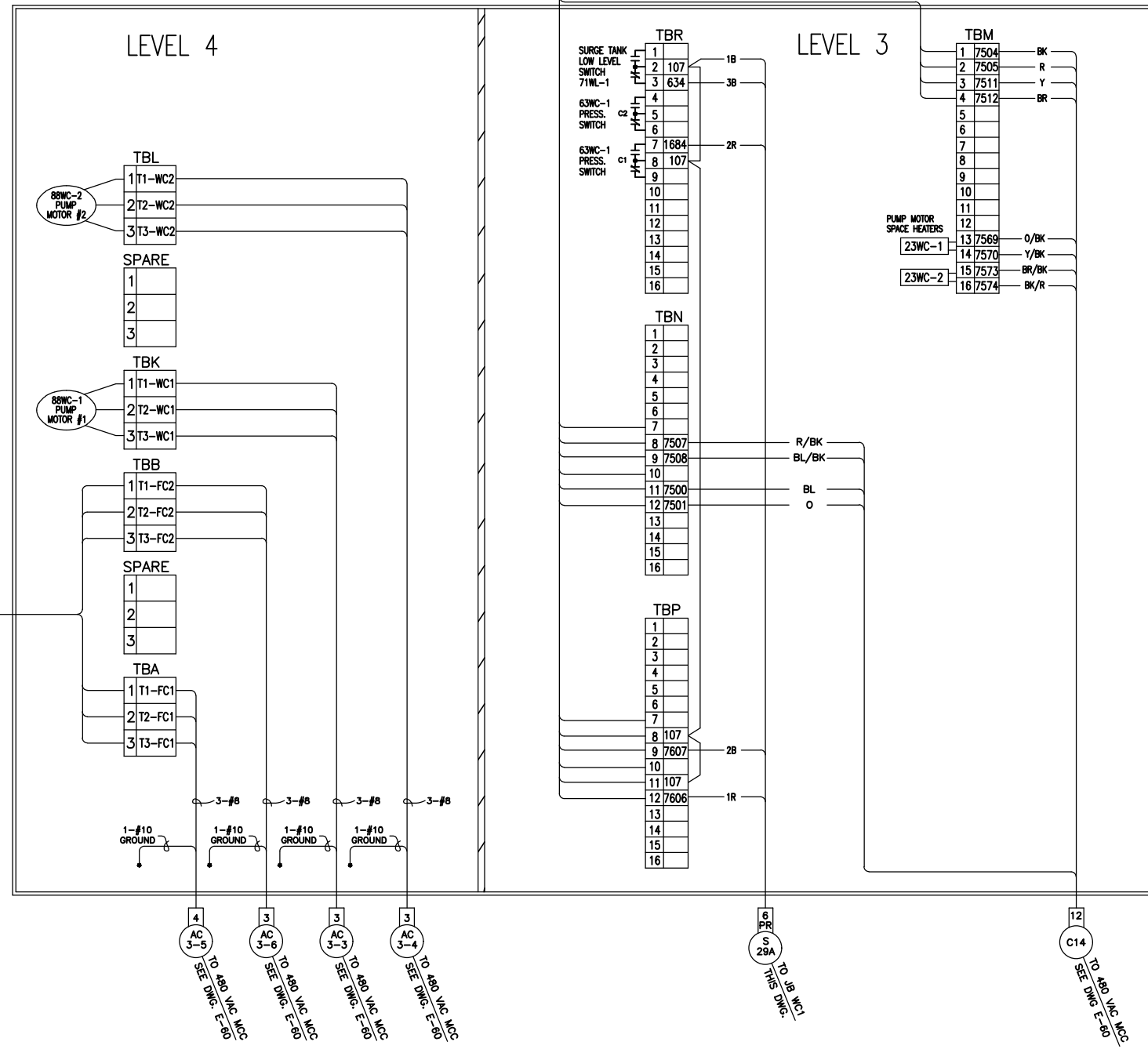
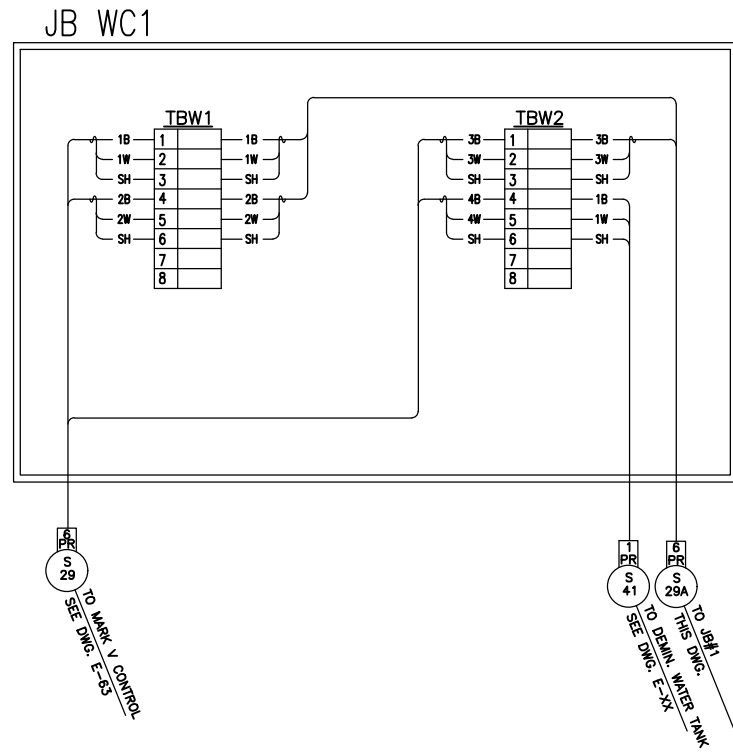
DWG NO
E-52



COOLING WATER MODULE MAIN JUNCTION BOX 90A/90 (BOX #1)

INTERCONNECTION WIRING

HEAT EXCHANGER TERMINAL BOX	TO	MAIN JUNCTION BOX
TERMINAL	TO	TERMINAL
TBA1		TBA1
TBA2		TBA2
TBA3		TBA3
TBB1		TBB1
TBB2		TBB2
TBB3		TBB3
TBM1		TBM1
TBM2		TBM2
TBM3		TBM3
TBM4		TBM4
TBN1		TBN7
TBN2		TBN8
TBN3		TBN9
TBN5		TBN10
TBN6		TBN11
TBN7		TBN12
TBP1		TBP7
TBP2		TBP8
TBP3		TBP9
TBP5		TBP10
TBP6		TBP11
		TBP12



REV	DATE	DES	DFTR	APP	DESCRIPTION
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
2	11-14-00	P&E	MRB	ARP	AS CONSTRUCTED PER CONTRACTOR
1	5-9-00	P&E	MRB	ARP	CHANGE 241 TO 3TR

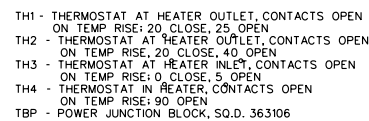
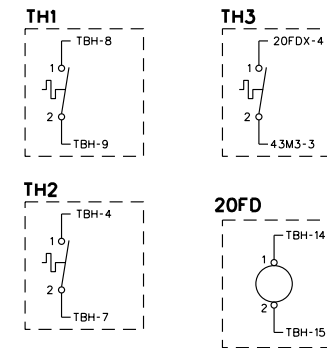
P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

INDIANOLA MUNICIPAL UTILITIES
ELECTRIC AND WATER

DATE 04-04-00
DESIGNED P&E
DRAWN MRB
APPROVED ARP

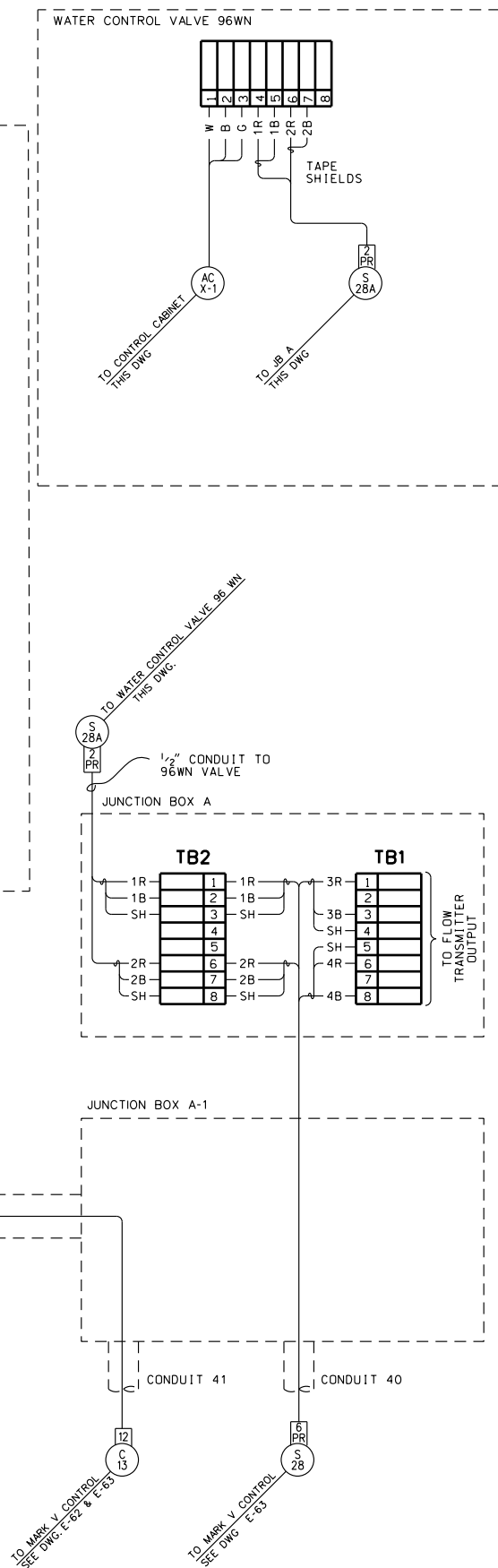
INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR NO. 8
WATER COOLING SKID
INTERCONNECTION WIRING

DWG NO
E-54



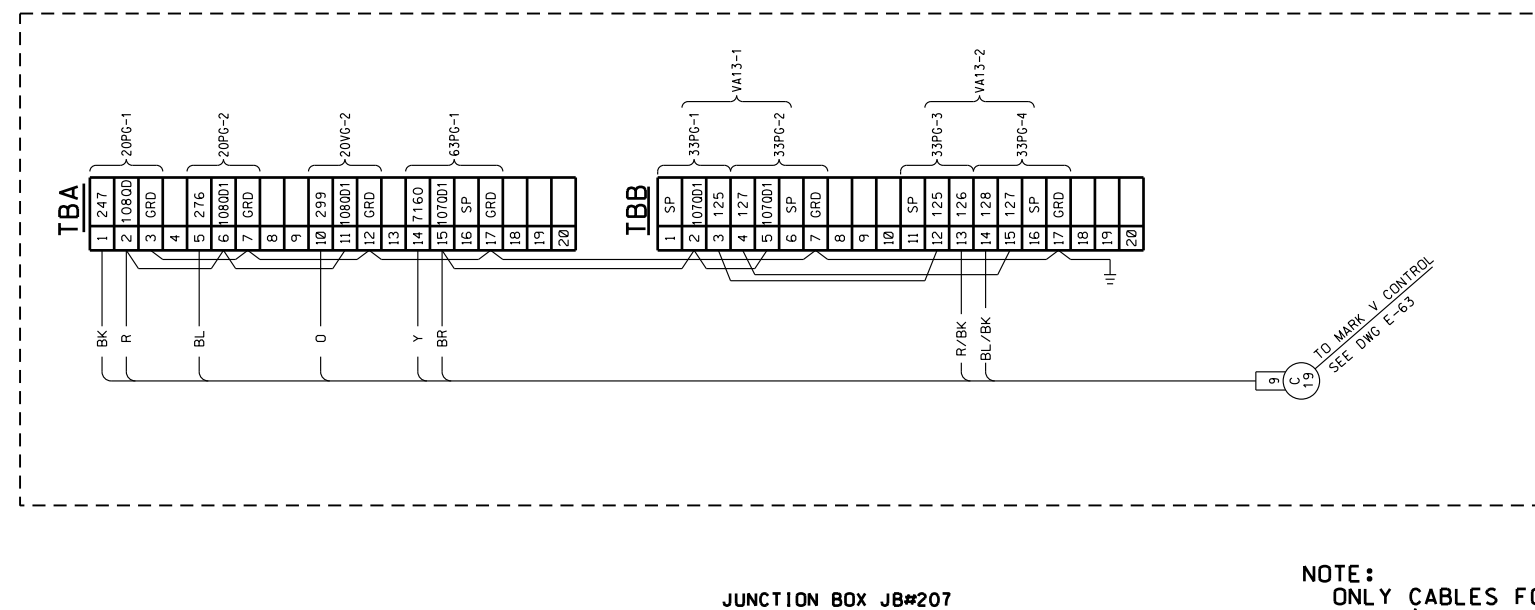
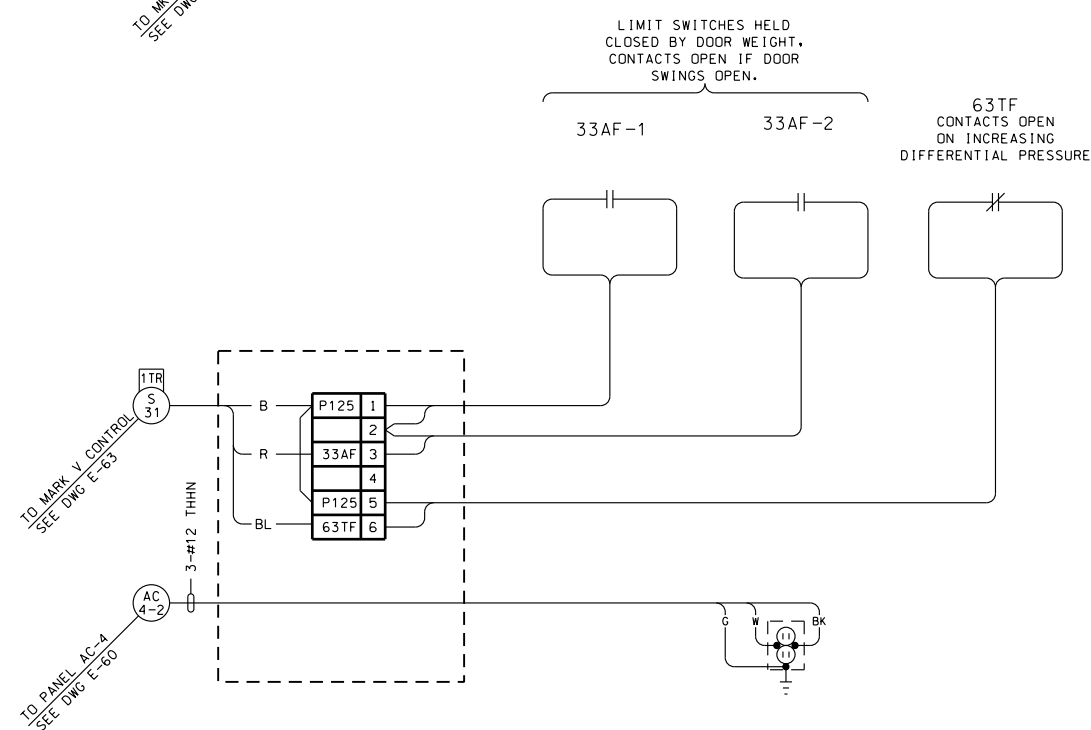
SEE DWG E-71
FOR JOCKEY PUMP
CONTROL WIRING.

E-55



NOTE - LOW TEMP ALARM
THERMOSTAT

E-56

[illegible]

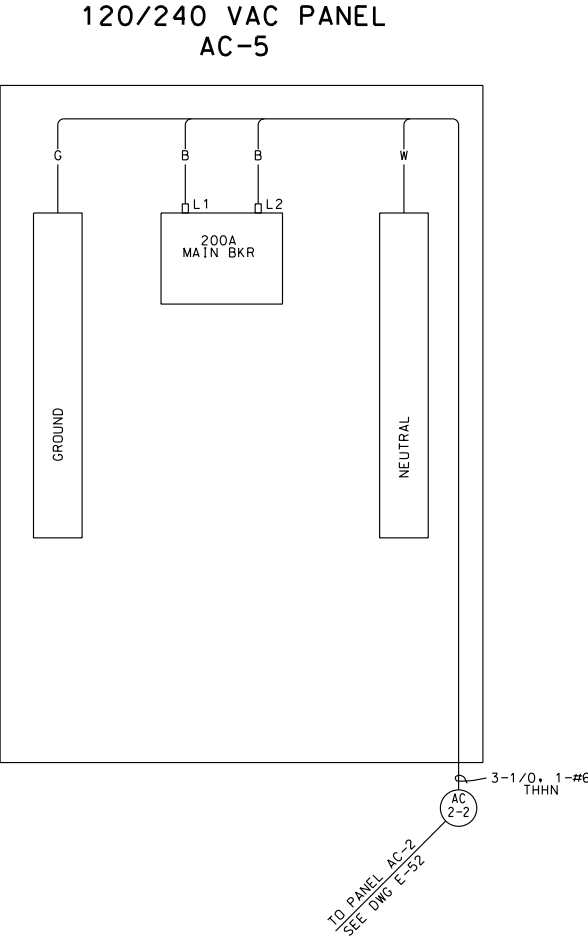
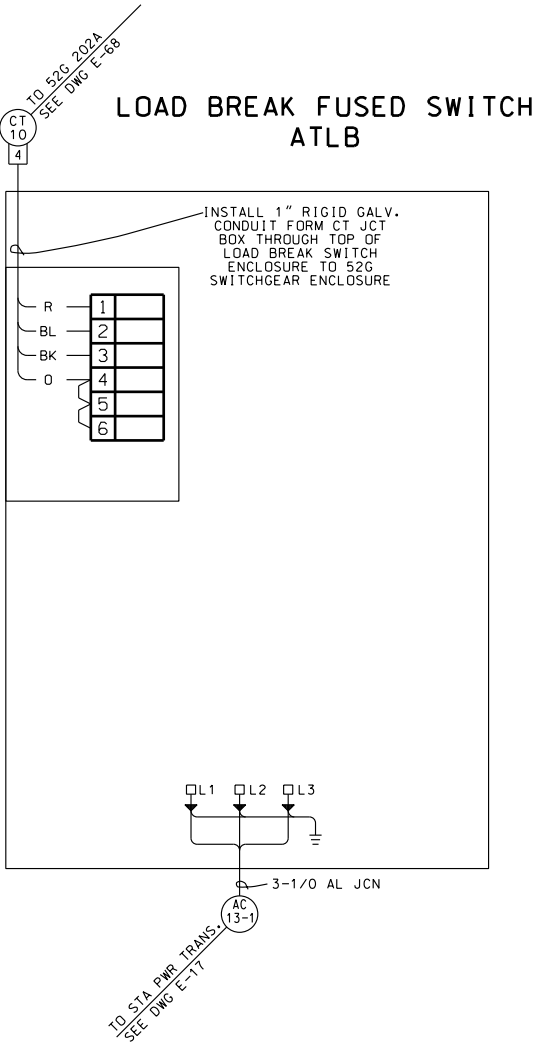
INDIANA MUNICIPAL UTILITIES
IMU

INDIANOLA MUNICIPAL UTILITIES

TURBINE GENERATOR NO 8
MISC. ON-SKID WIRING

DWG	
NO	

E-57



NOTE:
ONLY CABLES FOR
OWNER'S CONNECTIONS
ARE SHOWN ON THIS
DRAWING. SEE GE
DRAWINGS FOR
ADDITIONAL CABLES.

	-	-					-	-					
	-	-					-	-					
	-	-					-	-					
	-	-					-	-					
REV	DATE	DESG	DFTR	APP		DESCRIPTION	REV	DATE	DESG	DFTR	APP		DESCRIPTION
					01	10-31-00	&E	P&E	ARP				AS CONSTRUCTED PER CONTRACTOR

}}

P & E ENGINEERING CO.

POWER SYSTEM ANALYSIS AND DESIGN

SCALE: NONE



DATE	04-11-00
DESIGNED	P&E
DRAWN	MRB
APPROVED	ARP
APPROVED	

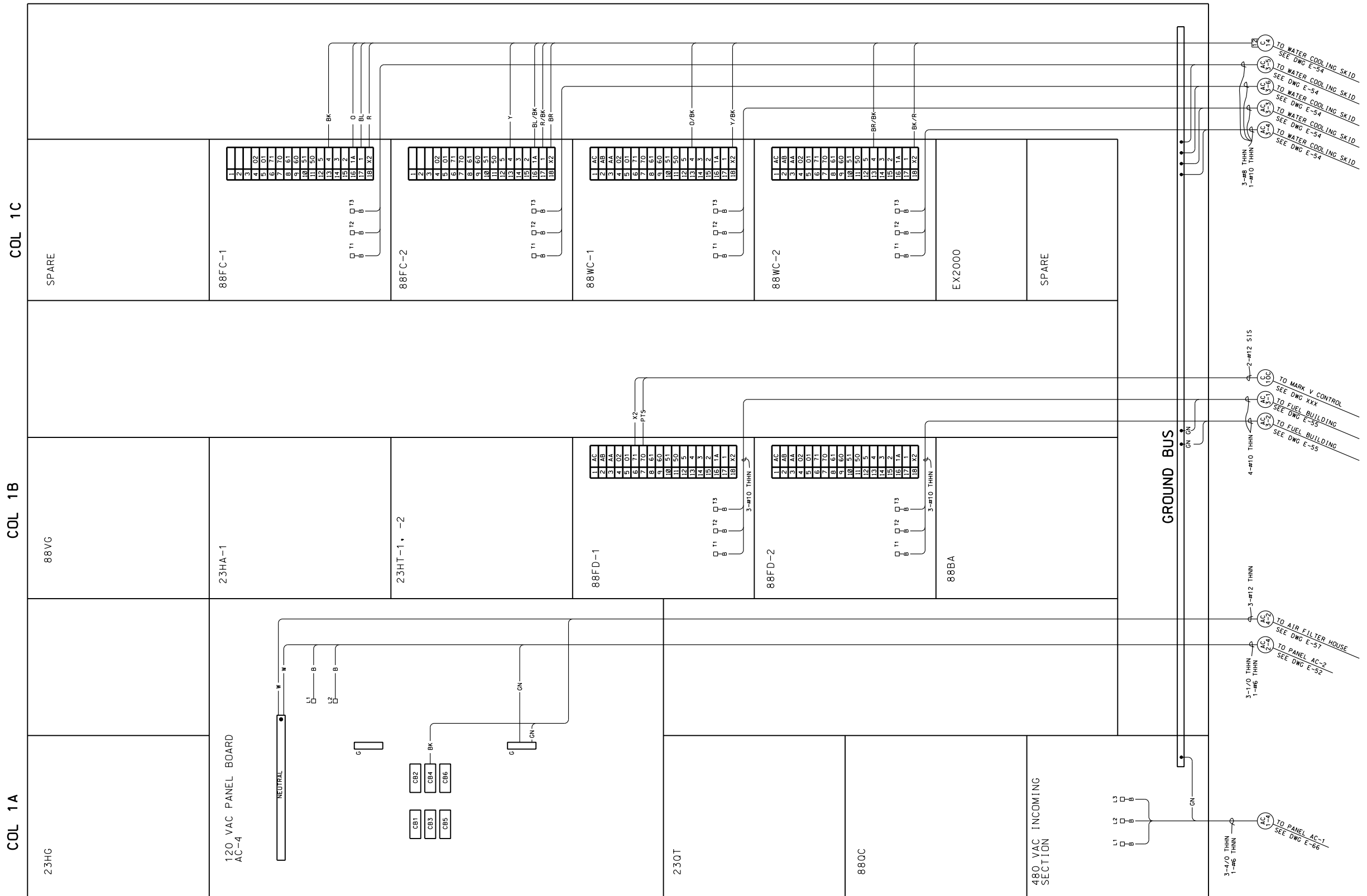
INDIANOLA MUNICIPAL UTILITIES

**TURBINE GENERATOR NO. 8
GENERATOR AUX. COMPARTMENT (GAC)
INTERCONNECTION WIRING**

DWG
NO

E-58

CONTROL CAB
AC MCC & PANEL BOARD



SEE GE DWG
304 D-01B-0495
SH. 806

NOTE:
ONLY CABLES FOR
OWNER'S CONNECTIONS
ARE SHOWN ON THIS
DRAWING. SEE GE
DRAWINGS FOR
ADDITIONAL CABLES.

	-	-					-	-				
	-	-					-	-				
	-	-					-	-				
	-	-					-	-				
	-	-					O1	10-31-00	P&E	P&E	ARP	AS CONSTRUCTED PER CONTRACTOR
REV	DATE	DESG	DFTR	APP	DESCRIPTION	REV	DATE	DESG	DFTR	APP	DESCRIPTION	

}} P & E ENGINEERING CO.
}} POWER SYSTEM ANALYSIS AND DESIGN

SCALE NONE



DATE	04-12-00
DESIGNED	P&E
DRAWN	MRB
APPROVED	ARP
APPROVED	

INDIANOLA MUNICIPAL UTILITIES

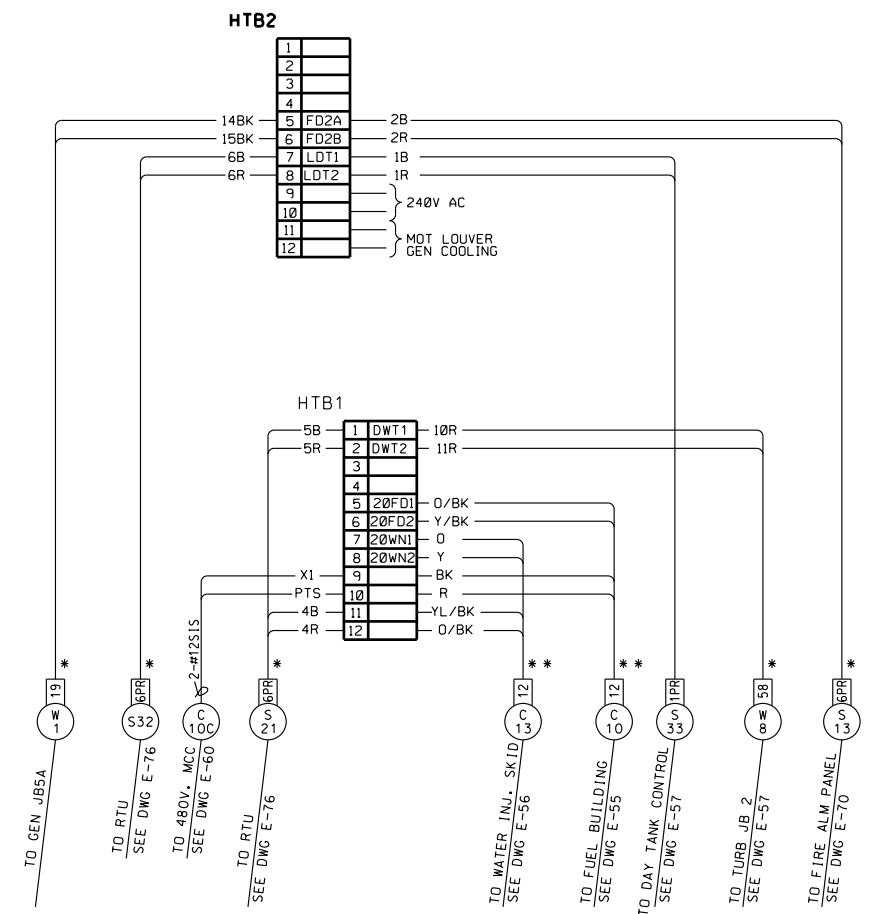
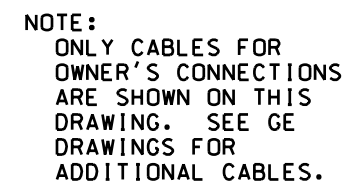
TURBINE GENERATOR NO 8
480 VAC MCC, 120/240 VAC PANEL
INTERCONNECTION WIRING

DWG
NO

E-60



RIGHT SIDE WALL



SEE DWG E-63 FOR ADDITIONAL
CONDUCTORS IN THIS CABLE

E-62

	-	-					-	-				
	-	-					-	-	-			
	-	-					-	-	-			
	-	-					-	-	-			
REV	DATE	DESG	DFTR	APP		DESCRIPTION	REV	DATE	DESG	DFTR	APP	DESCRIPTION
					01	03-22-02	P&E	AMW	ARP			WAS E-63, REDRAWN FOR AS-BUILT



SCALE NONE

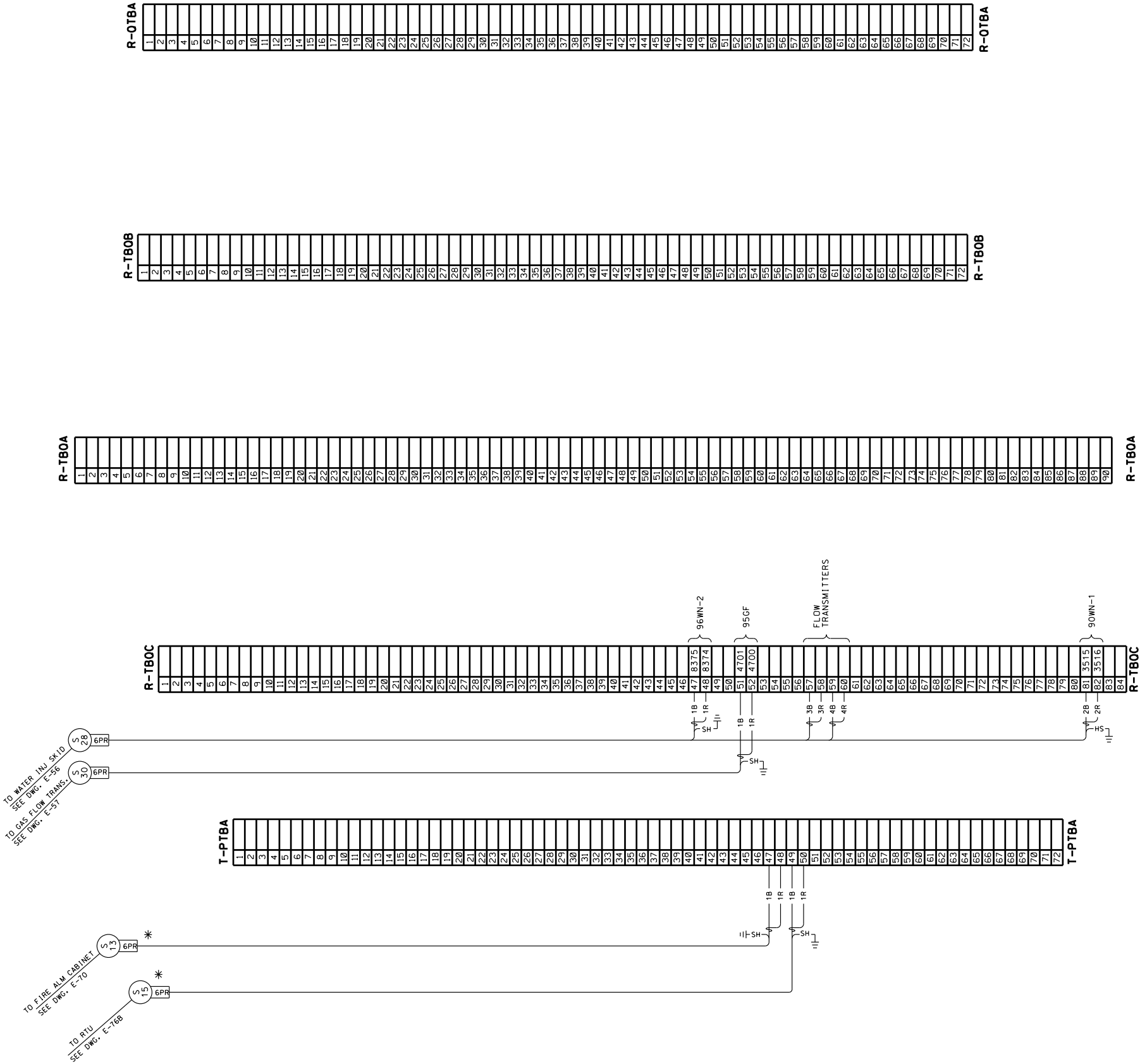


DATE	03-21-02
DESIGNED	P&E
DRAWN	AMW
APPROVED	ARP
APPROVED	

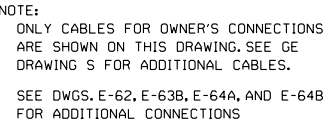
INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR NO 8 MARK V CONTROL CABINET INTERCONNECTION WIRING

DWG NO

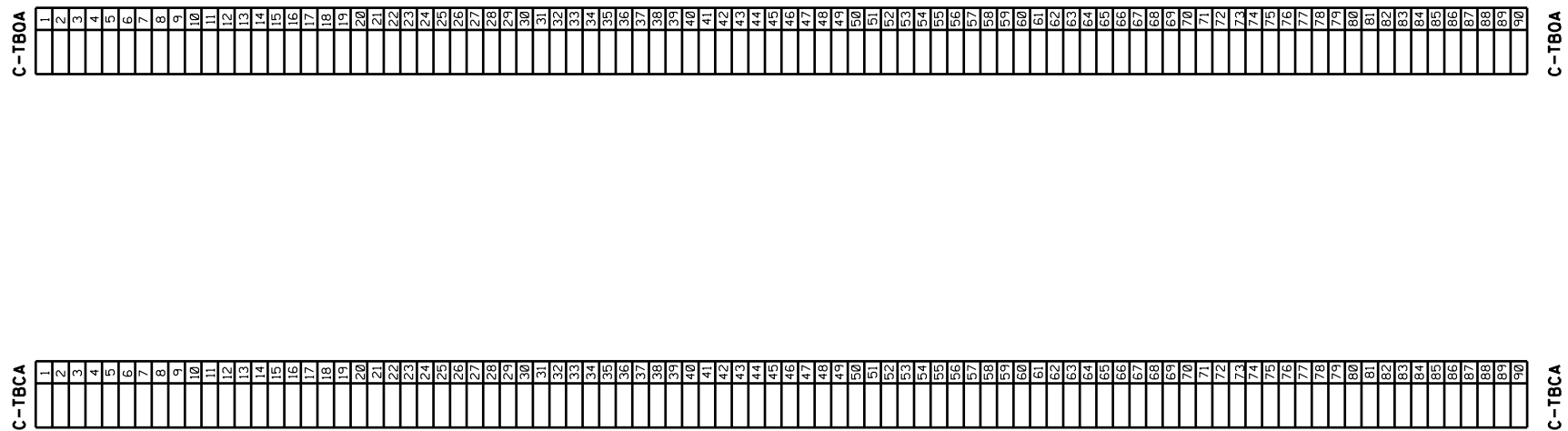
E-63A



NOTE:
ONLY CABLES FOR OWNER'S CONNECTIONS
ARE SHOWN ON THIS DRAWING. SEE GE
DRAWING S FOR ADDITIONAL CABLES.
SEE DWGS. E-62, E-63B, E-64A, AND E-64B
FOR ADDITIONAL CONNECTIONS

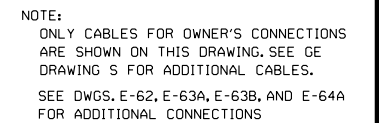


DWG
NO
E-63B

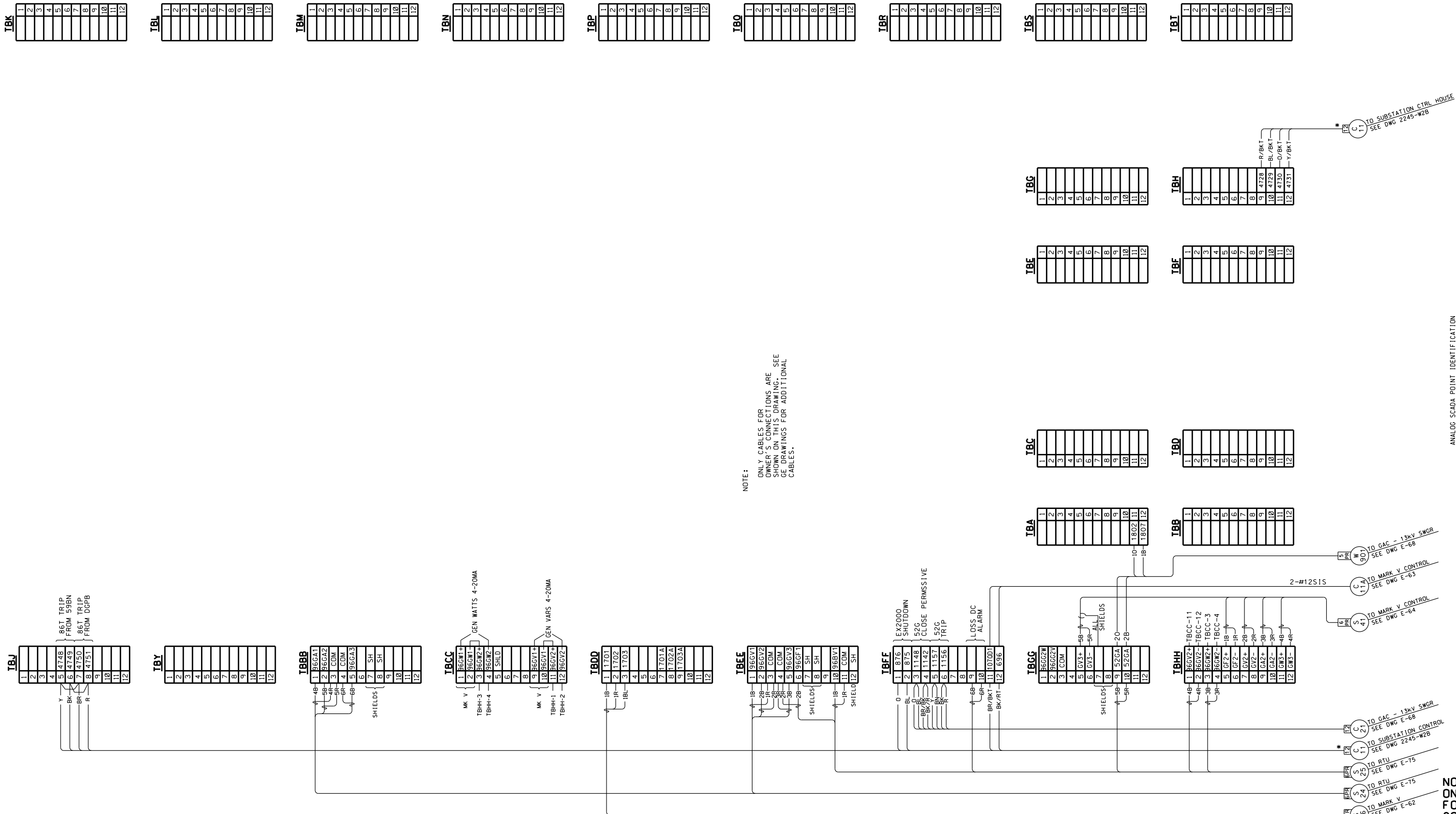


SEE DWGS. E-62, E-63A, E-63B, AND E-64B
FOR ADDITIONAL CONNECTIONS

-	-					-	-					<
---	---	--	--	--	--	---	---	--	--	--	--	--



NO
E-64B



ANALOG SCADA POINT IDENTIFICATION

NOTE:
ONLY CABLES
FOR OWNER'S
CONNECTIONS
ARE SHOWN ON
THIS DRAWING.
SEE GE DRAWINGS
FOR ADDITIONAL
CABLES.

	-	-						-	-						
	-	-						03	07-08-02	P&E	ARP	ARP	ARP	ADD GEN V, I, F, P, & Q ANALOG POINTS	
	-	-						02	10-31-00	P&E	MRB	ARP	ARP	AS CONSTRUCTED PER CONTRACTOR.	
	-	-						01	06-02-00	P&E	ARP	ARP	ARP	ADDED CABLE C21 AND W901	
REV	DATE	DESG	DFTR	APP	DESCRIPTION					REV	DATE	DESG	DFTR	APP	DESCRIPTION

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

SCALE N.T.S.



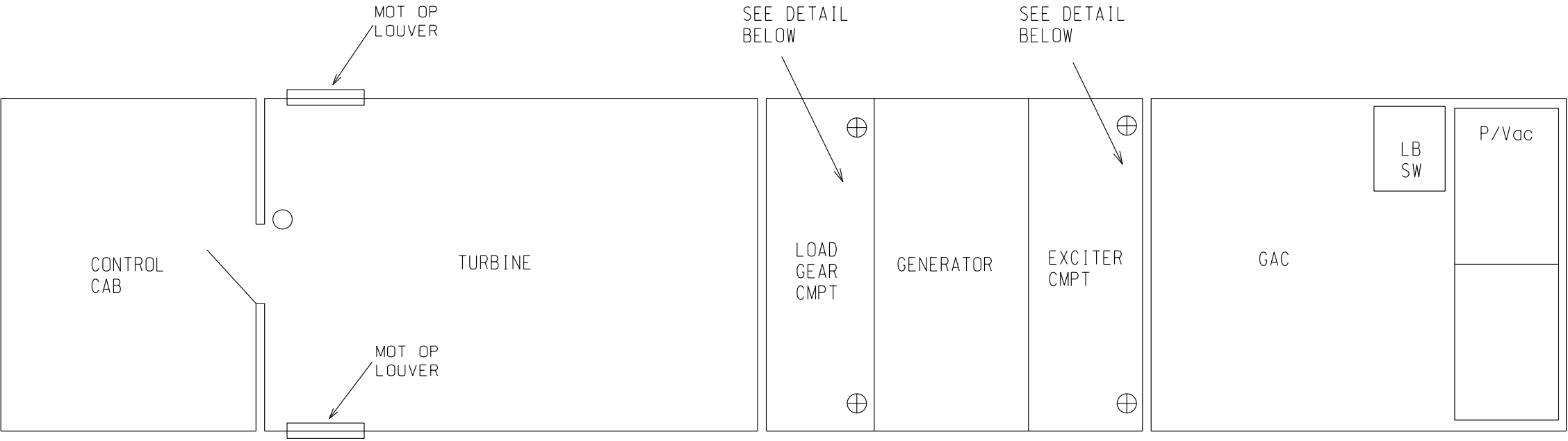
DATE	04-13-00
DESIGNED	P&E
DRAWN	MRB
APPROVED	ARP
APPROVED	

INDIANOLA MUNICIPAL UTILITIES

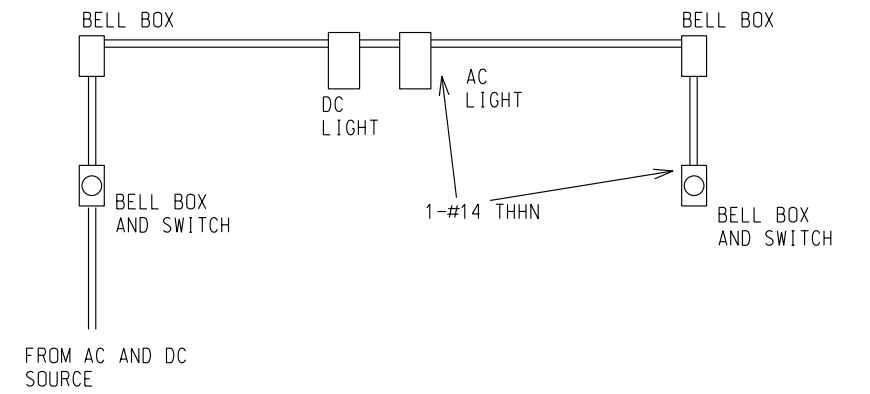
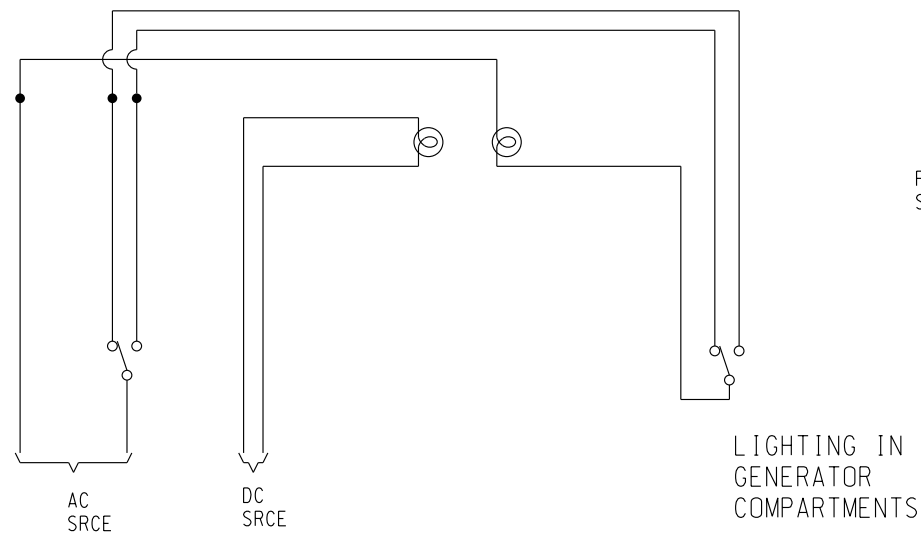
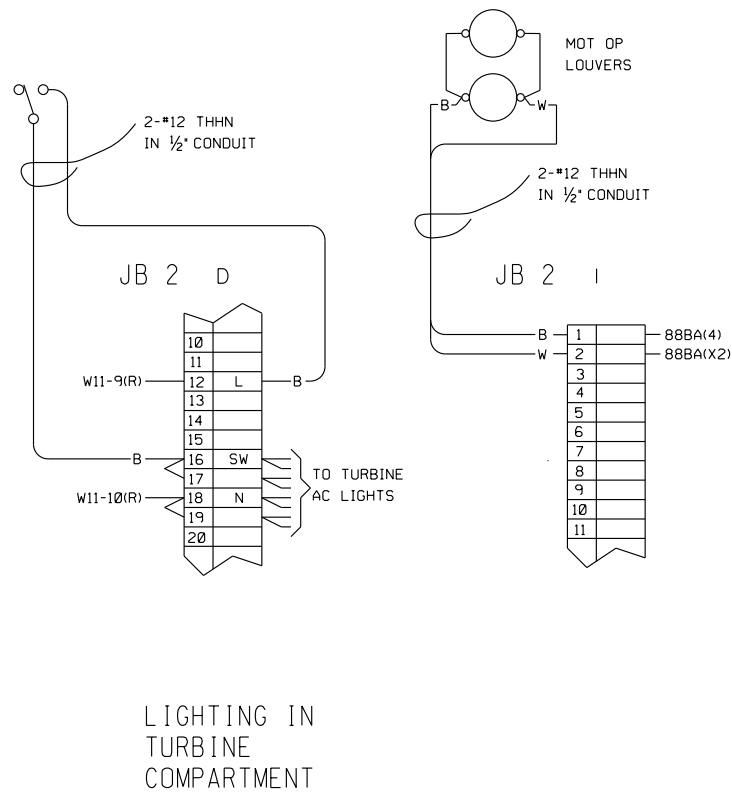
TURBINE GENERATOR NO 8 GENERATOR CONTROL PANEL INTERCONNECTION WIRING

DWC
NO

E-67



- WP BOX WITH
SP LIGHT SWITCH
- ⊕ WP BOX WITH
3 WAY LIGHT SWITCH



	-	-					-	-						
	-	-					-	-						
	-	-					-	-						
	-	-					-	-						
REV	DATE	DES	DFTR	APP		DESCRIPTION	REV	DATE	DES	DFTR	APP		DESCRIPTION	

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

SCALE N.T.S.

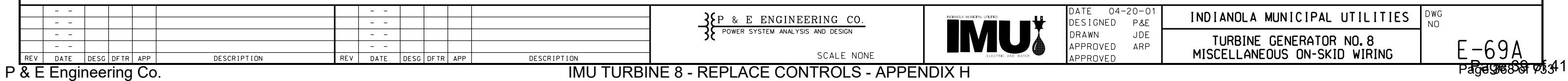


DATE 05-29-00
DESIGNED P&E
DRAWN ARP
APPROVED ARP
APPROVED

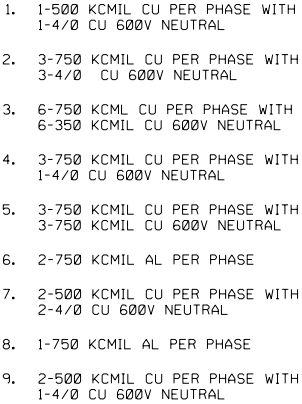
INDIANOLA MUNICIPAL UTILITIES
TURBINE GENERATOR NO. 8
MISCELLANEOUS ON-SKID WIRING

DWG
NO

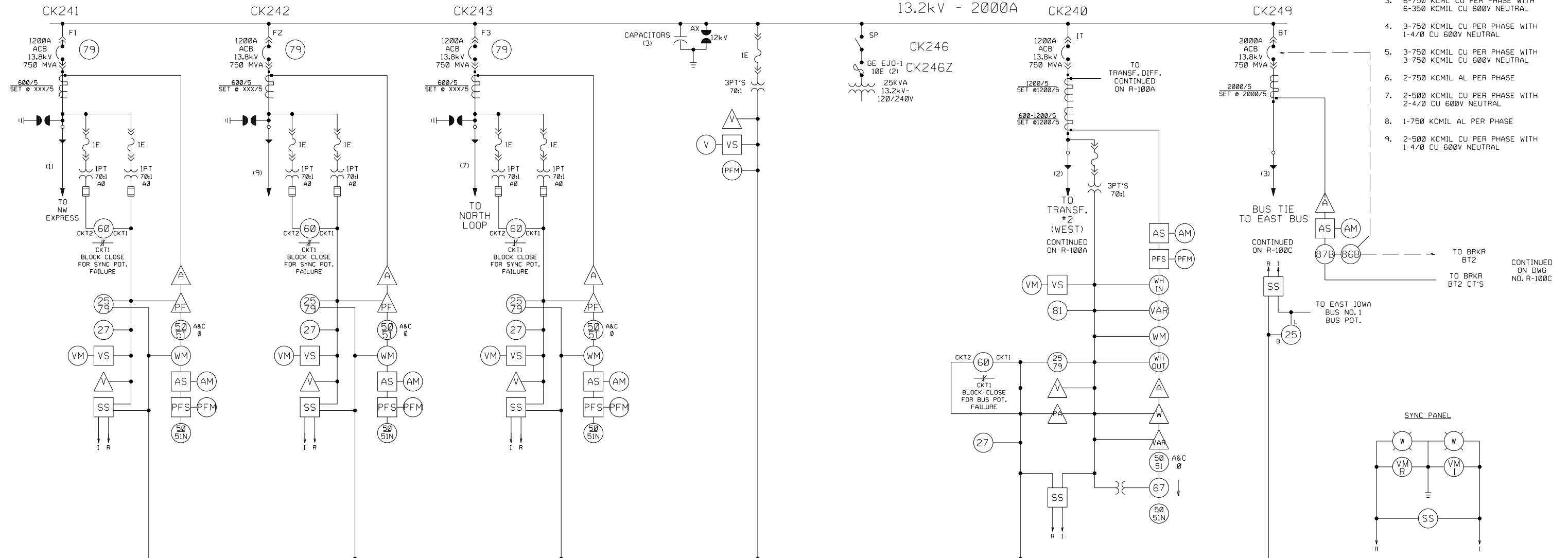
E-69



Appendix I - East Iowa Substation Single Line Diagrams

Page 3 of 3

BUS NO. 2 (WEST SWITCHGEAR)

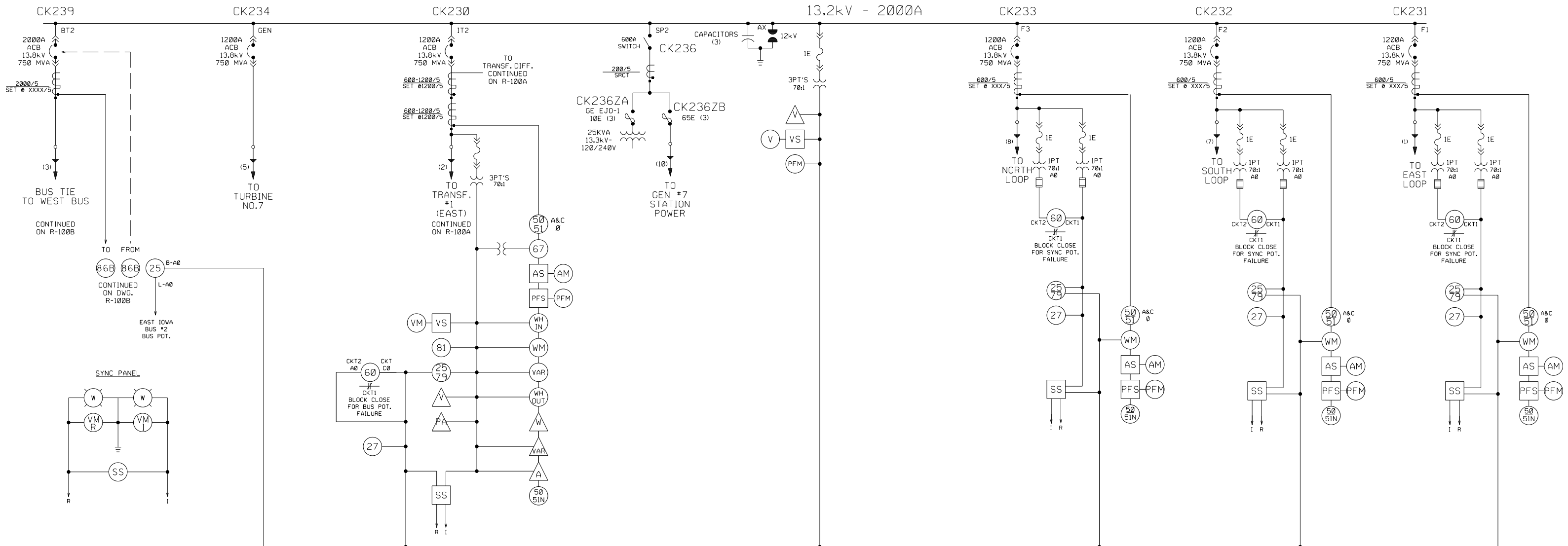


NOTES:

1. NUMBERS IN PARENTHESES INDICATE CABLE TYPES & SIZES.

[illegible]

BUS NO. 1 (EAST SWITCHGEAR)



13.2kV CABLES

1. 1-500 KCMIL CU PER PHASE WITH
1-4/0 CU 600V NEUTRAL
2. 3-750 KCMIL CU PER PHASE WITH
3-4/0 CU 600V NEUTRAL
3. 6-750 KCMIL CU PER PHASE WITH
6-350 KCMIL CU 600V NEUTRAL
4. 3-750 KCMIL CU PER PHASE WITH
1-4/0 CU 600V NEUTRAL
5. 3-750 KCMIL CU PER PHASE WITH
3-750 KCMIL CU 600V NEUTRAL
6. 2-750 KCMIL AL PER PHASE
7. 2-500 KCMIL CU PER PHASE WITH
2-4/0 CU 600V NEUTRAL
8. 1-750 KCMIL AL PER PHASE
9. 2-500 KCMIL CU PER PHASE WITH
1-4/0 CU 600V NEUTRAL
10. 3-1/0 CU PER PHASE

NOTES:

1. NUMBERS IN PARENTHESES INDICATE
CABLE TYPES & SIZES.

[illegible]

} { P & E ENGINEERING CO.
 } { POWER SYSTEM ANALYSIS AND DESIGN



DATE	04-27-00
DESIGNED	P&E
DRAWN	JDE
APPROVED	DLB
APPROVED	

INDIANOLA MUNICIPAL UTILITIES

EAST IOWA SUBSTATION
FUNCTIONAL ONE LINE DIAGRAM
SHEET 3 OF 3

DWG
NO

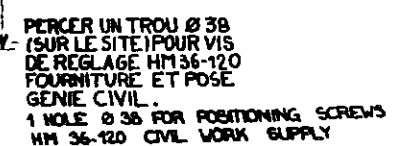
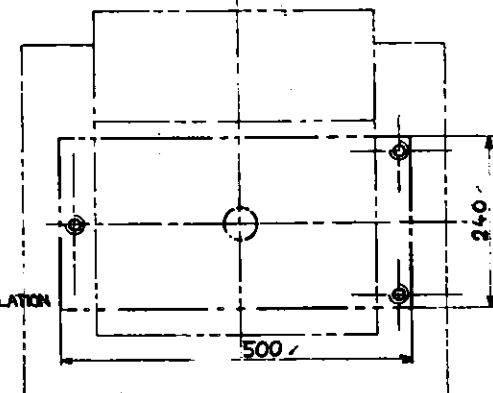
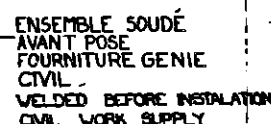
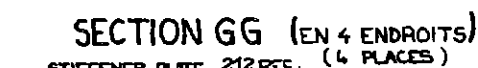
R-600C
Page 3 of 3

Appendix K - Original Alstom Mechanical Drawings

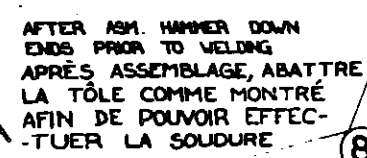


RUGOSITES	NF E 05-016	Ro En μ	ETALONS RUGOTEST
SURFACE ROUGHNESS IN MICRON ($\times 1000$ mm)			

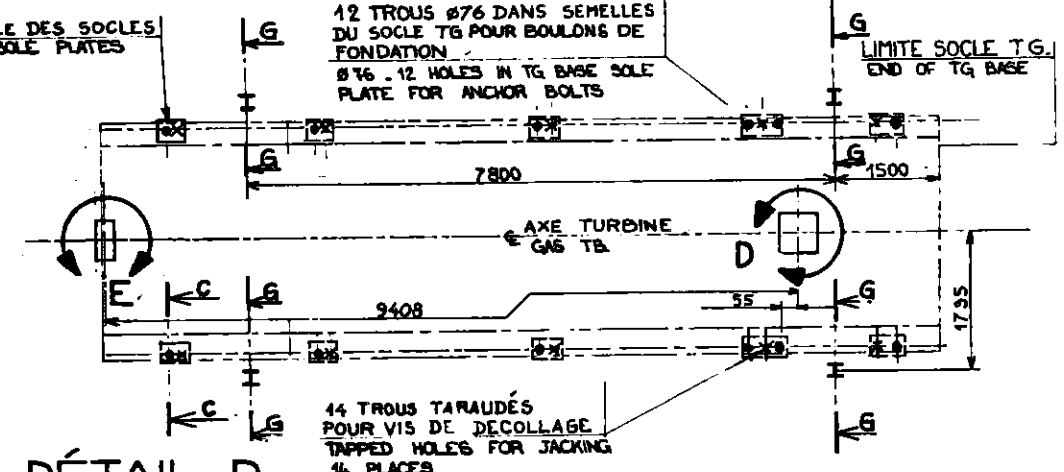
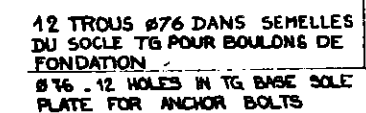
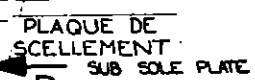
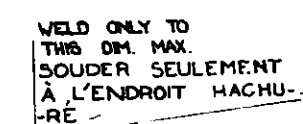
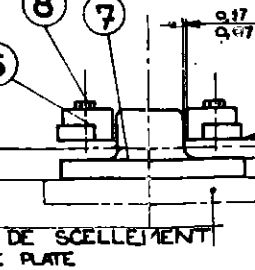
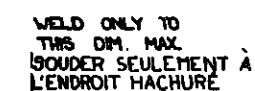
2. SOUDURES SUIVANT P8A.AG1.
ALL WELDS PER P8A.AG1



SOCLE TG _____
MACHINE BASE _____



SECTION BB
COUPE B-B

[illegible]

1	NORMES GENERALES APPLIED PRACTICES	
ITEM	DESCRIPTION	NUMERO DES DOCUMENTS REFERENCE NUMBER
LISTE DES DOCUMENTS DE REFERENCE LIST OF REFERENCE DRAWINGS		
SIMILAIRE A 94.160.120		MASSE APPROX. _____ kg
SIMILAR TO		APPROX. WT. _____
TEM 1603 TG DE BASE NG ARR.		
ARRANGEMENT BOULONS DE FONDATION		
91		
ALSTHOM - BELFORT N° 91.160 167 CONT. OF SHEET _____ SH NO 1		

Appendix L - Control Cab Diagrams

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B93341.PRT

CUSTOMER: INDIANOLA MUNICIPAL UTILITIES
LOCATION: E. IOWA SUBSTATION

DM #	ML #	GAS TURBINE S/N
F2977G1	GT #8	OOT143 (ALSTHOM)

SECTION 1: CAB LAYOUT AND CUSTOMER CONNECTION ARRANGEMENT
SECTION 2: CONDUIT RUN-CONTROL CAB TO TURBINE BASE JB1 & JB2

- REFERENCE DRAWINGS
- MKV CASE LAYOUT - GE-DSD, DWG #342A4698CL
 - MCC ELEMENTARY - GE ENGINEERING SERVICES, DWG # 420E3701-00B-400
 - EX2000 ELEMENTARY - GE-DSD, DWG #2595992AA
 - CONTROL CAB WIRE LIST - GE ENGINEERING SERVICES, DWG #420E3700-00B-600
 - MKV CONTROL INTERFACE ELEMENTARY - GE-DSD, DWG #247B1619

-	-	REV	REV STATUS	SECTION
2	1	SH	OF SHEETS	2

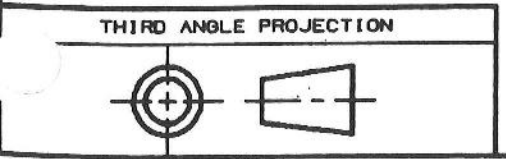
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8	7	6	5	4	3	2	1	SH	OF SHEETS	1

-	REV	REV STATUS	INDEX
1	SH	OF SHEETS	

BOM ISSUED

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE	GE Power Generation	
DIMENSIONS ARE IN INCHES.	DRAWN D MARX SR	00-05-11	GENERAL ELECTRIC COMPANY	
TOLERANCES ON:	CHECKED RD LOUCKS	00-05-11	GAS TURBINE	
2 PL DECIMALS ±	ENGRG SJ KLICK	00-05-11	Schenectady, NY	
3 PL DECIMALS ±	ISSUED D MARX SR	00-05-11		
ANGLES ±			DIAGRAM, CONTROL CAB	
FRACTIONS ±			FMF: 324A2977G001 1101	
			SIZE	CAGE CODE
			B	
			DWG NO	352B9334 INDEX
			SCALE	NONE
			SHEET	1

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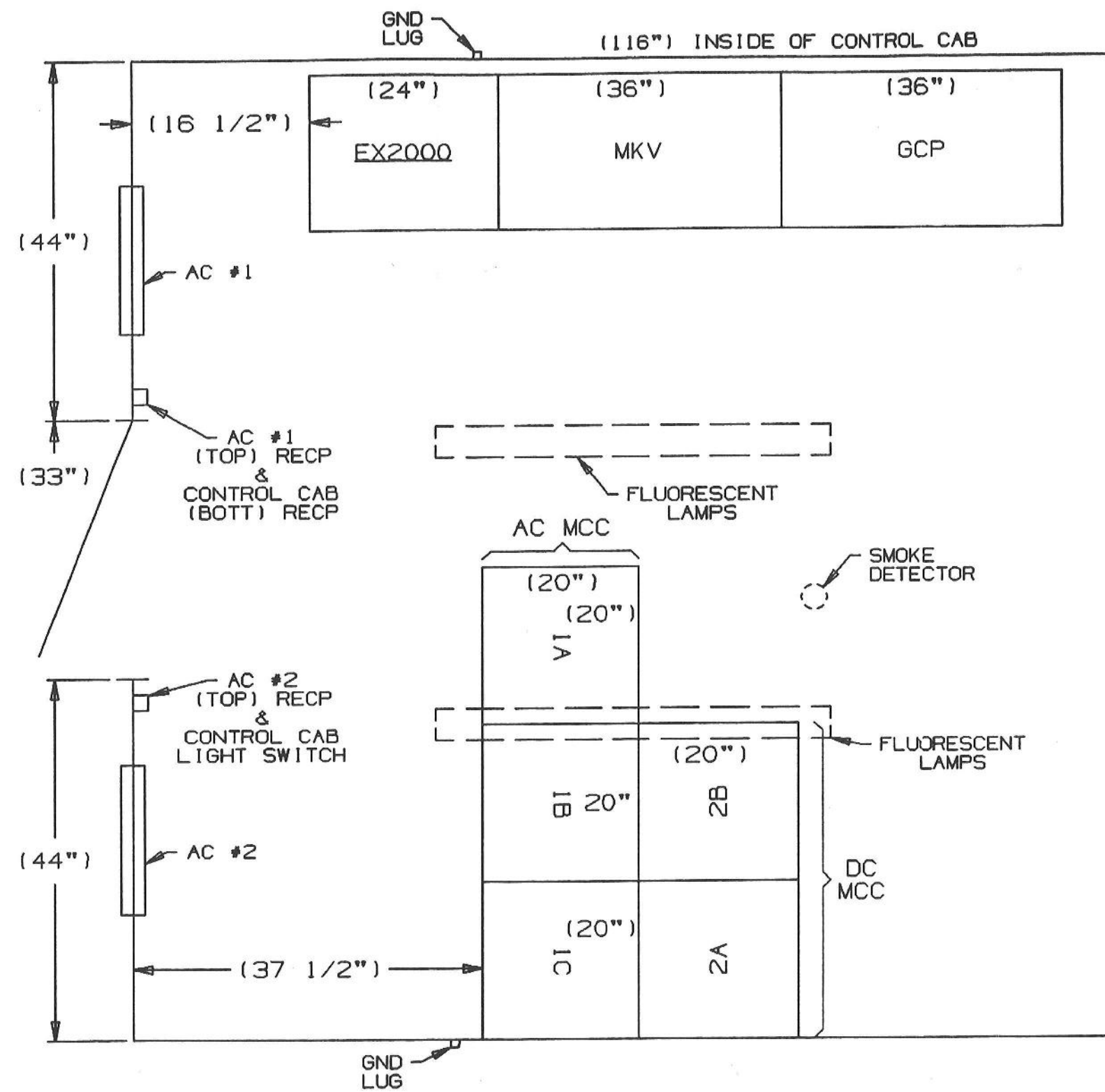
DT-1N

FCTD

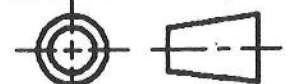
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B933401.PRT

CONTROL CAB



THIRD ANGLE PROJECTION



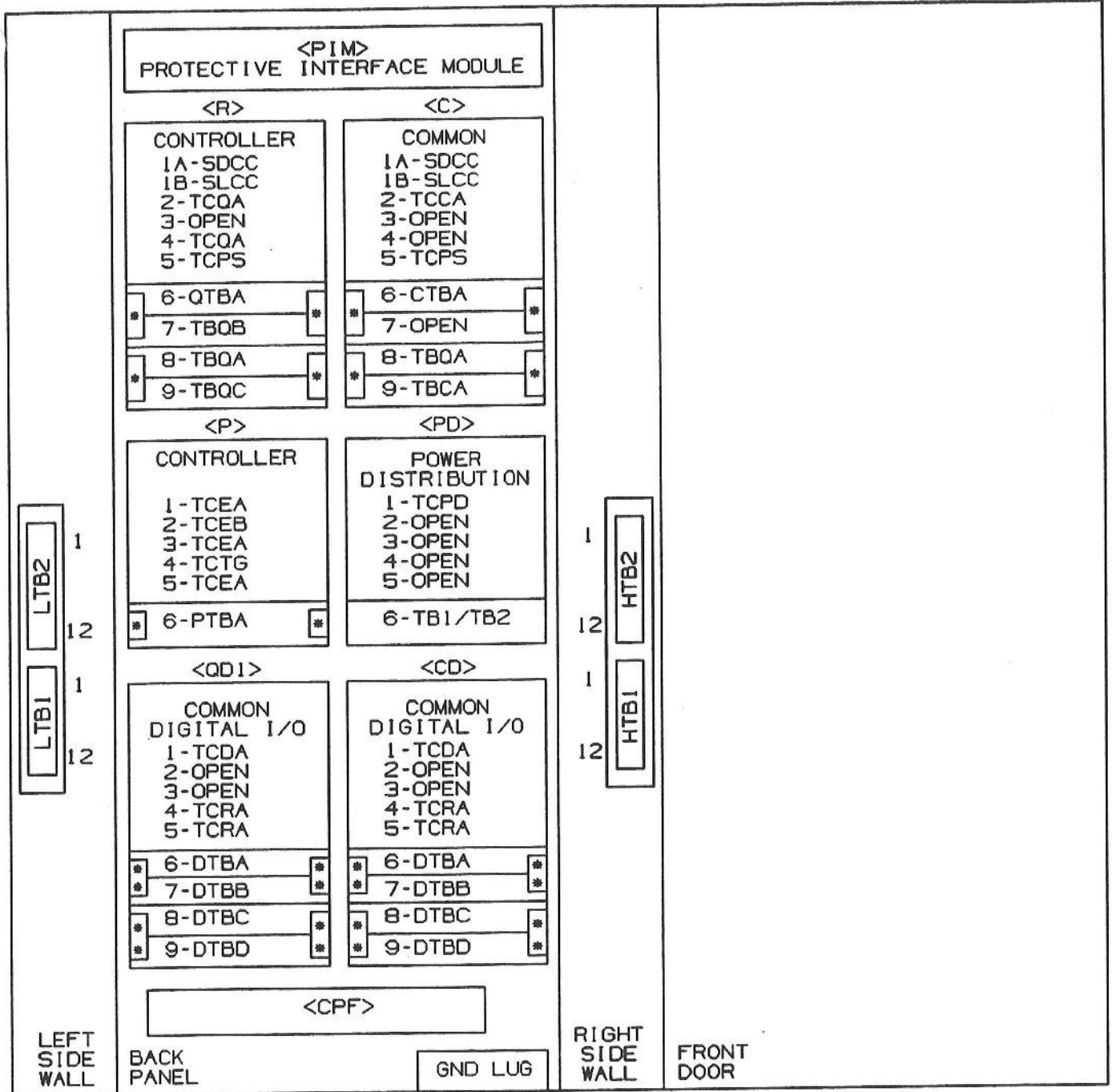
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GENERAL ELECTRIC COMPANY Schenectady, NY	SIZE	CAGE CODE	DWG NO
GE Power Generation	B		352B9334 SECT 1
DRAWN	D MARX SR	00-05-11	
ISSUED	D MARX SR	00-05-11	
SCALE		SHEET 1	

DISTR TO

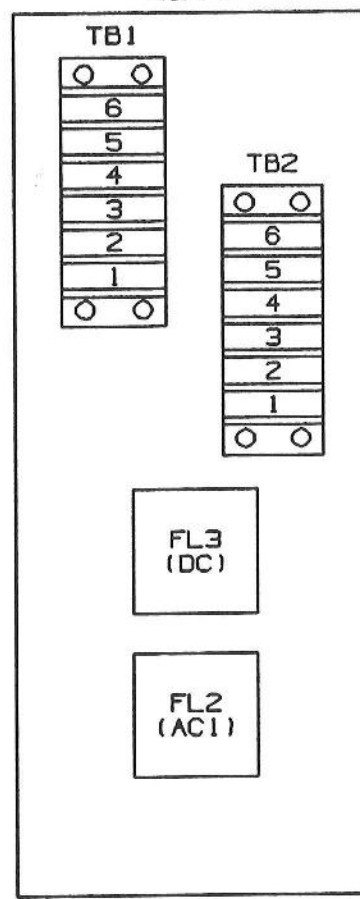
MARK V TURBINE CONTROL PANEL

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



101 ⊖

<CPF>



REVISE ON CAD ONLY
UG PART: 352B933401.PRT

NOTES:

1. HIGH LEVEL WIRING ON RIGHT SIDE OF CASE, LOW LEVEL ON LEFT SIDE.
 2. CABLE SUPPORT RAILS PROVIDED ON BOTH SIDE WALLS. HIGH LEVEL WIRING ON RIGHT SIDE OF CASE.
- * LOW LEVEL SHIELD BUS
** HIGH LEVEL SHIELD BUS

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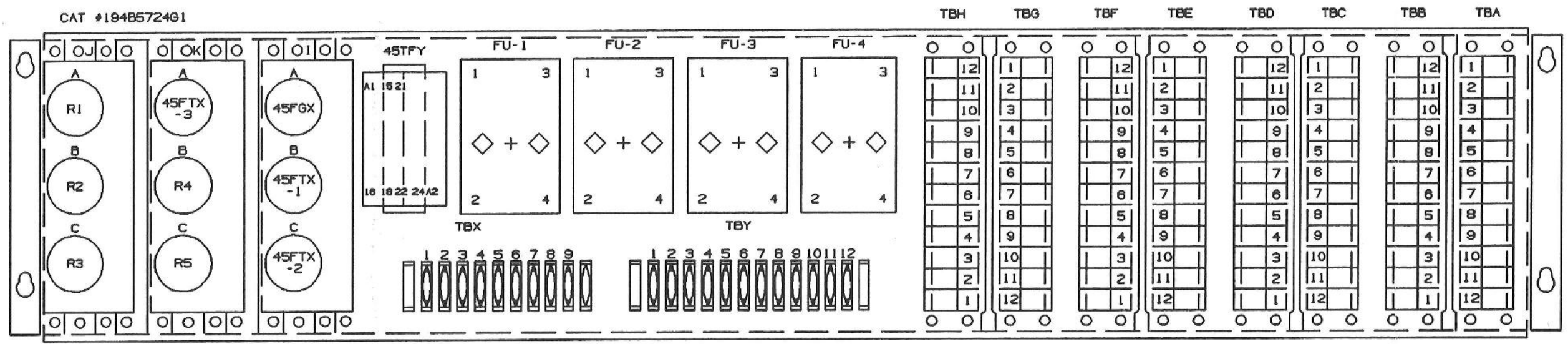
 GE Power Generation		GENERAL ELECTRIC COMPANY BAS TURBINE Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9334 SECT 1	DISTR TO
DRAWN	D MARX SR 00-05-11						
ISSUED	D MARX SR 00-05-11			SCALE	NONE	SHEET 2	

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B933401.PRT

101

MARK V PROTECTIVE INTERFACE MODULE



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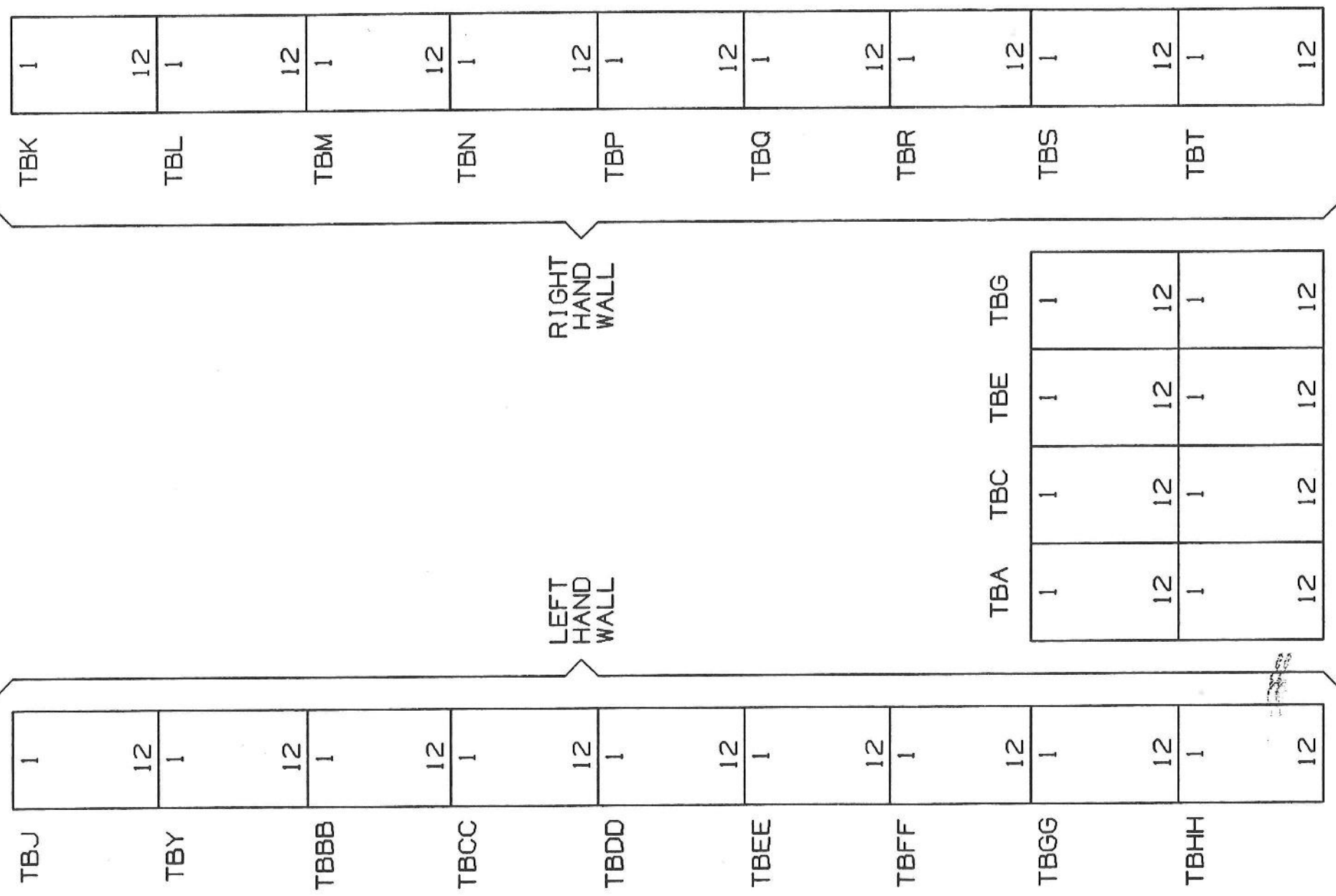
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	DRAWN D MARX SR 00-05-11	ISSUED D MARX SR 00-05-11		SCALE NONE	SHEET 3

DISTR
TO

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B933401.PRT

GENERATOR CONTROL PANEL
TERMINAL BOARD ARR'G'T



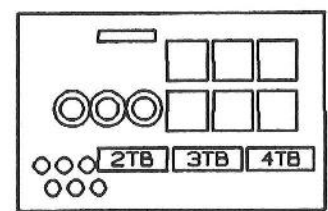
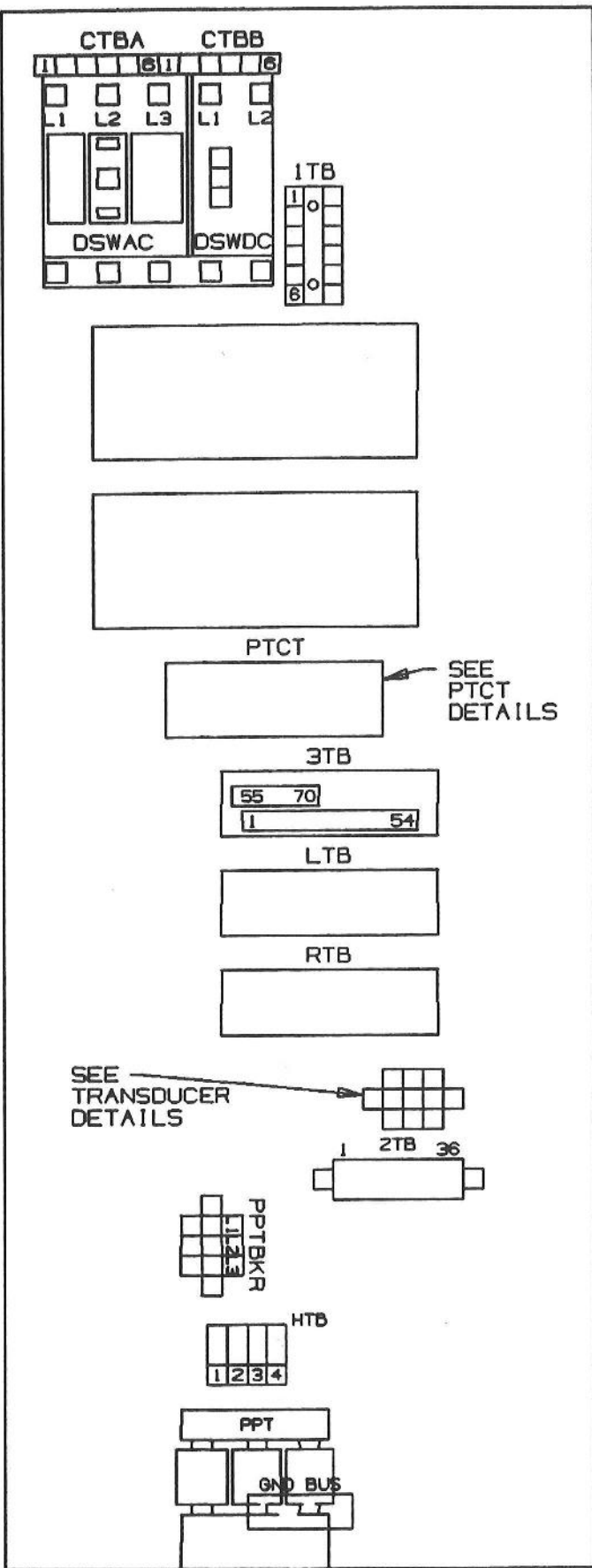
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GE Power Generation		GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY	SIZE B	CAGE CODE	DWG NO 352B9334 SECT 1
DRAWN	D MARX SR 00-05-11		SCALE NONE		SHEET 4
ISSUED	D MARX SR 00-05-11				

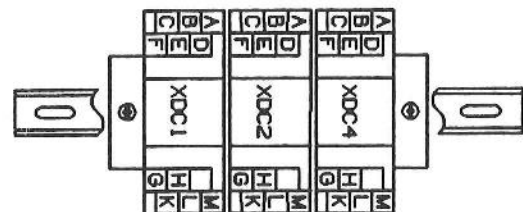
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TO

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

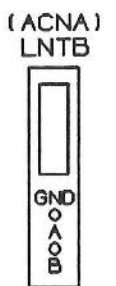
REVISE ON CAD ONLY
UG PART: 352B933401.PRT



PTCT
DETAILS



TRANSDUCER
DETAILS



EX
EX2000 PANEL

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GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9334 SECT 1
DRAWN D MARX SR 00-05-11				
ISSUED D MARX SR 00-05-11		SCALE NONE	SHEET 5	

DISTR
TO

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B933401.PRT

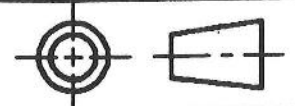
1A	2A	3A
23HG	88VG	SPARE SIZE 2
120/240V PNLBD	23HA-1,2	88FC-1
	23HT-1,2	88FC-2
	88FD-1	88WC-1
23QT	88FD-2	88WC-2
88QC		FEEDER EX2K
480V INCOMING	88BA	SPARE 50A FEEDER

AC MCC
FRONT VIEW

1B	2B
125VDC INCOMING	MCC SP HTR THERMOSTAT
FUTURE	125VDC PNLBD
	27MC-1
88HR-1	
88QE	88DS-1
	FUTURE
	FUTURE

DC MCC
FRONT VIEW

THIRD ANGLE PROJECTION



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 GE Power Generation	GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE	CAGE CODE	DWG NO
			B		352B9334 SECT 1
DRAWN	D MARX SR 00-05-11				
ISSUED	D MARX SR 00-05-11		SCALE		SHEET 6

DISTR
TO

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B933401.PRT

AC MCC

1	
2	
3	
4	02
5	01
6	71
7	70
8	61
9	60
10	51
11	50
12	5
13	4
14	3
15	2
16	1A
17	1
18	X2

FOR UNITS

23HG 88BA
23QT SPARE
88QC 88FC-1
88VG 88FC-2
23HA-1,2
23HT-1,2

1	AC
2	AB
3	AA
4	02
5	01
6	71
7	70
8	61
9	60
10	51
11	50
12	5
13	4
14	3
15	2
16	1A
17	1
18	X2

FOR UNITS

88FD-1
88FD-2
88WC-1
88WC-2

88DS

1	4
2	901
3	2
4	900

88HR-1

1	
2	
3	50
4	51
5	38
6	37
7	36
8	35
9	34
10	K3
11	K2
12	K1

125VDC PNLBD

CB'S	
1	2
3	4
5	6
7	8
9	10
11	12
DC LIGHT INTERFACE	
TB2	TB1
10	2
9	1
8	
7	

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	GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE	CAGE CODE	DWG NO
	GE Power Generation		B		352B9334 SECT 1
DRAWN	D MARX SR 00-05-11		ISSUED	D MARX SR 00-05-11	
SCALE NONE			SHEET 7		

DISTR TO

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B933401.PRT

88QE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	28	29	30	31	32	2A	33
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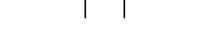
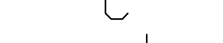
1	F2
2	A2
3	A1

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	GENERAL ELECTRIC COMPANY Schenectady, NY		SIZE	CAGE CODE	DWG NO	DISTR TO
	GE Power Generation		B		352B9334 SECT 1	
DRAWN	D MARX SR 00-05-11		SCALE NONE		SHEET	8
ISSUED	D MARX SR 00-05-11					

Appendix M - Exciter Drawings

P & F Engineering Co. IMU TURBINE 8 - REPLACE CONTROLS - APPENDIX M Page 1 of 2

	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V		
01																					01	
02																					02	
03																					03	
04			SUPPLIED BY OTHERS					PURCHASER'S EQUIPMENT													04	
05			REMOTELY MOUNTED					BUS AUX COMPT DEVICE													05	
06			DOOR MOUNTED					GENERATOR COMPT DEVICE													06	
07			MOUNTED ON DOOR ONE, TWO, ETC.					GENERATOR TERMINAL ENCLOSURE													07	
08			PANEL MOUNTED					PACKAGED ELECTRICAL CONT. CTR (PEECC)													08	
09			MOUNTED IN MAIN OPERATOR'S STATION					PEECC MCC													09	
10			EQUIPMENT EXISTS IN PLACE					STATIC STARTER													10	
11			EX2000 EXCITER					LOAD COMMUTATED INVERTER													11	
12			GENERATOR CONTROL PANEL					ISOLATION TRANSFORMER													12	
13			TURBINE CONTROL					CASE GROUND													13	
14								GROUND BUS													14	
15								CONFIGURABLE LOGIC BLOCK													15	
16			THERMAL SWITCH					CENTRIFUGAL SPEED SWITCH													16	
17			TERMINAL JUMPER					CONTACT ACTUALLY SHOWN ELSEWHERE													17	
18			VOLTAGE CONTROLLED OSCILLATOR					FIELD CONNECTION													18	
19			OPTICAL ISOLATOR					SOFTWARE LOGICAL OR GATE													19	
20			PL PIN NUMBER					SOFTWARE LOGICAL AND GATE													20	
21								SOFTWARE LOGIC NOT													21	
22																					22	
23																					23	
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	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V		

SYMBOLS

LOCATIONS

DEVICES

CONVENTIONS

NOTES:

A. UNLESS OTHERWISE SHOWN ON THE ELEMENTARY DIAGRAM:

1. ALL CONNECTIONS TO THE CONTROLLER'S COMMON MUST BE MADE TO 3TB-66 (COM).

2. NO CONNECTION SHOULD BE MADE TO 3TB60 (+5 VOLTS).

3. ALL DIGITAL TACH AND ENCODER SIGNALS SHOULD BE DIFFERENTIAL.

4. EXCITER COMMON (3TB-66) SHOULD BE GROUNDED AT ONLY ONE POINT. IF THE REFERENCE IS SUPPLIED BY NUMERICAL CONTROL OR PROCESS INSTRUMENT WITH A GROUNDED COMMON THE EXCITER COMMON SHOULD NOT BE GROUNDED SEPARATELY.

5. DEVICES SHOWN WITHOUT CONNECTIONS ARE NOT USED.

B. CONTROL SYSTEM RELAYS OR SOLENOIDS CAN PRODUCE ERRATIC EXCITER BEHAVIOR DUE TO ELECTRICAL NOISE TRANSIENTS. TO REDUCE THIS POSSIBILITY, AN RC SUPPRESSOR IS ADDED IN PARALLEL WITH THE COILS OF THESE DEVICES.

AVOID ELECTROMAGNETIC INTERFERENCE OR 'NOISE' INTRODUCED BY:

1. RADIO FREQUENCY SIGNALS, TYPICALLY FROM PORTABLE TRANSMITTERS USED IN THE VICINITY OF THE EQUIPMENT OR ITS WIRING.

2. STRAY HIGH VOLTAGE OR HIGH FREQUENCY SIGNALS AS MIGHT BE PROVIDED BY ARC WELDERS.

C. WIRING SHOULD BE RUN IN SEPARATE CONDUITS OR WIREWAYS FOR SIGNAL, CONTROL AND POWER WIRING LEVELS.

SIGNAL - LOW LEVEL ANALOG AND DIGITAL SIGNALS

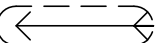
- SPEED, POSITION AND OTHER FEEDBACK/REFERENCE SIGNALS

- POWER SUPPLIES AND LOGIC SYMBOLS (SEE SYSTEM ELEMENTARY AND NOTES TO IDENTIFY SIGNALS)

CONTROL - AC OR DC CONTROL CIRCUITS

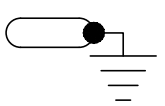
POWER - FIELD LEADS, ARMATURE LEADS

D. SIGNAL WIRING AND POWER WIRING MUST CROSS AT RIGHT ANGLES WITH A MINIMUM ONE INCH SEPARATION. AVOID PARALLEL RUNS BETWEEN SIGNAL LEVEL WIRES AND POWER OR CONTROL WIRES. IF SIGNAL WIRES MUST BE RUN IN PARALLEL TO CONTROL OR POWER WIRES, A MINIMUM OF A FOUR-INCH SEPARATION MUST BE MAINTAINED BETWEEN THE WIRES.

E.  INDICATES [SHIELDED/TWISTED] OR [TWISTED PAIR] WIRING.

-FOR SHORT WIRE RUNS INTERNAL TO THE CONTROLLER, TWISTED PAIR IS ADEQUATE.

-FOR WIRE RUNS EXTERNAL TO THE CONTROLLER (AND INTERNAL TO THE CONTROLLER WHEN LONGER THAN 20 FEET) SHIELDED, TWISTED WIRE IS REQUIRED.

-ALL SHIELD DRAINS SHOULD BE TERMINATED ON ONE END ONLY, THAT END BEING AT THE CONTROLLER. THIS POINT MAY BE DEPICTED ON THE ELEMENTARIES AS  THE REMOTE END OF THE SHIELD DRAIN WIRE SHOULD BE CUT OFF AND THE WIRE TAPED TO PREVENT ACCIDENTAL GROUNDING.

-NO SHIELD DRAIN WIRES SHOULD EVER BE ROUTED THROUGH ANY CONTROLLER MOUNTED FERRITE CORES.

F. CLOSED PUSHBUTTONS AND/OR CLOSED INTERLOCKS INDICATE MAINTAINED CIRCUIT CLOSURE REQUIRED.

G. OPEN PUSHBUTTONS INDICATE MOMENTARY CIRCUIT CLOSURE REQUIRED.

H. SOME SINGLE TERMINAL BOARD CONNECTION POINTS MAY BE SHOWN MORE THAN ONCE FOR DRAWING CLARITY.

I. RELAY CONTACT RATINGS ARE 1 AMP (NON-INDUCTIVE) AT 115 VAC OR 28 VDC, UNLESS NOTED OTHERWISE.

J. ADDITIONAL CONSIDERATIONS:

ENVIRONMENTS WHICH INCLUDE EXCESSIVE AMOUNTS OF ONE OR MORE OF THE FOLLOWING CHARACTERISTICS SHOULD BE CONSIDERED HOSTILE TO EXCITER PERFORMANCE AND LIFE:

1. DUST, DIRT OR FOREIGN MATTER.

2. VIBRATION OR SHOCK.

3. MOISTURE OR VAPORS.

4. RAPID TEMPERATURE EXCURSIONS OR HIGH AMBIENT TEMPERATURES.

5. CAUSTIC FUMES.

6. POWER LINE FLUCTUATIONS.

ATTENTION SHOULD BE GIVEN TO THE NATIONAL ELECTRICAL CODE AND ANY APPLICABLE LOCAL CODES WHEN INSTALLING EQUIPMENT. WIRE SIZE AND INSULATION TYPE, CONDUIT SIZING, ENCLOSURES, ETC., SHOULD BE DETERMINED PER THESE CODES.

GENERAL ELECTRIC

Industrial Systems

SALEM, VA, U. S. A.

ISSUE DATE

01/03/00

REVISION

420E3701A

SHOP ORDER NO.

ZPZ569

ENGINEERING

WA SANDY

TECHNICIAN

DANNY RIPPEE

DRAWN BY

BOBCAT

01/03/00

REVISION NO.

0

REVISION DATE

REVISED BY

01																				01
02	JUMPERS FOR GDDD CARD																			02
03	JUMPER			POSITION		DESCRIPTION														03
04				1-2	2-3															04
05	JP1				X	600V 1-2 300V 2-3														05
06	JP2				X	600V 1-2 300V 2-3														06
07	JP3				X	600V 1-2 300V 2-3														07
08																				08
09																				09
10	JUMPERS FOR PTCT CARD																			10
11	JUMPER			POSITION		DESCRIPTION														11
12				1-2	2-3															12
13	JP1-9				X	CURRENT INPUT 1-2 VOLTAGE INPUT 2-3														13
14																				14
15	JUMPERS FOR TCCB CARD																			15
16	JUMPER			POSITION		DESCRIPTION														16
17				1-2	2-3															17
18	JP1-5				X	TC2000 USES 1-2 EX2000 USES 2-3														18
19	JP14-16			X		NORMAL POSITION 1-2 TEST POSITION 2-3														19
20																				20
21																				21
22	JUMPERS FOR LDCC CARD																			22
23	JUMPER			POSITION		DESCRIPTION														23
24				1-2	2-3															24
25	JP1			X		WRITE DISABLE 1-2 WRITE ENABLE 2-3														25
26	JP7 JP8			X		NORMAL GAIN 1-2 6 TO 1 GAIN 2-3														26
27	JP14 JP15 JP16				X	ISOLATED DLAN 1-2 ARCNET 2-3														27
28	JP17 JP18			X		RESISTOR IN 1-2 RESISTOR OUT 2-3														28
29	JP19 JP22			X		NORMAL OP. 1-2 CARD TEST 2-3														29
30																				30
31																				31
32																				32
33	JUMPERS FOR RTBA CARD																			33
34	JUMPER			POSITION		DESCRIPTION														34
35				1-2	2-3															35
36	JP1-9			USE SETTINGS ON SHEET 07A																36
37	JP10-15			USE DEFAULT SETTING OF 1-2																37
38																				38
39																				39

01																				01
02	JUMPERS FOR NTB CARD																			02
03	JUMPER			POSITION		DESCRIPTION														03
04				1-2	2-3															04
05	JP1 JP2				X	RESISTOR IN 1-2 RESISTOR OUT 2-3														05
06	JP4 AND JP5			1-3 AND 2-4	1-2 AND 3-4	DEPENDS ON PC AND RS232 CABLE CONFIGURATION														06
07	JP6 JP7			3-7 1-5		TRUE HANDSHAKING														07
08	JP8 JP9			1-2 3-4		FORCED TRUE														08
09	JP10 JP11			1-2 3-4		POSITIVE LOGIC														09
10	JP12 JP13			X		ENCODER SUPPLY USE DEFAULT 1-2														10
11	JP14 JP15			X		VCD #3 SCALE USE DEFAULT 1-2														11
12	JP17 JP18 JP19			X		ENCODER ZERO LEVEL USE DEFAULT 1-2														12
13	JP20				X	24 VOLTS 2-3 120 VOLTS 1-2														13
14	JP21			X		COMPL-25 OPEN														14
15	JP22 JP23			X		VCD #4 SCALE SET FOR 24.4 INPUT														15
16	JP24			X		VOLTAGE INPUT 1-2 CURRENT INPUT 2-3														16
17																				17
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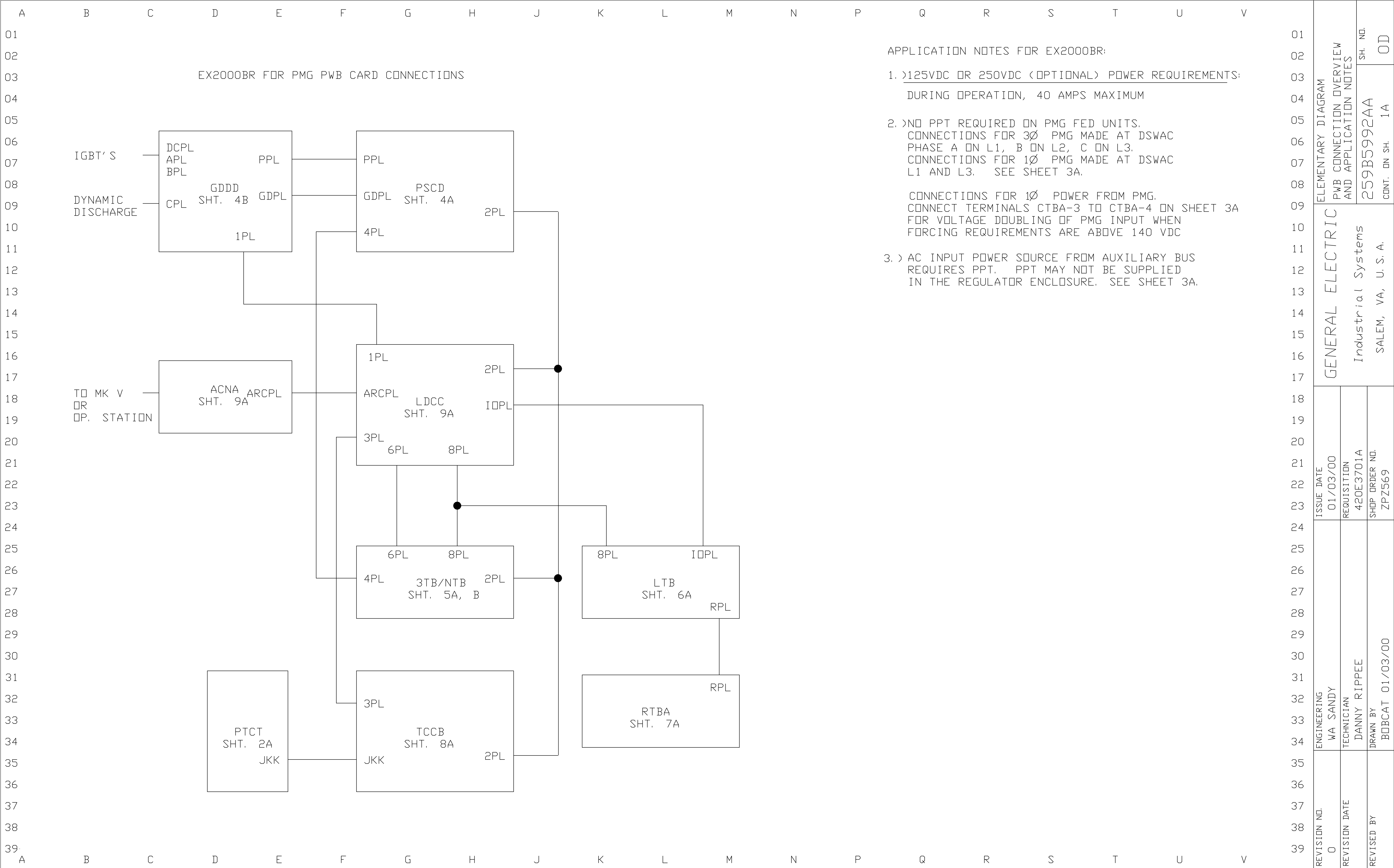
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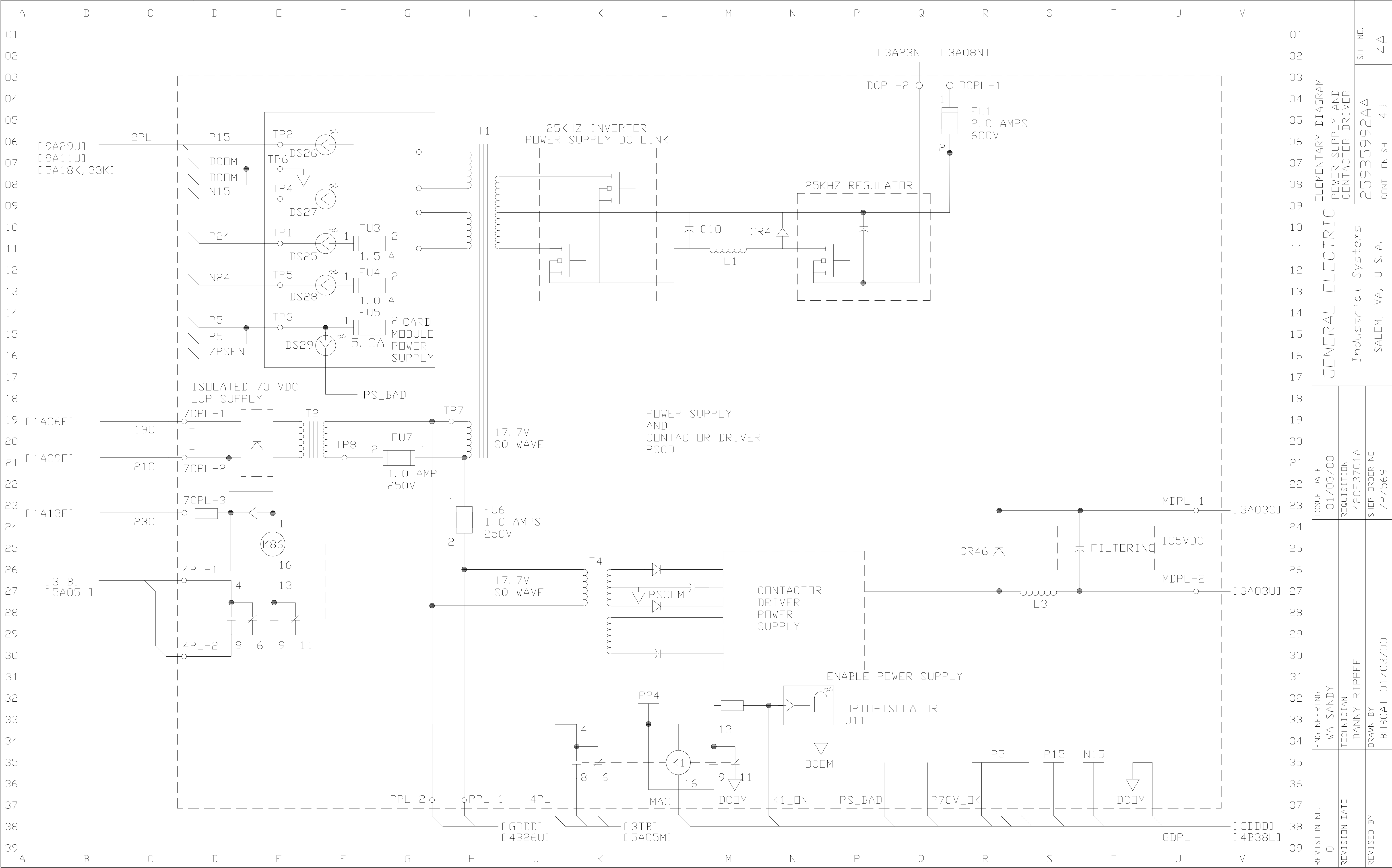
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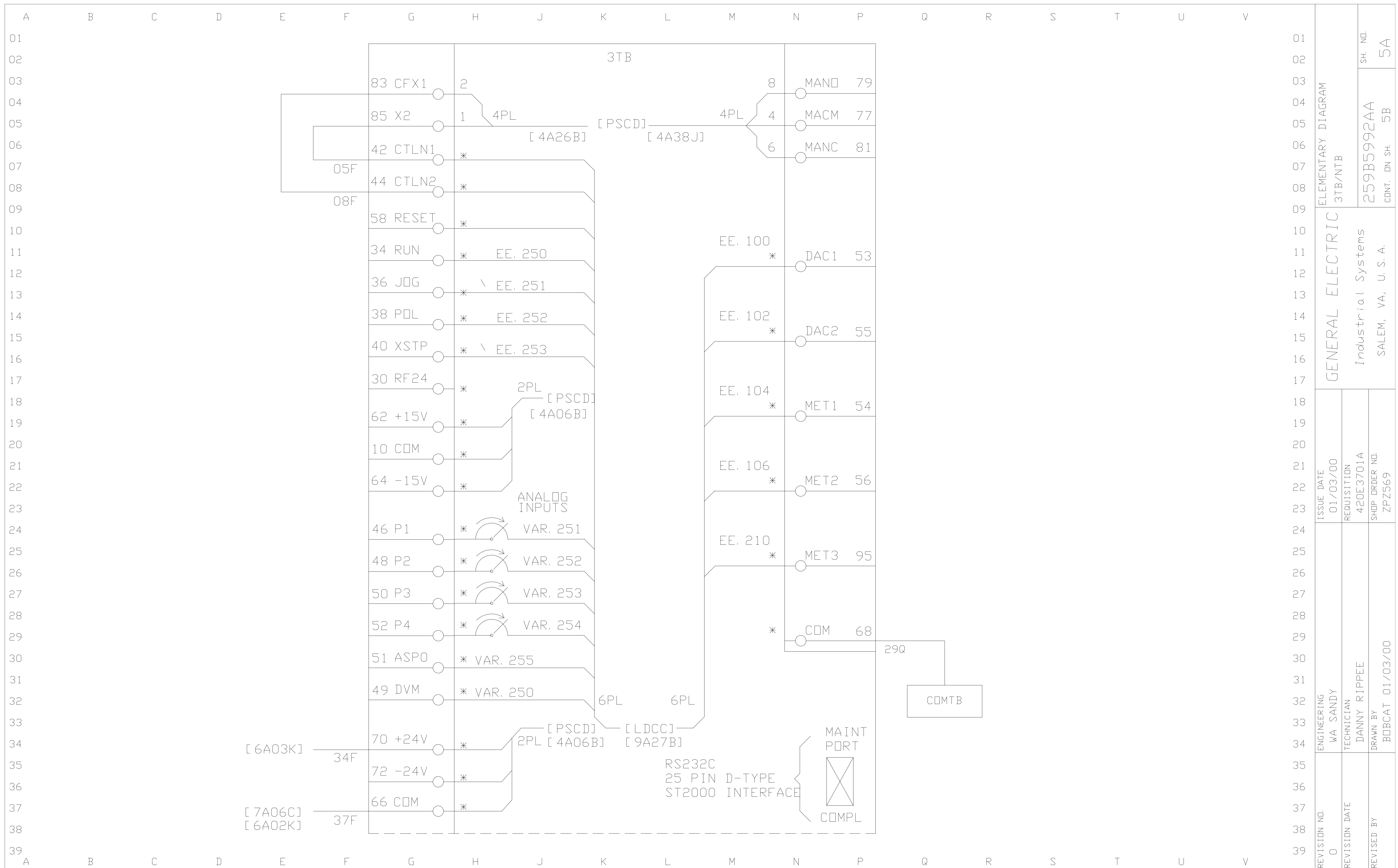
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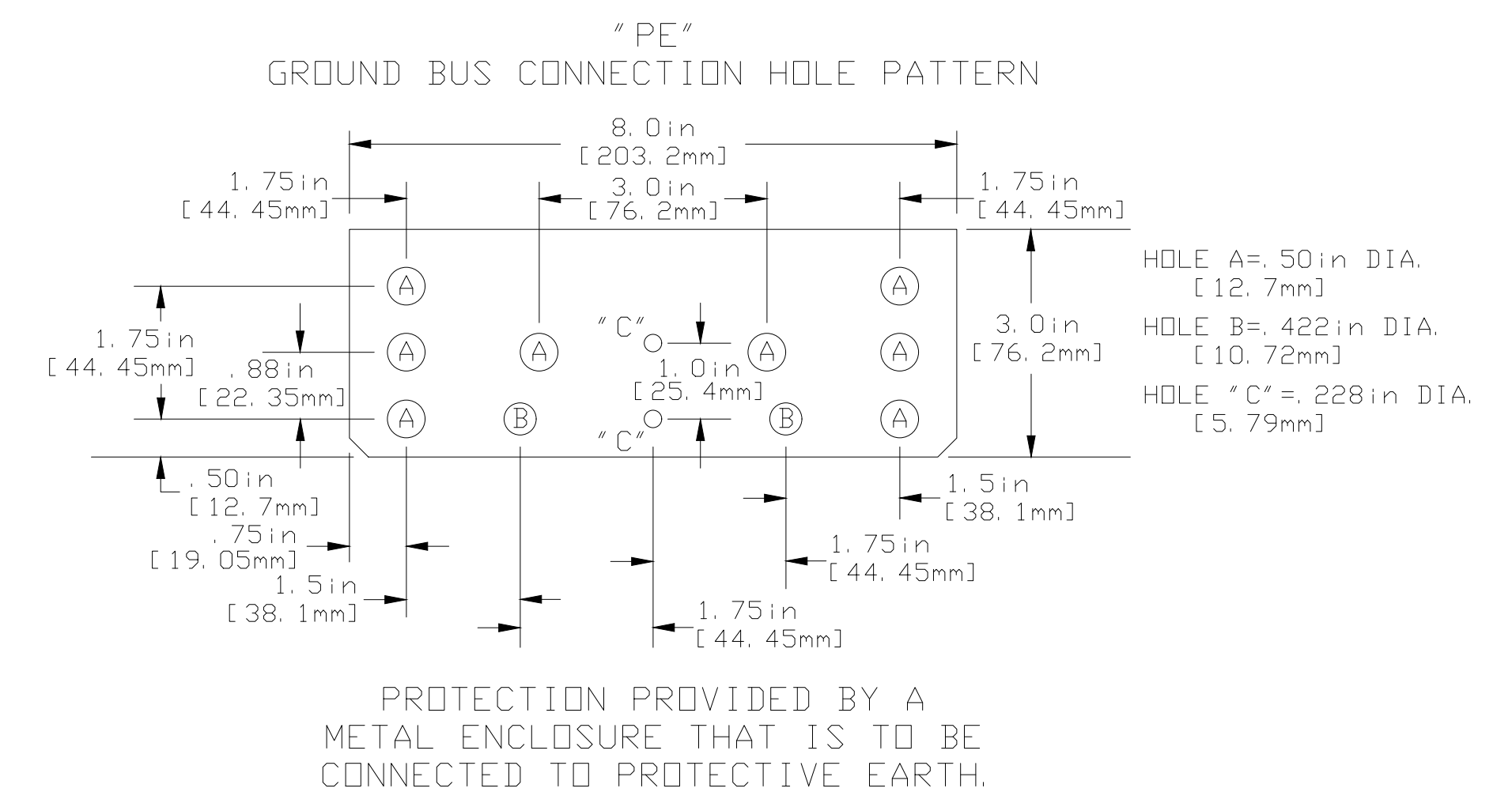
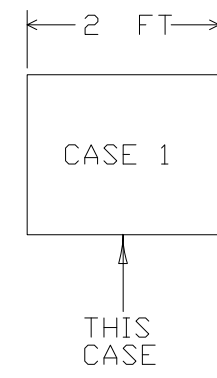
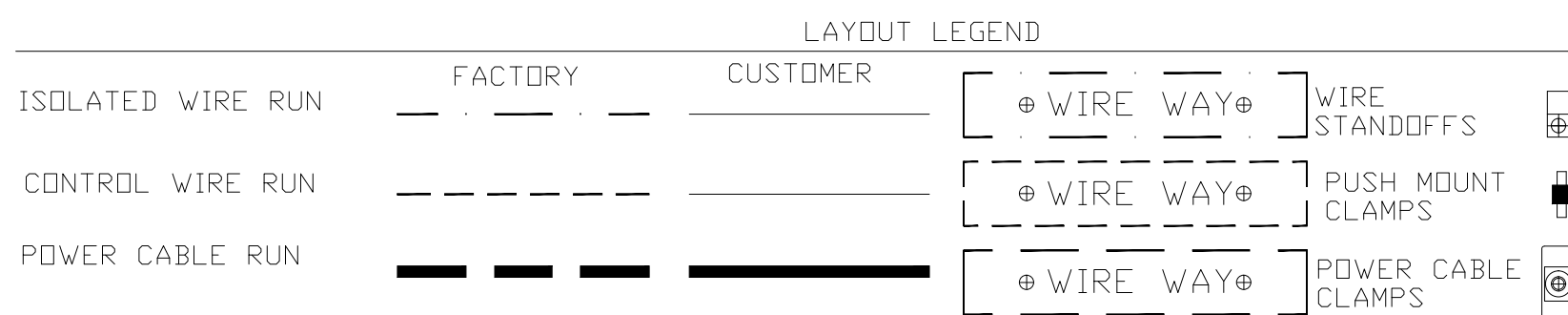
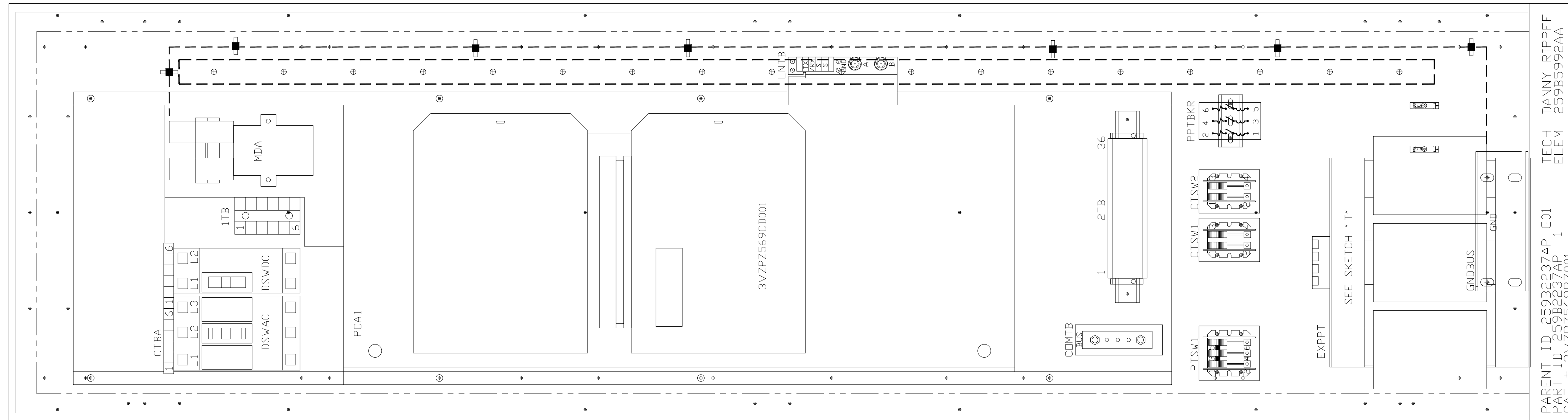
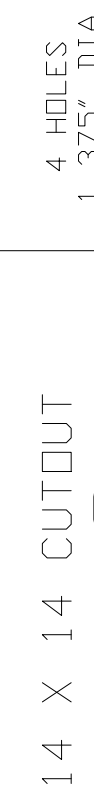
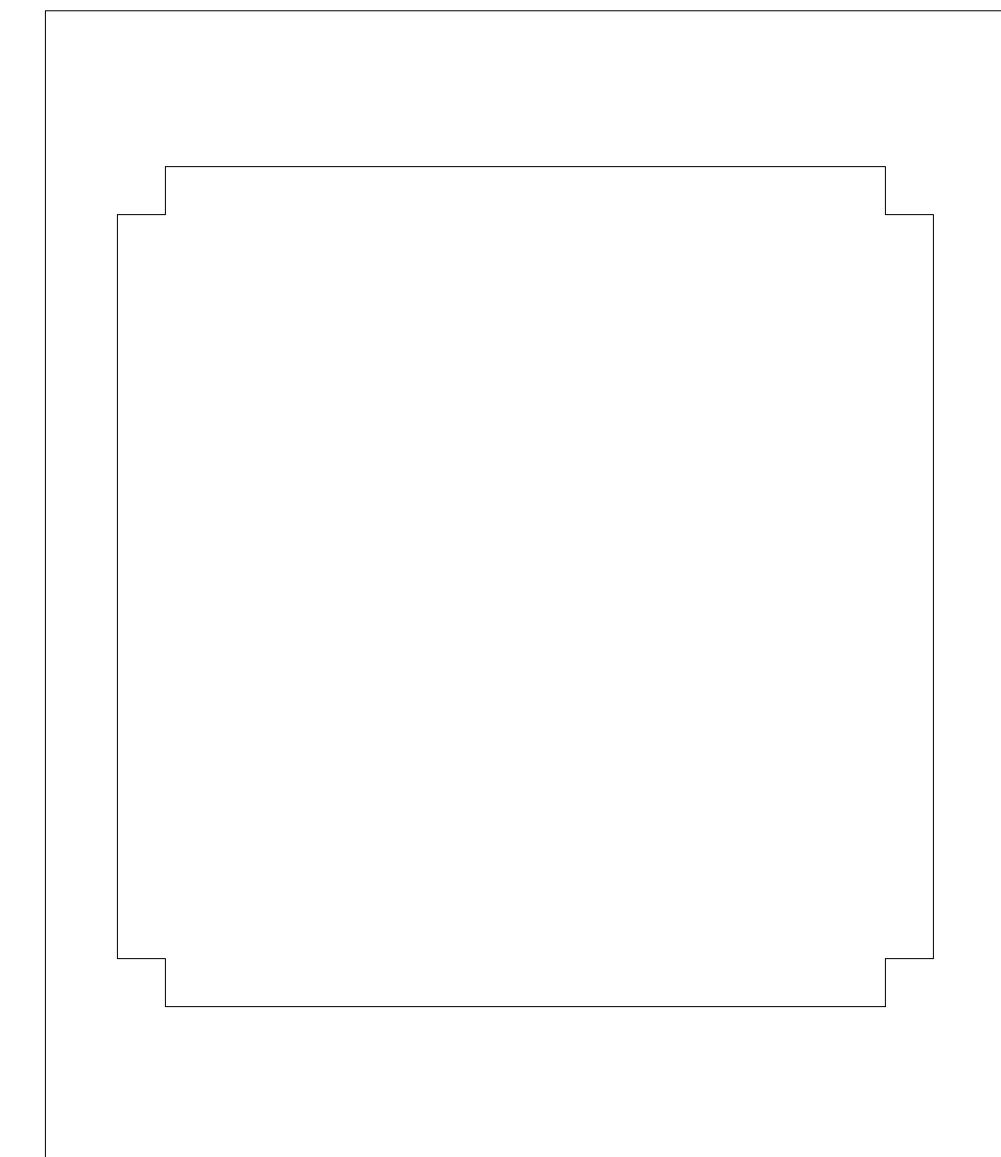
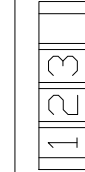
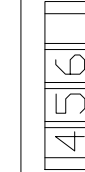


FIG. 1 – REGULATOR FRAME DETAILS



CASE 1

THIS
CASE



REVISION NO. 0	CASE SIZE 24W X 90H X 20D	ISSUE DATE 01/03/00	GENERAL ELECTRIC Industrial Systems SALEM, VA. U. S. A.		PANEL LAYOUT DIAGRAM ALSTOM TEAM CONTROL		SH. NO. 1
REVISION DATE	TECHNICIAN DANNY RIPPEE	REQUISITION 420E3701A					
REVISED BY BOBCAT	DRAWN BY BOBCAT	SHOP ORDER NO. 01/03/00 ZP7569					

GENERAL ELECTRIC

Industrial Systems

SALEM, VA. U. S. A.

259B5992AP

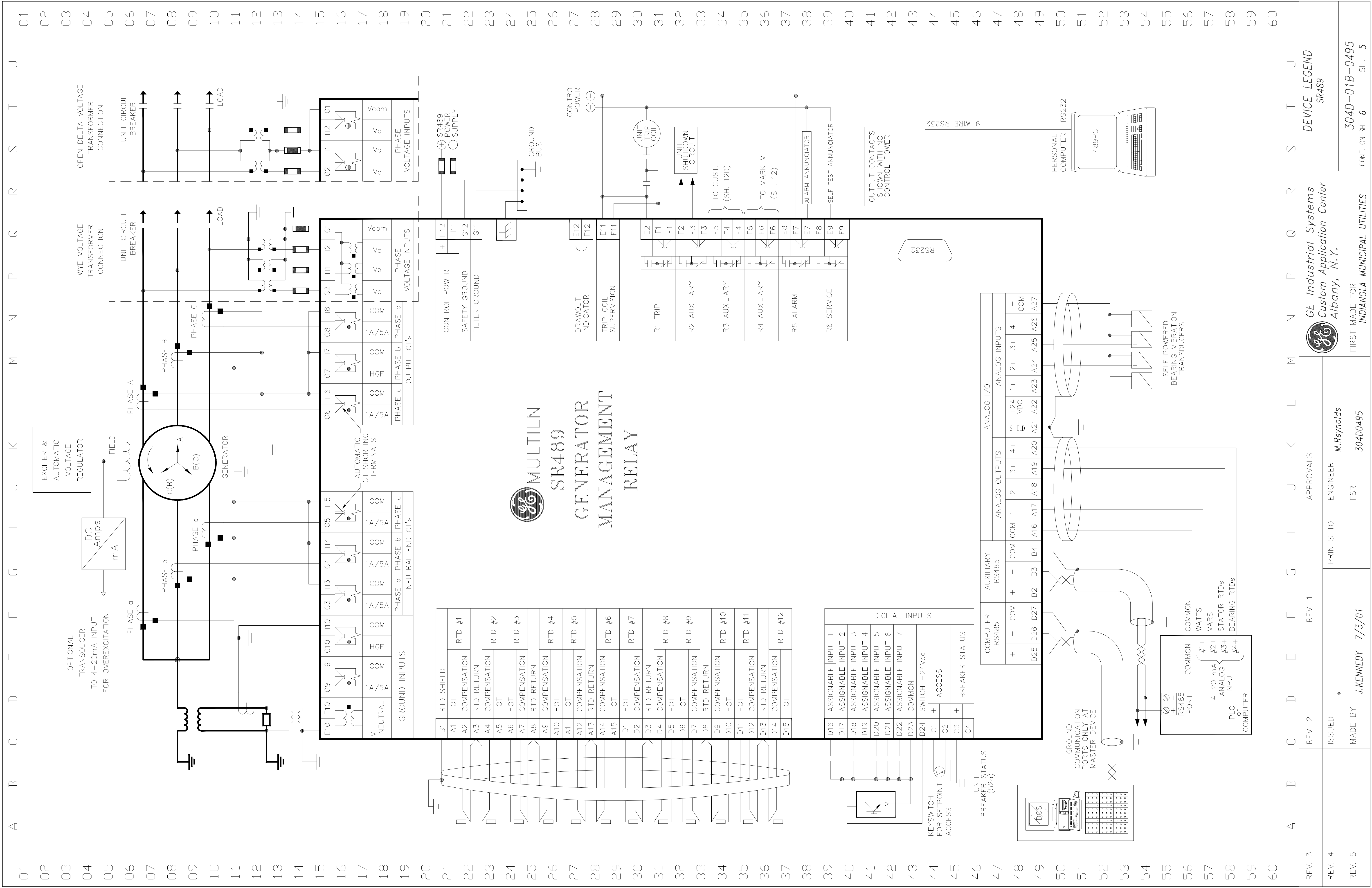
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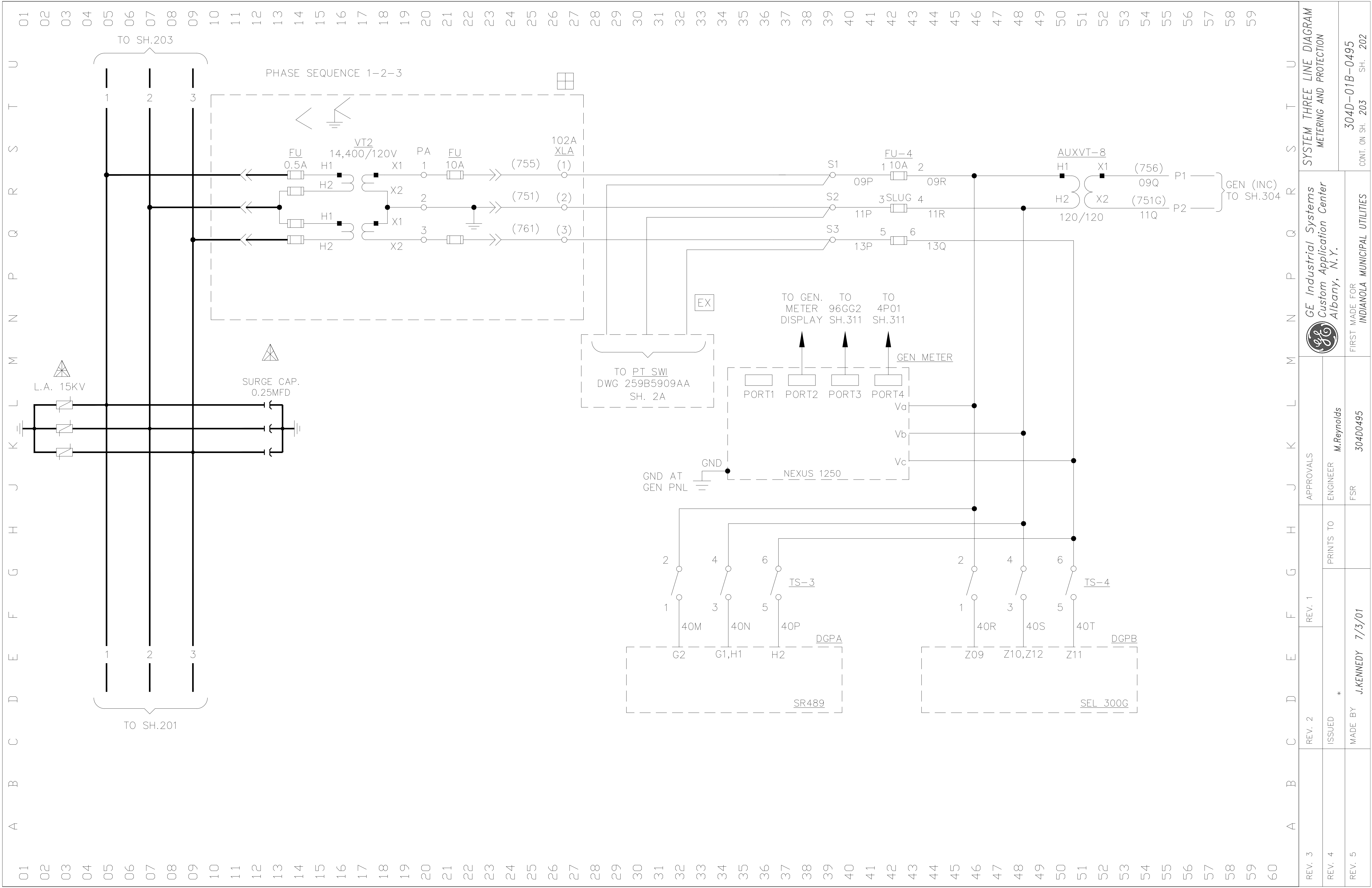
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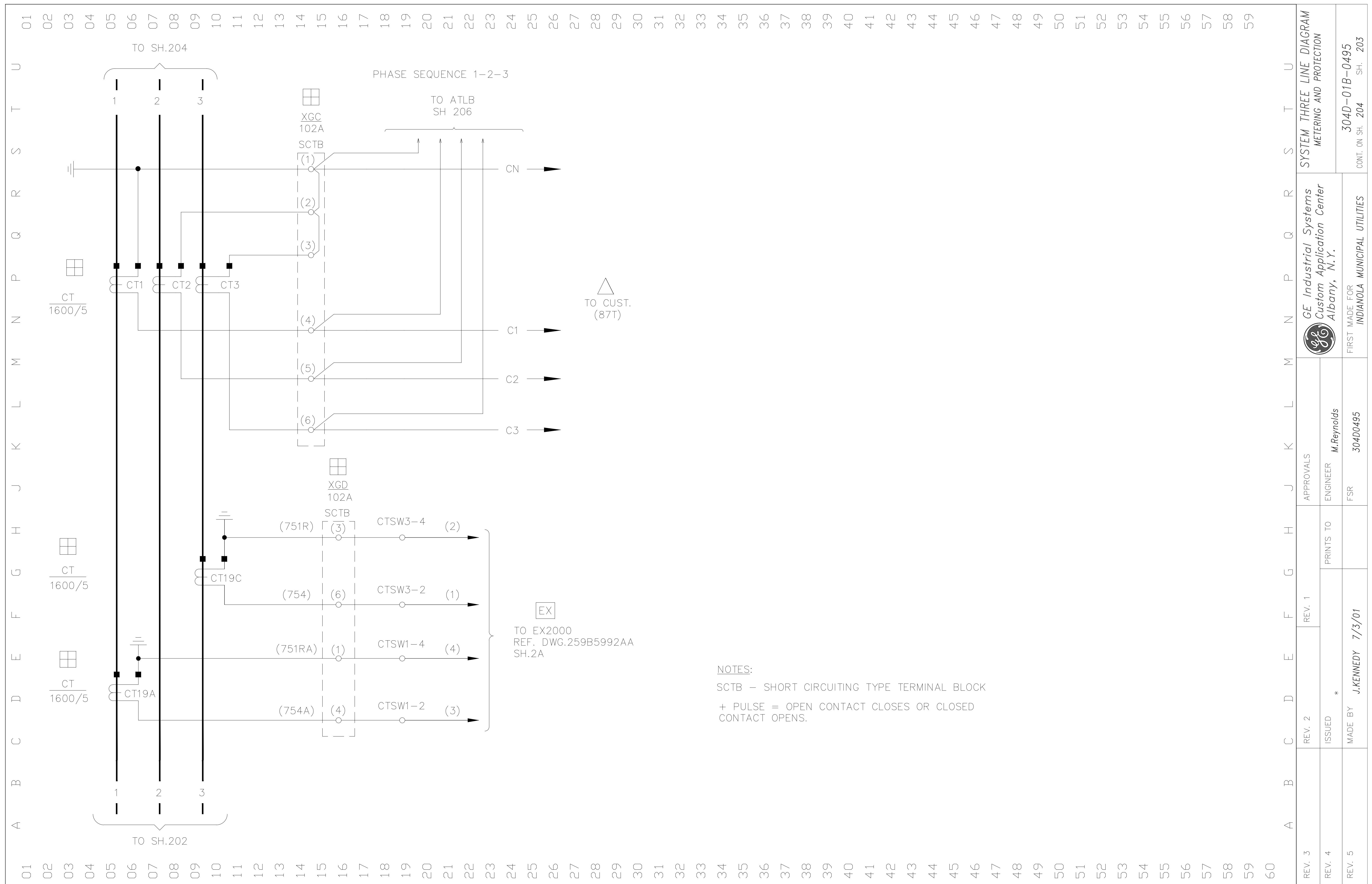
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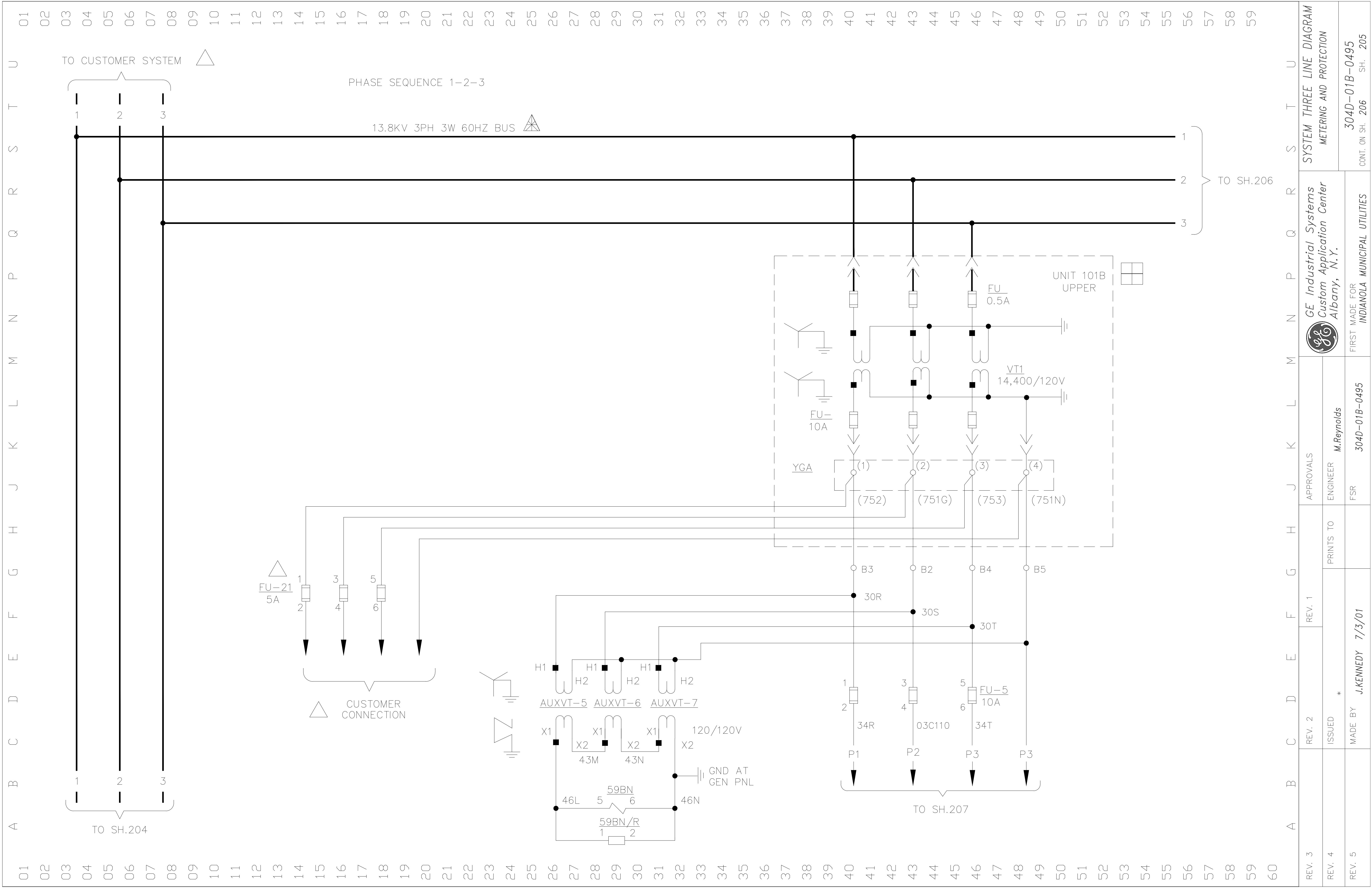
Appendix N - Generator Protection and Turbine Auxiliary; Schematic Drawings

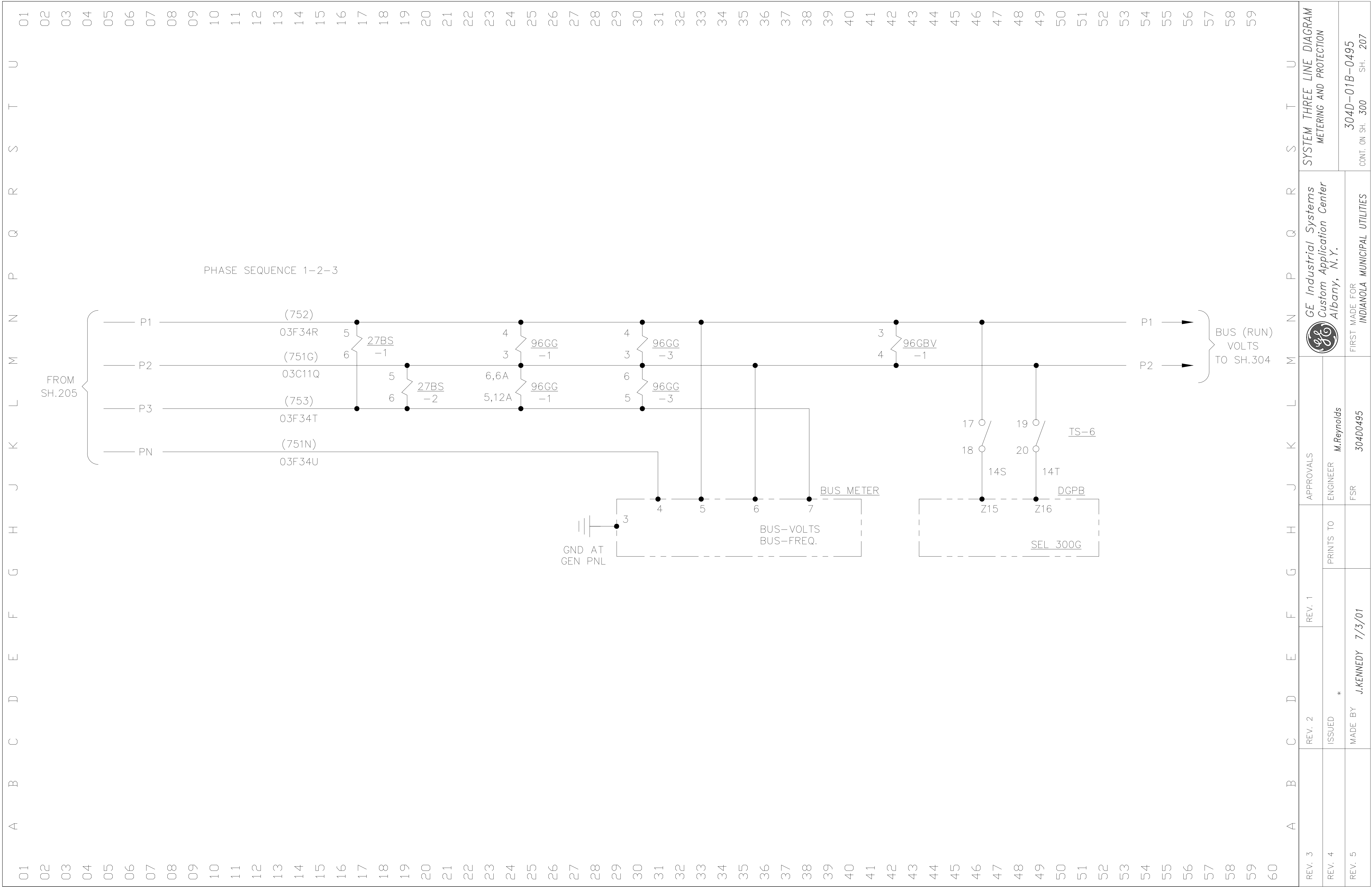
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GE ENGINEERING SERVICES (ALBANY, NY) FSR# 304D0495																			FIRST MADE FOR INDIANOLA MUNICIPAL UTILITIES											304D-01B-0495 SH. 0																													
GE ENGINEERING SERVICES (ALBANY, NY) FSR# 304D0495																			INDIANOLA MUNICIPAL UTILITIES																																								
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INDIANOLA, IOWA																																																											
GENERATOR PROTECTION PANEL																																																											
T-143																																																											
REFERENCE DRAWINGS																																																											
GE POWER GENERATION																			112E5226																																								
GE ENGINEERING SERVICES (DALLAS, TX.)																			91704AE																																								
GE ENGINEERING SERVICES (BEAUMONT, TX.)																			420E3701																																								
GE TEAM CONTROLS																			91704A																																								
GE AUTOMATION SERVICES																			91704A-ENCO																																								
GE INDUSTRIAL SYSTEMS																			259B5992AA																																								

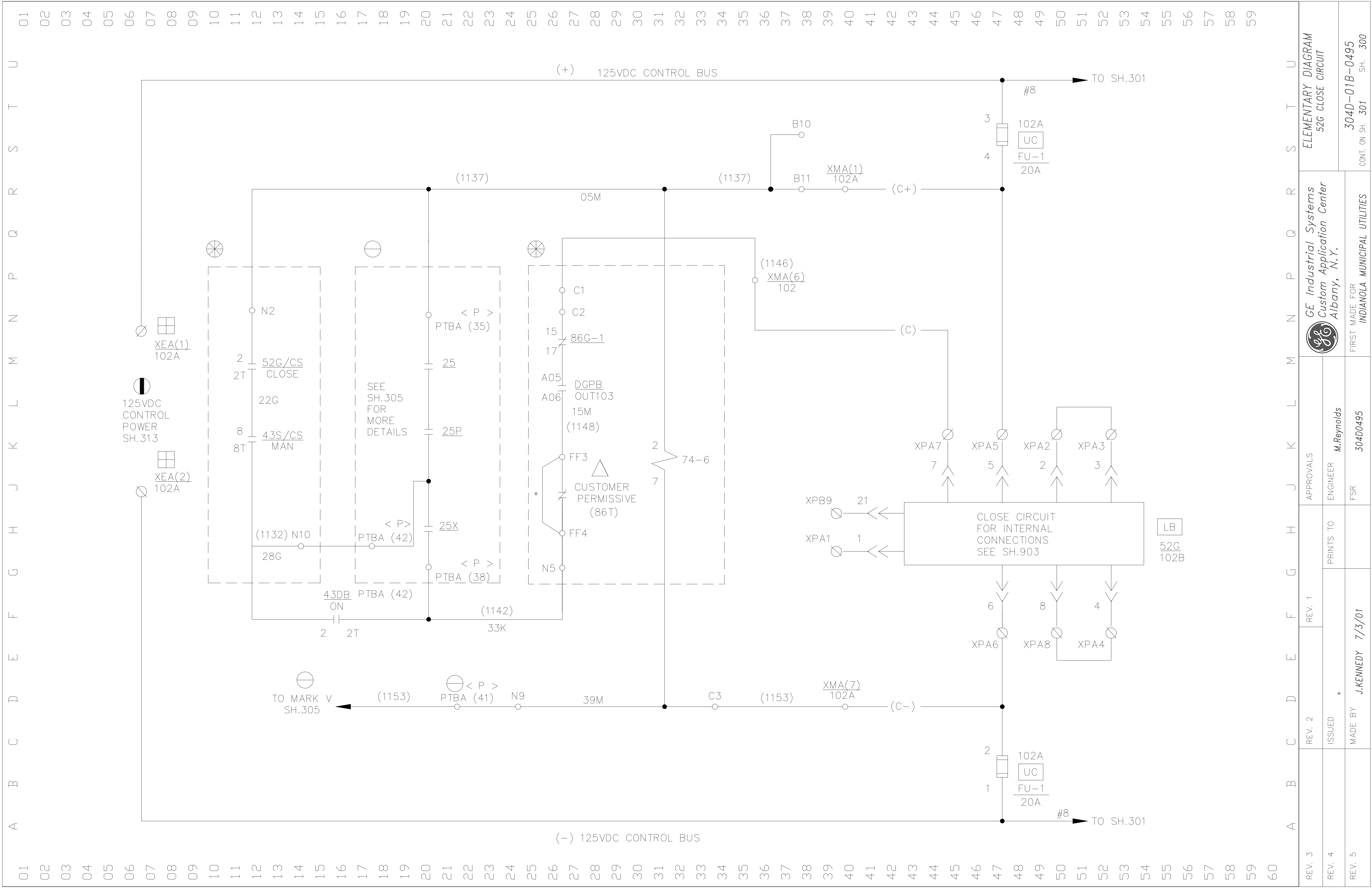


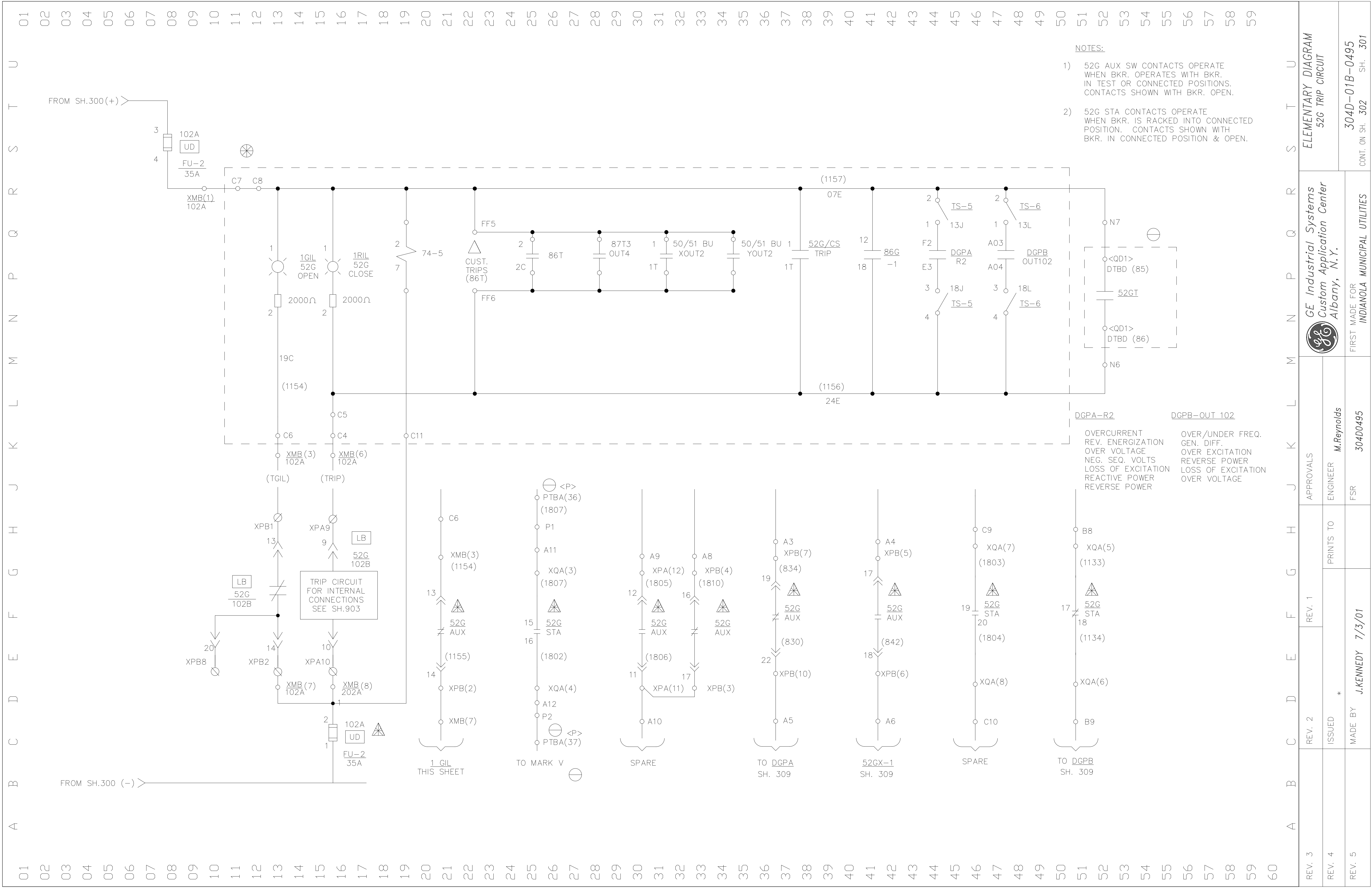


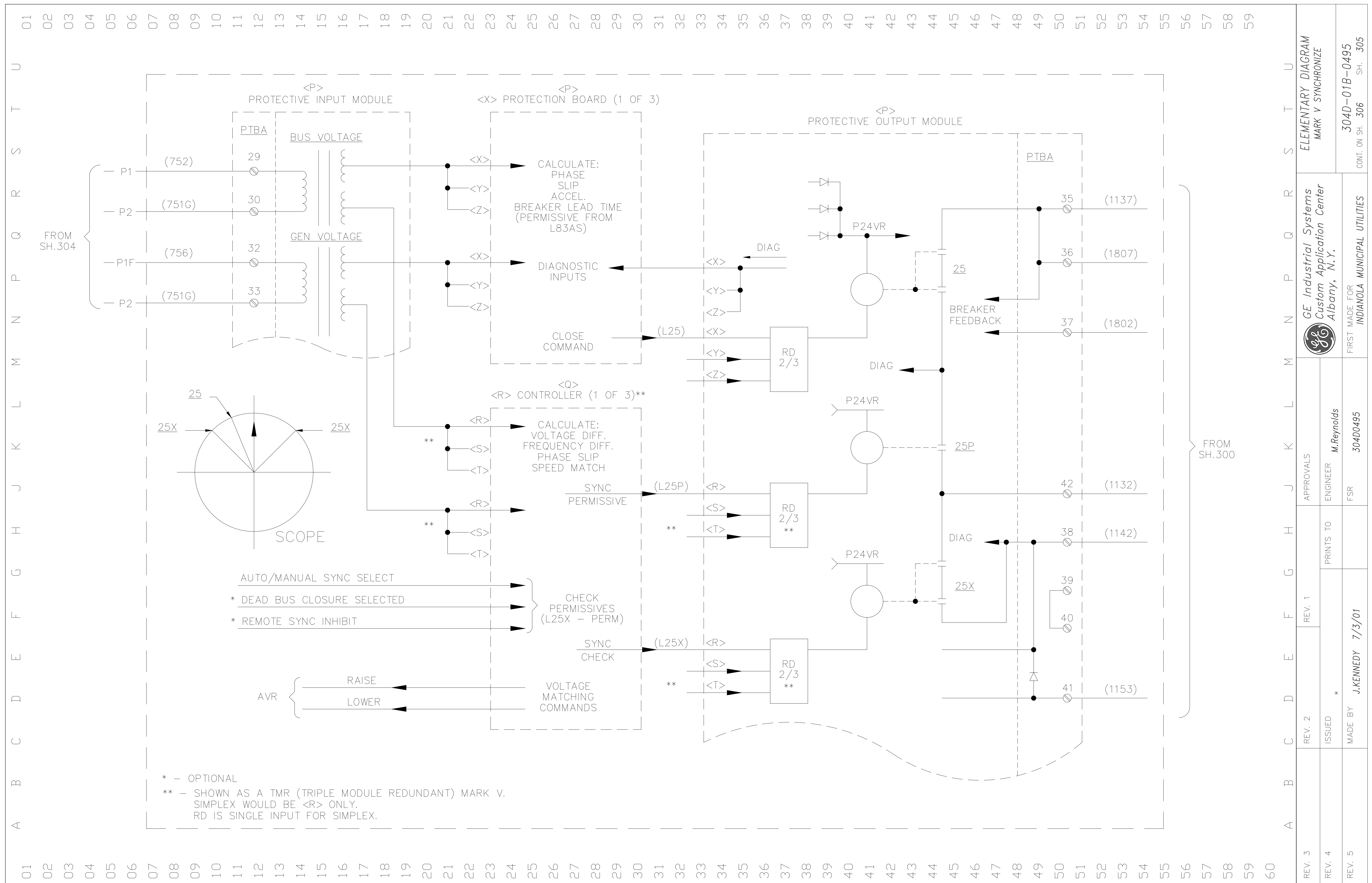


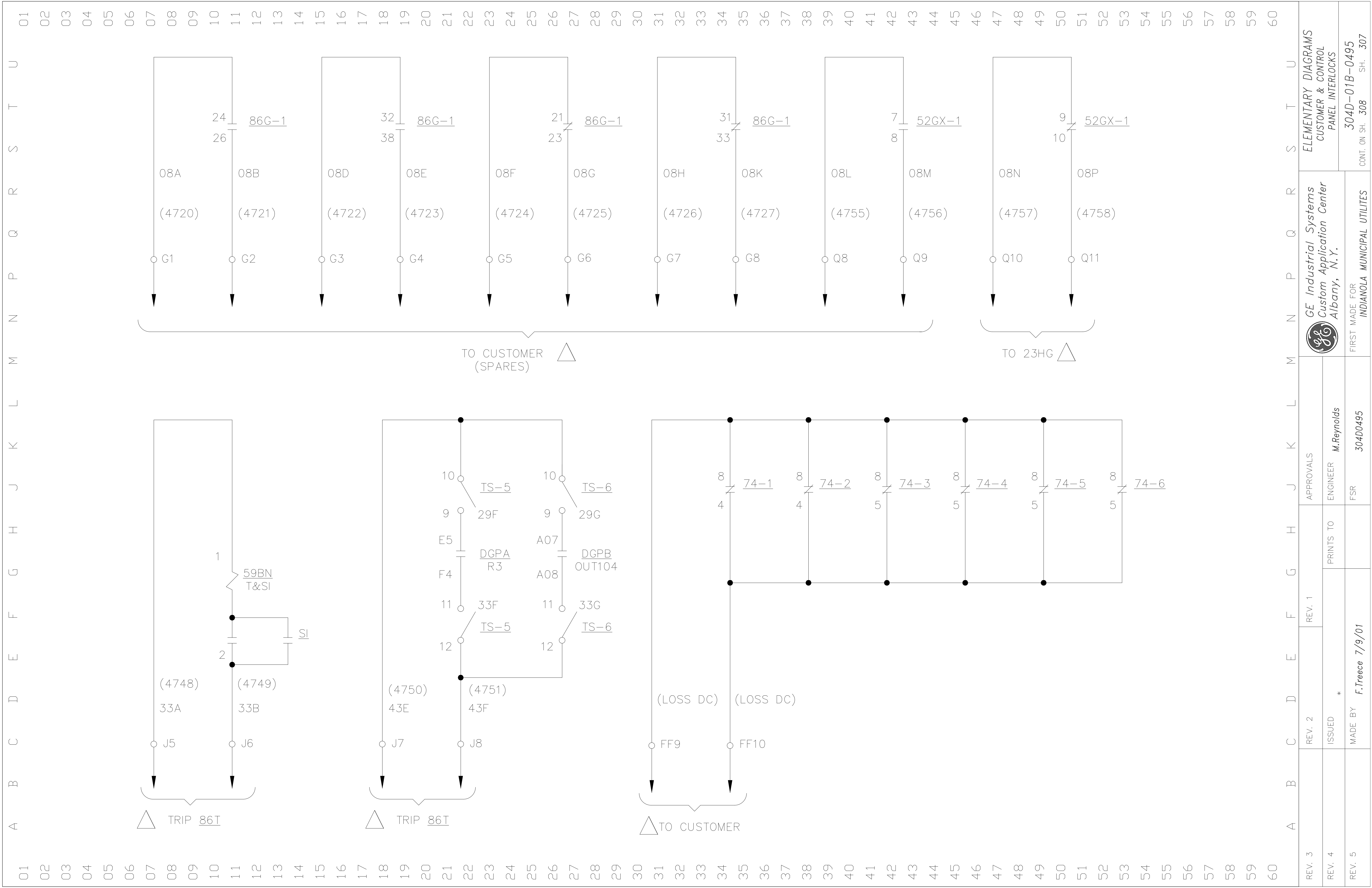


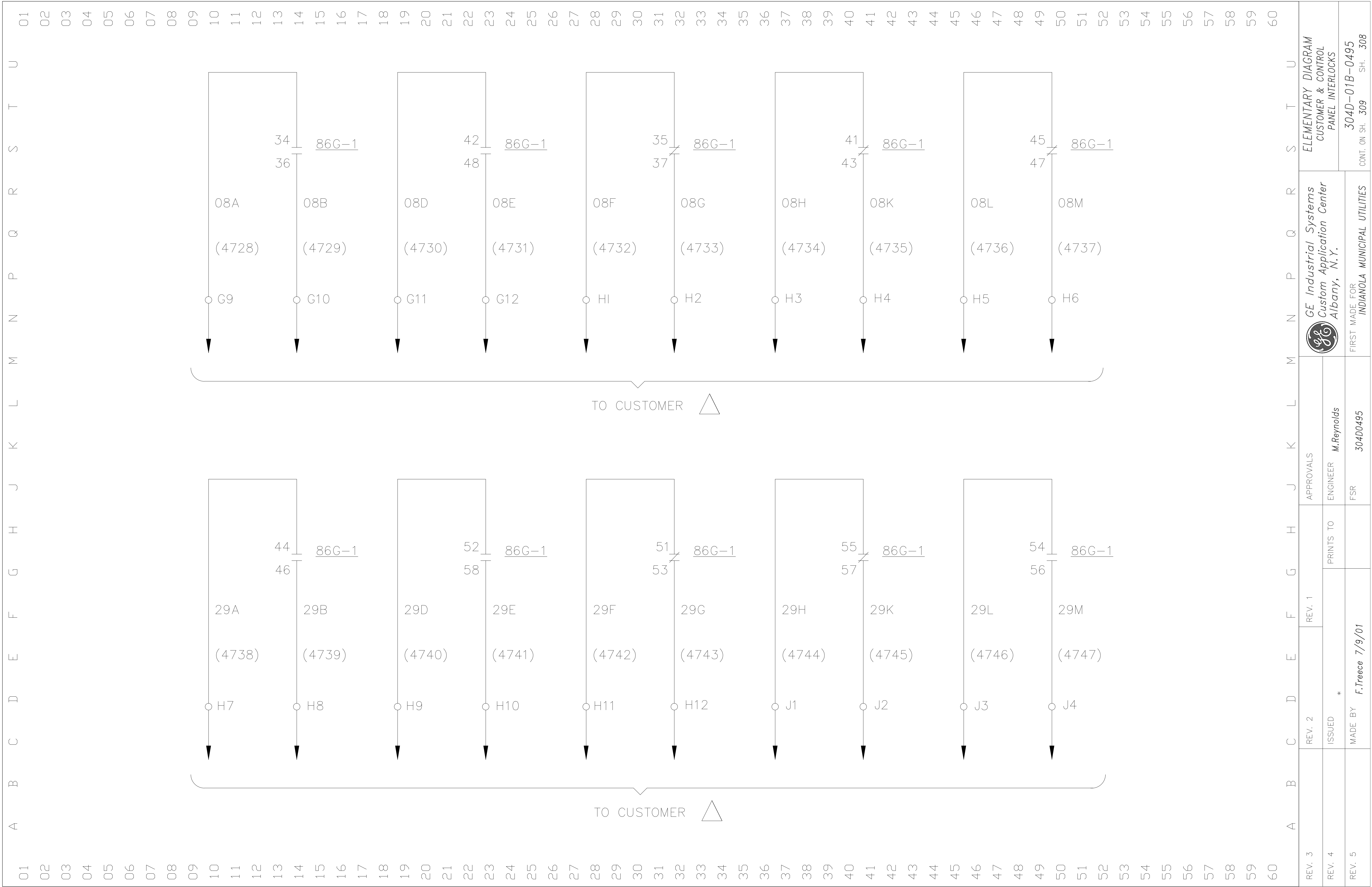


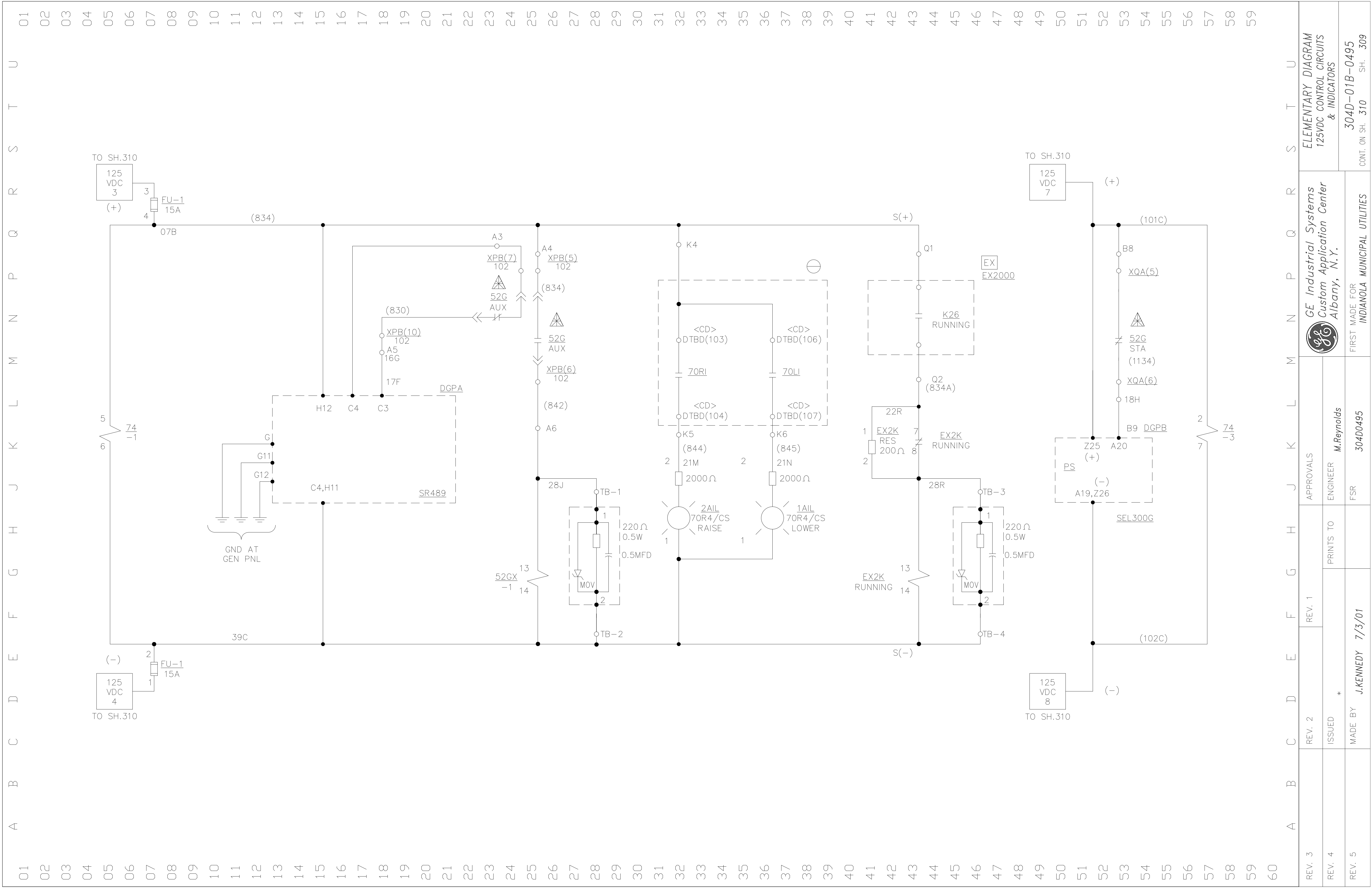


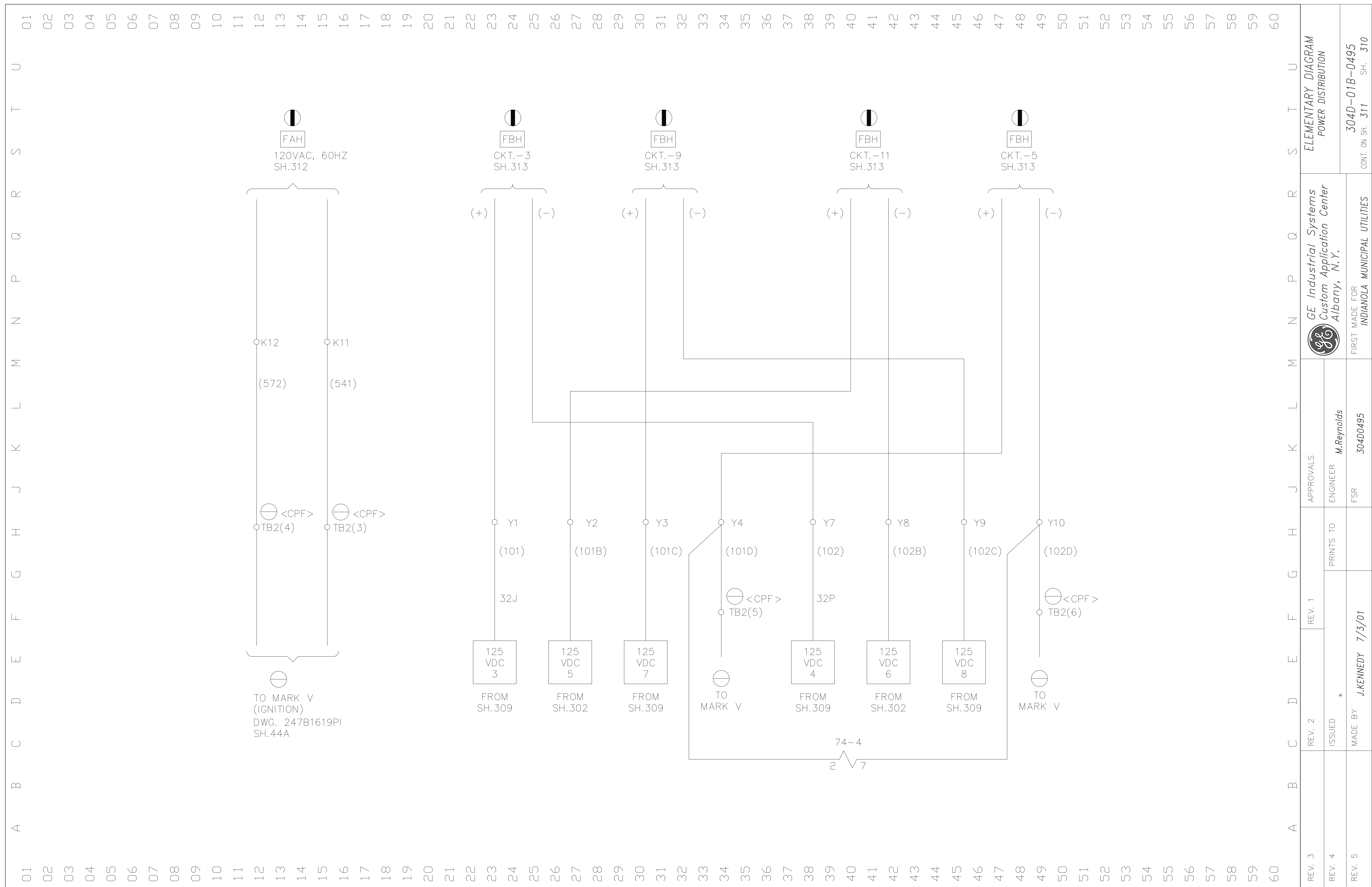


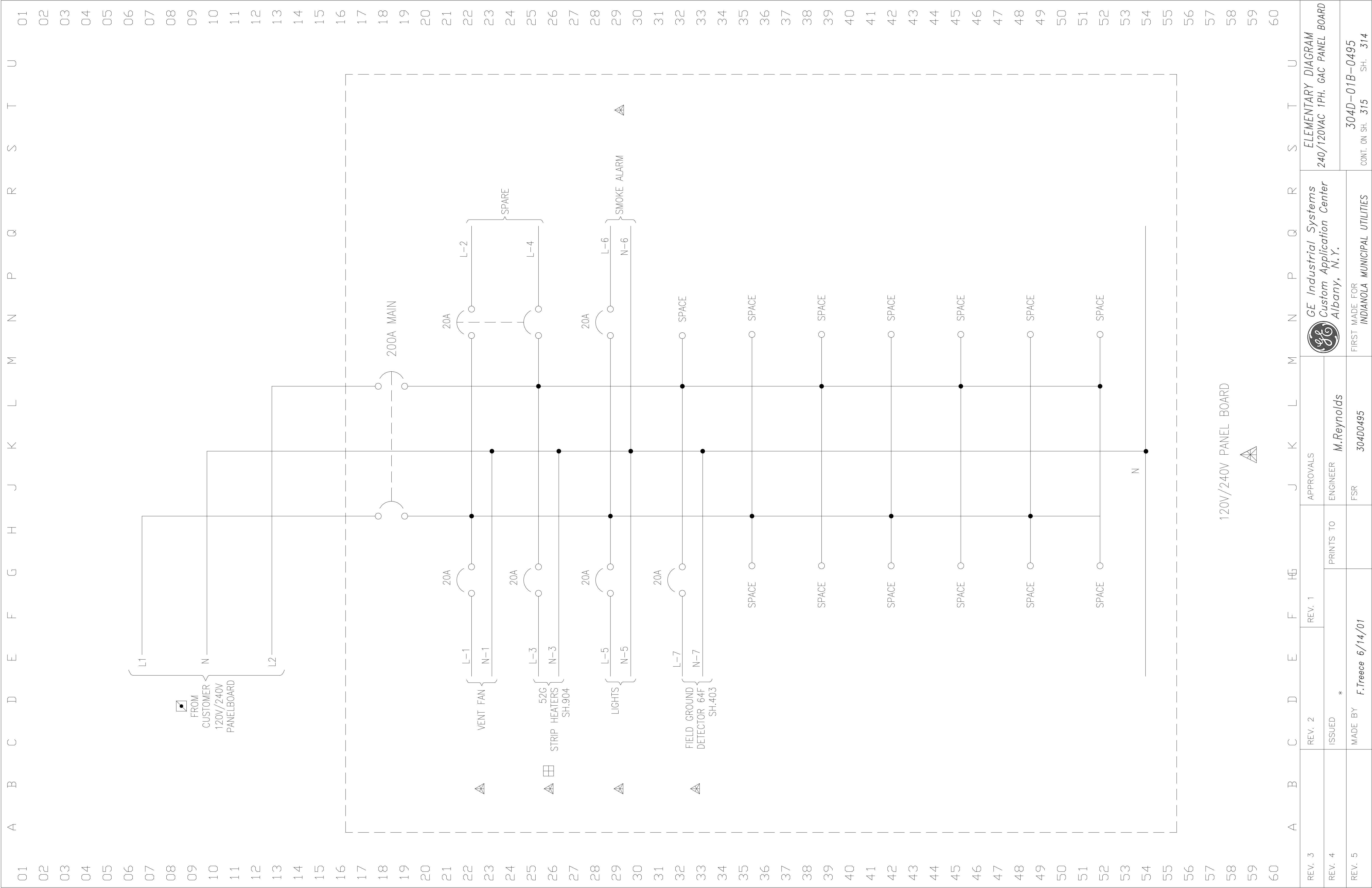






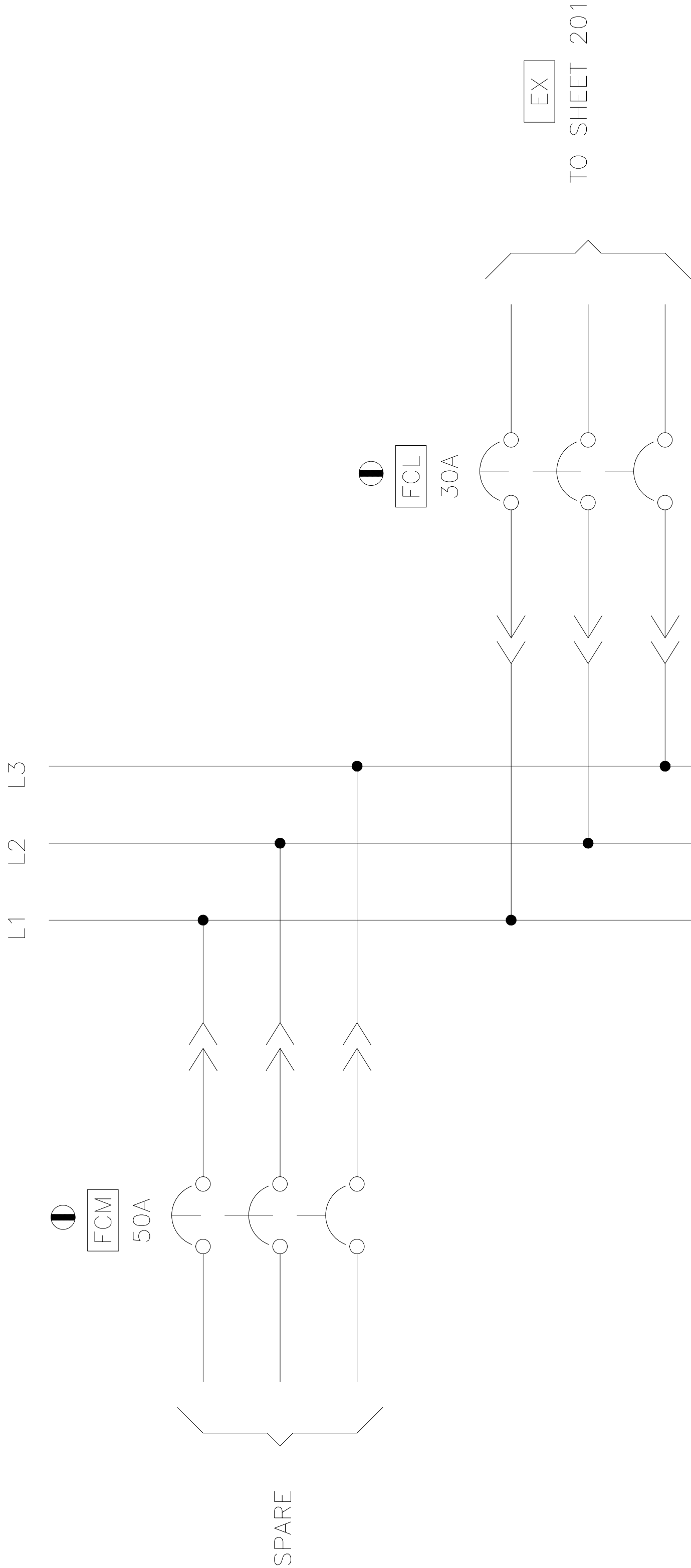


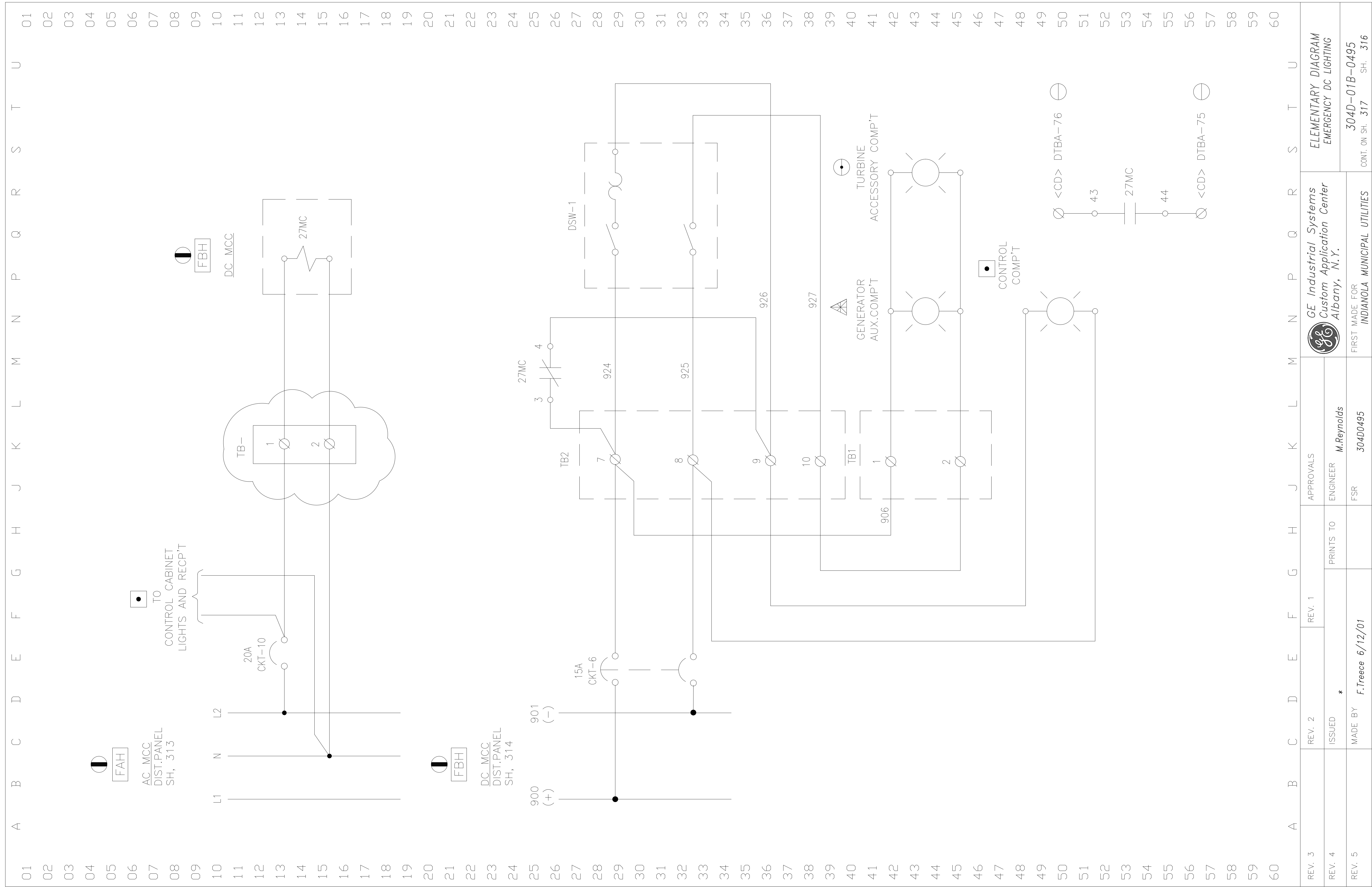


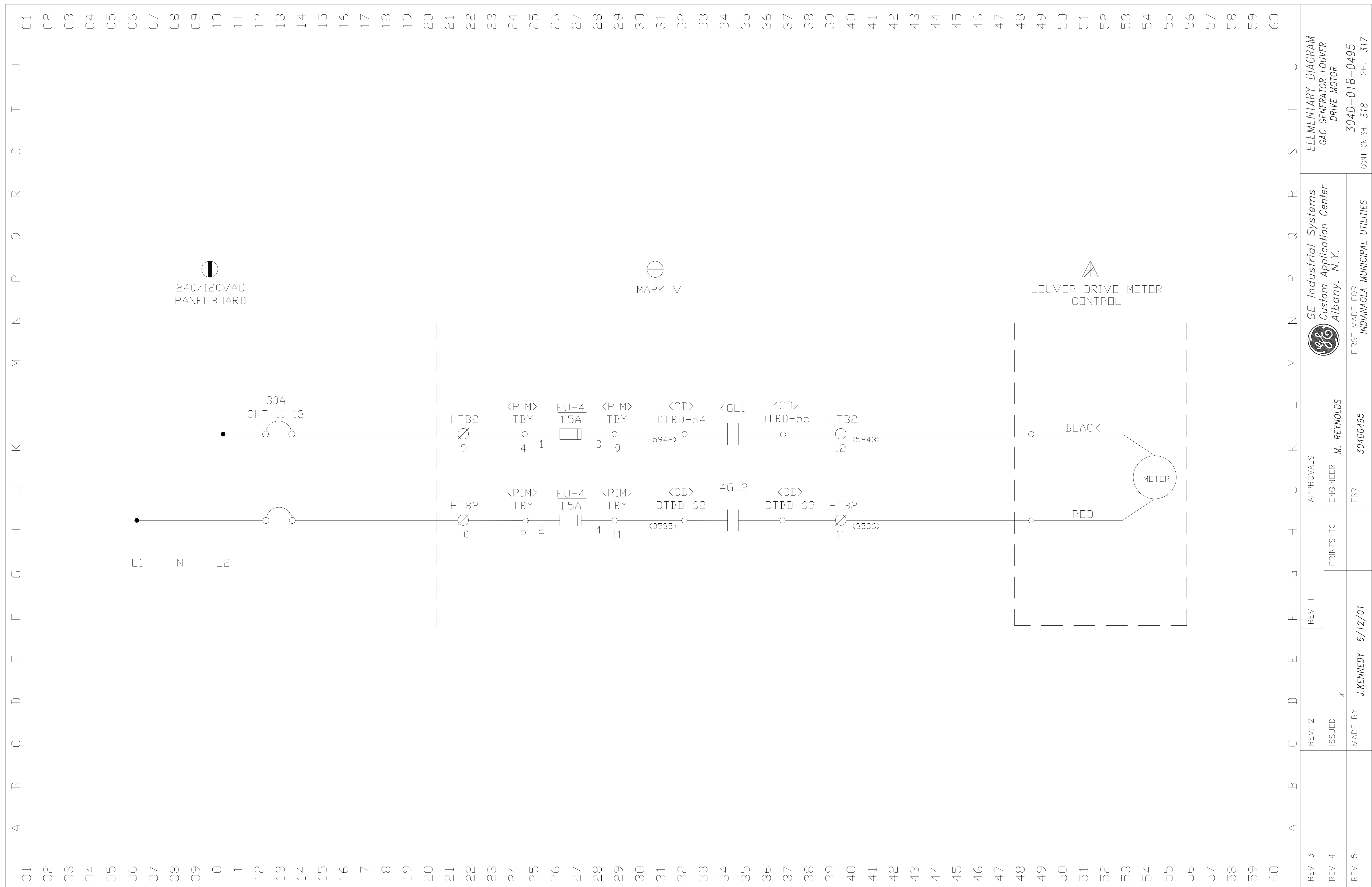


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REV. 3			REV. 2			REV. 1	APPROVALS		GE Industrial Systems Custom Application Center Albany, N.Y.											ELEMENTARY DIAGRAM 480V 3 PHASE MCC FEEDERS	
REV. 4			ISSUED	*			PRINTS TO		ENGINEER M. REYNOLDS												
REV. 5			MADE BY	J.KENNEDY	6/13/01		FSR		304D0495											304D-01B-0495 CONT. ON SH. 316 SH. 315	

ACMCC MAIN BUS
480VAC, 3PH., 60HZ.







Appendix O - Control Cab MCC, Connection and Elementary Drawings

NOTES:

1. REFER TO GEH-2614 FOR MOTOR OVERLOAD HEATER SELECTION TABLE.
2. STANDARD TYPE OVERLOAD RELAY.

MCC – AC: 3 PHASE, 3 WIRE, 60 HZ 600A MAIN BUS, 42KA ASYM SHORT CKT RATING

UNIT NO.	NOMEN-CLATURE	DESCRIPTION	LOAD HP/KW	STARTER NEMA SIZE	STARTER TYPE	CKT. BKR SWITCH TYPE	TRIP FUSE/CLIP	OVERLOAD HEATER CR123	DL SETT %	POWER/CONTROL VOLTAGE VA	CONN. DIAG. DWG. NO.	ELEM. DIAG. DWG. NO.
	23HG	GENERATOR COMPT HEATER	4.5 KW	1	FVNR	SEL(T)	20	C330B		480/1210 150	304D-01B-0495 SH. 504	304D-01B-0495 SH. 321
	SPARE			2	FVNR	SEL(T)	50	C250B		480/1210 150	304D-01B-0495	304D-01B-0495 SH. 330
	88BA	COOLING AIR FAN ACCESS & TURB COMPT	5.5 HP	1	FVNR	SEL(T)	30	C778A		480/1210 150	304D-01B-0495 SH. 504	304D-01B-0495 SH. 329
	88VG	LOAD GEAR COMPT COOLING FAN	2.5 HP	1	FVNR	SEL(T)	7	C356A		480/1210 150	304D-01B-0495 SH. NONE	304D-01B-0495 SH. 324
	88QC	COOLDOWN LUBE OIL PUMP	7.5 HP	1	FVNR	SEL(T)	15	C104B		480/1210 150	304D-01B-0495 SH. NONE	304D-01B-0495 SH. 323
	23QT	LUBE OIL SYSTEM IMMERSION HEATER	15 KW	1	FVNR	SEL(T)	30	C330B		480/1210 150	304D-01B-0495 SH. 504	304D-01B-0495 SH. 322
	23HT-1 23HT-2	TURBINE COMPT HEATER	12 KW	1	FVNR	SEL(T)	30	C330B		480/1210 150	304D-01B-0495 SH. 505	304D-01B-0495 SH. 326
	23HA	ACCESSORY COMPT HEATER	12 KW	1	FVNR	SEL(T)	30	C330B		480/1210 150	304D-01B-0495 SH. 506	304D-01B-0495 SH. 325
	88FD-1	FUEL FORWARDING PUMP #1	8.4 HP	1	FVNR	SEL(T)	30	C113B		480/1210 150	304D-01B-0495 SH. 505	304D-01B-0495 SH. 327
	88FD-2	FUEL FORWARDING PUMP #2	8.4 HP	1	FVNR	SEL(T)	30	C113B		480/1210 150	304D-01B-0495 SH. 506	304D-01B-0495 SH. 328

304D-018-0495

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	-	-					-	-					DESIGNED P&E	TURBINE GENERATOR NO. 8 MCC INDEX		
	-	-					-	-					DRAWN AMW		318A	
	-	-					-	-					APPROVED	APPROVED		
REV	DATE	DESIG	DFTR	APP	DESCRIPTION	REV	DATE	DESIG	DFTR	APP	DESCRIPTION	ACAD	SCALE:			

NOTES:

1. REFER TO GEH-2614 FOR MOTOR OVERLOAD HEATER SELECTION TABLE.
2. REFER TO GEH-4729 FOR MOTOR OVERLOAD HEATER SELECTION TABLE.
3. REFER TO GEH-2543 FOR MOTOR OVERLOAD HEATER SELECTION TABLE.
4. STANDARD TYPE OVERLOAD RELAY.

MCC – AC: 3 PHASE, 3 WIRE, 60 HZ 600A MAIN BUS, 42KA ASYM SHORT CKT RATING

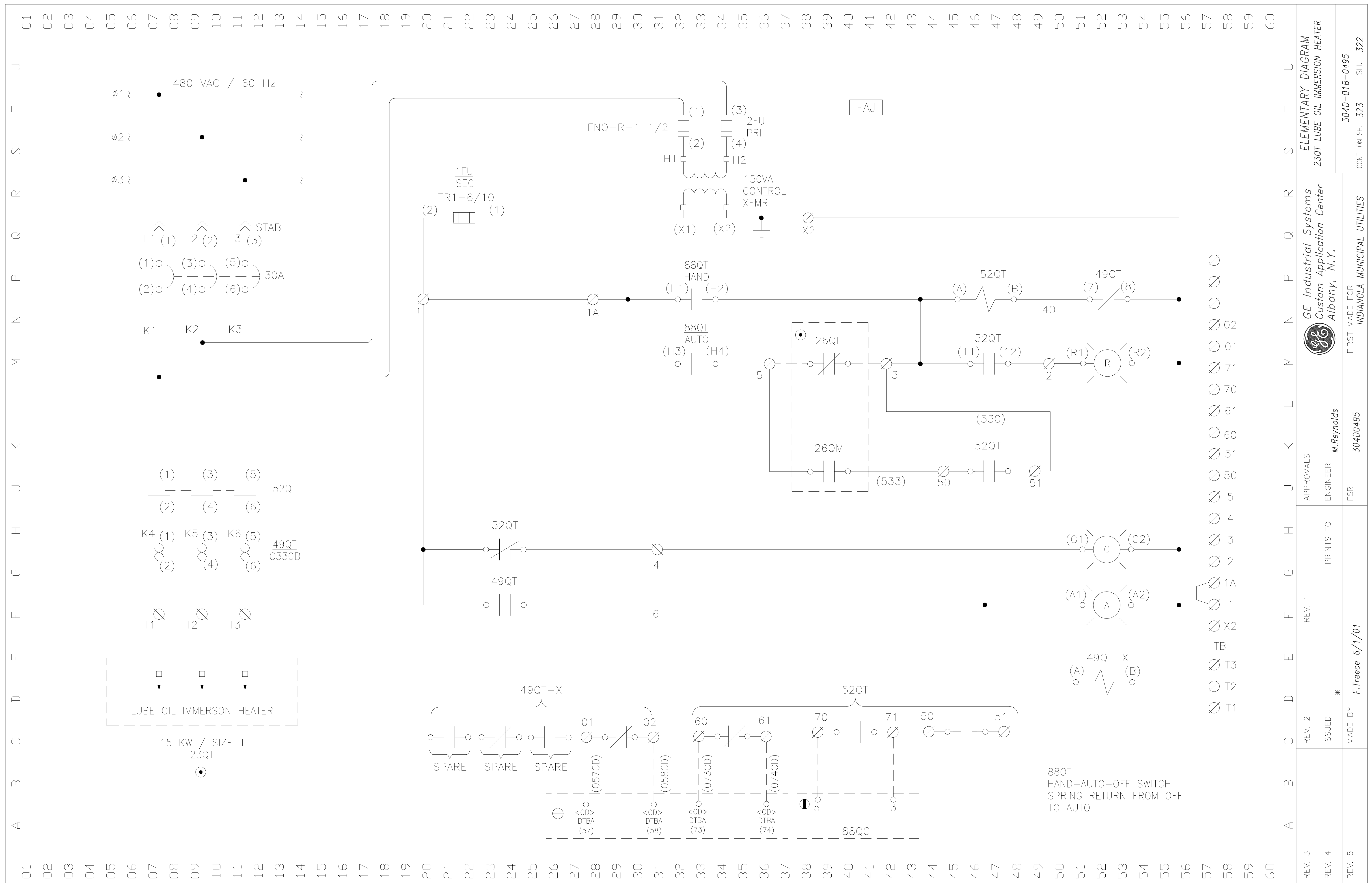
UNIT NO.	NOMEN-CLATURE	DESCRIPTION	LOAD HP/KW	STARTER NEMA SIZE	STARTER TYPE	CKT. BKR SWITCH TYPE	TRIP FUSE/CLIP	OVERLOAD HEATER CR123	DL SETT %	POWER/CONTROL VOLTAGE VA	CONN. DIAG. DWG. NO.	ELEM. DIAG. DWG. NO.
	88WC-1	TURBINE COOLING WATER PUMP #1	25 HP	2	FVNR	SEL(T)	70	C330B		480/120 150	304D-01B-0495 SH. 507	304D-01B-0495 SH. 333
	88WC-2	TURBINE COOLING WATER PUMP #2	25 HP	2	FVNR	SEL(T)	70	C330B		480/120 150	304D-01B-0495 SH. 507	304D-01B-0495 SH. 334
	88FC-1	TURBINE COOLING WATER FAN #1	20 HP	2	FVNR	SEL(T)	50	C250B		480/120 150	304D-01B-0495 SH. 507	304D-01B-0495 SH. 331
	88FC-2	TURBINE COOLING WATER FAN #2	20 HP	2	FVNR	SEL(T)	50	C250B		480/120 150	304D-01B-0495 SH. 508	304D-01B-0495 SH. 332

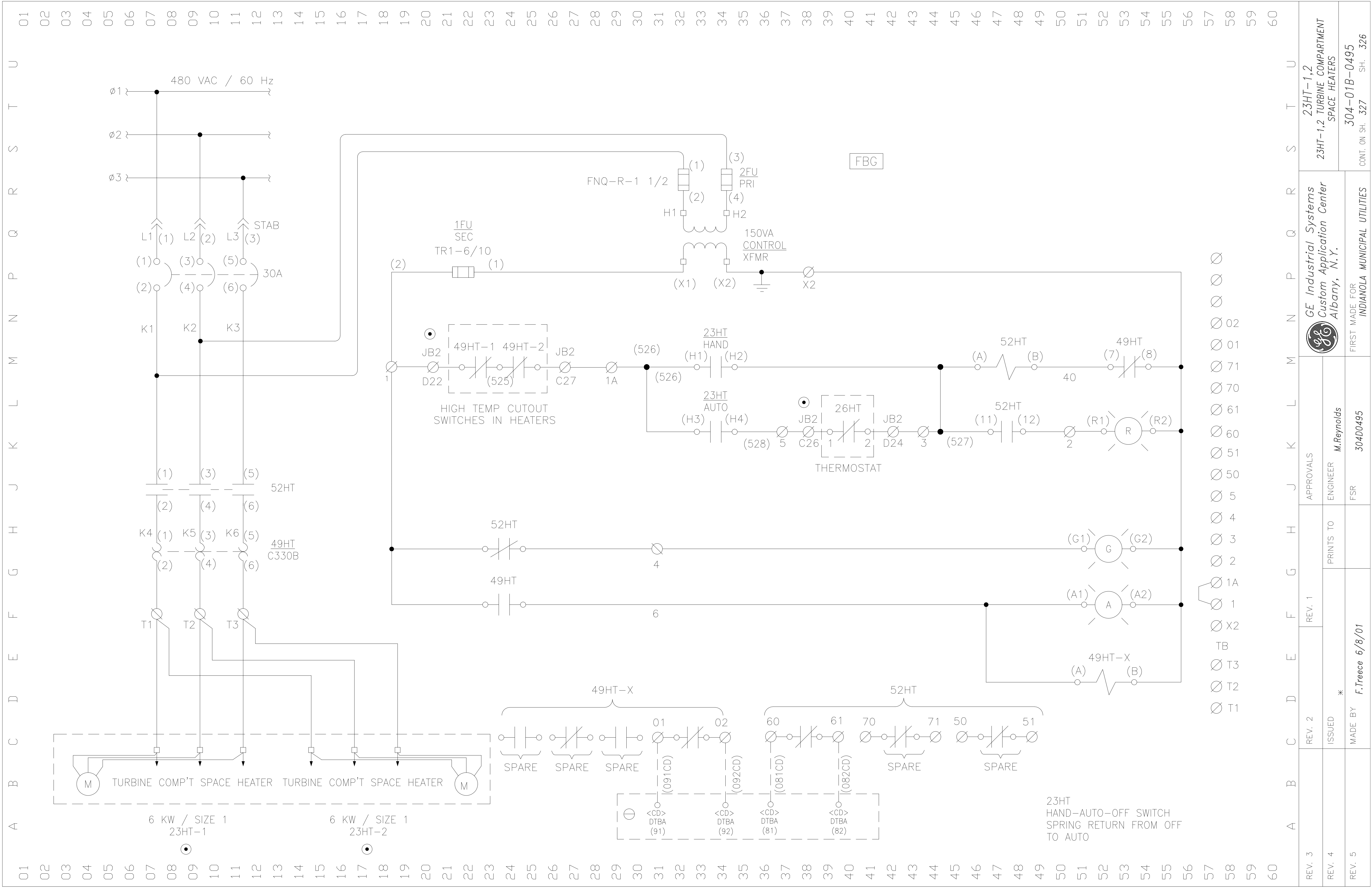
MCC – DC: 2 WIRE, 125VDC

	88QE	EMERGENCY LUBE OIL PUMP	7.5 HP	3	RVNR	THED	100	C330B		125VDC	304D-01B-0495 SH. 508	304D-01B-0495 SH. 319
	88DS	DIESEL ENGINE STARTER MOTOR	10 HP	3	FVNR	THED	125	C113B		125VDC	304D-01B-0495 SH. 508	304D-01B-0495 SH. 320
	88HR	HYDRAULIC RATCHET PUMP	3/4 HP	1	FVNR	THED	15	C113B		125VDC	304D-01B-0495 SH. 508	304D-01B-0495 SH. 318

304D-01B-0495

	-	-					-	-				}} P & E ENGINEERING CO. POWER SYSTEM ANALYSIS AND DESIGN	SCALE:	DATE 02/28/02 DESIGNED P&E DRAWN AMW APPROVED APPROVED	INDIANOLA MUNICIPAL UTILITIES	DWG NO	
	-	-					-	-								TURBINE GENERATOR NO.8 MCC INDEX	318B
	-	-					-	-									
REV	DATE	DESIG	DFTR	APP		DESCRIPTION	REV	DATE	DESIG	DFTR	APP				DESCRIPTION	ACAD	

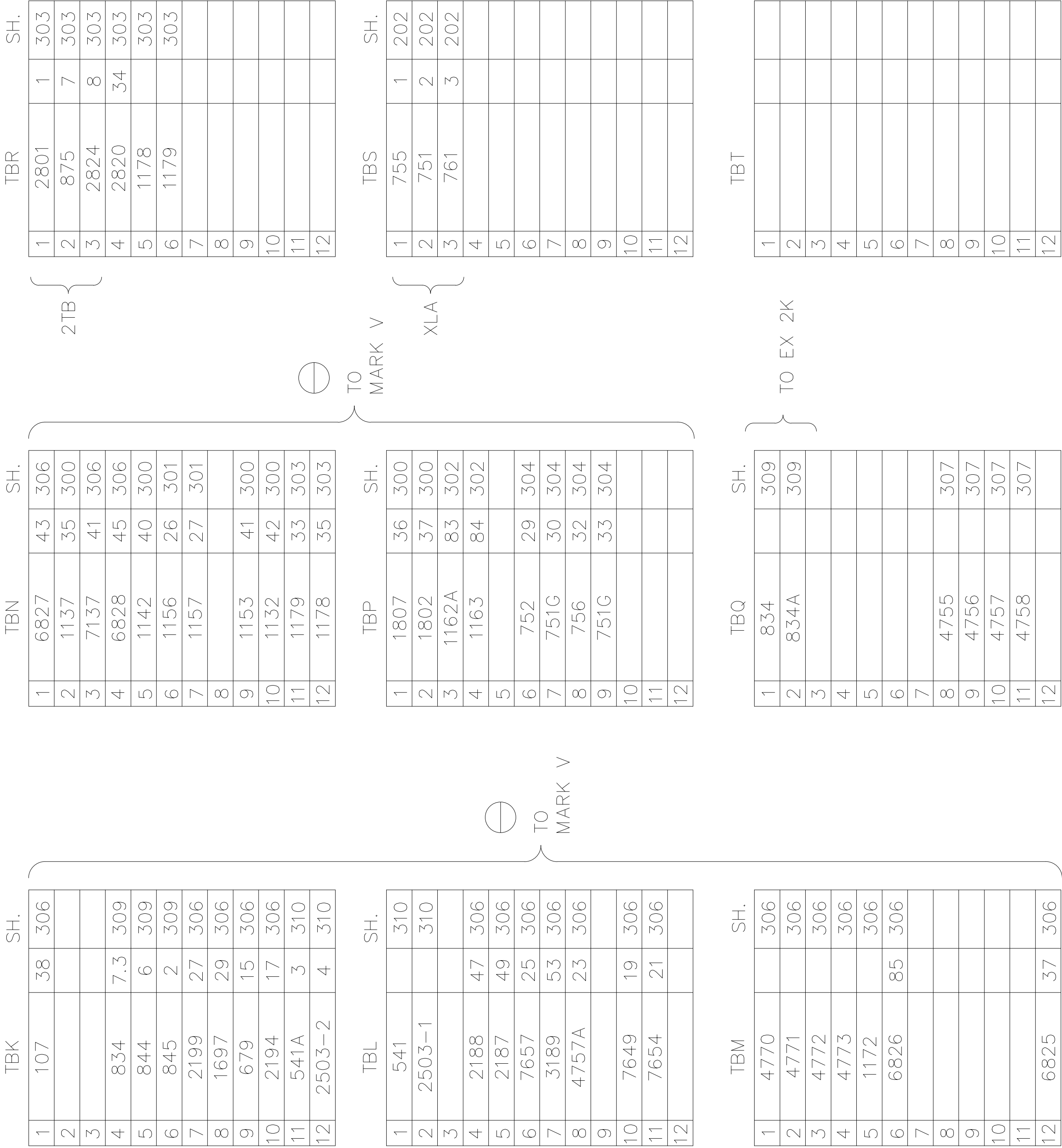




Appendix P - Misc. Schematics

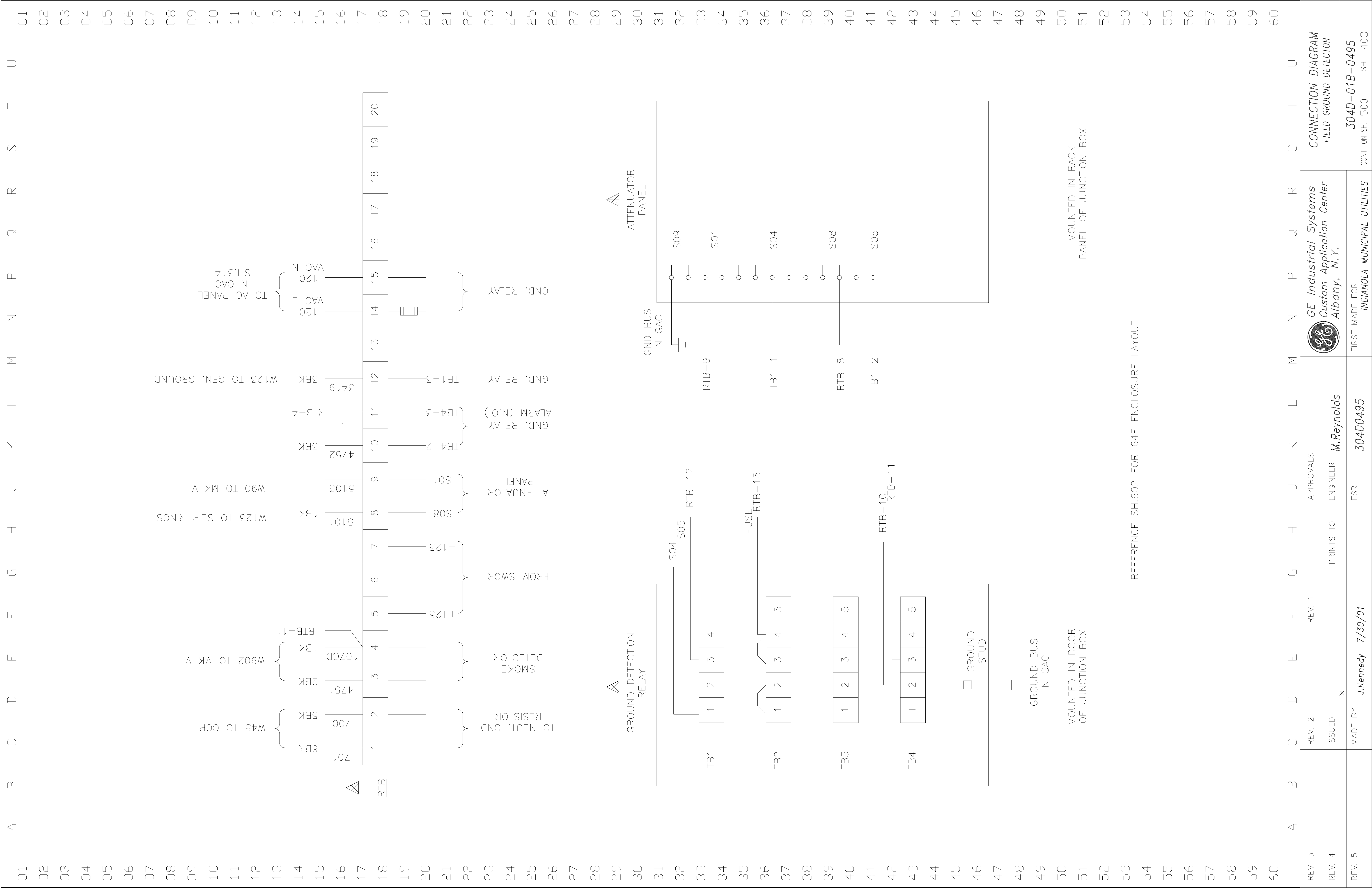
Appendix Q - Generator Protection Cabinet Terminal Blocks

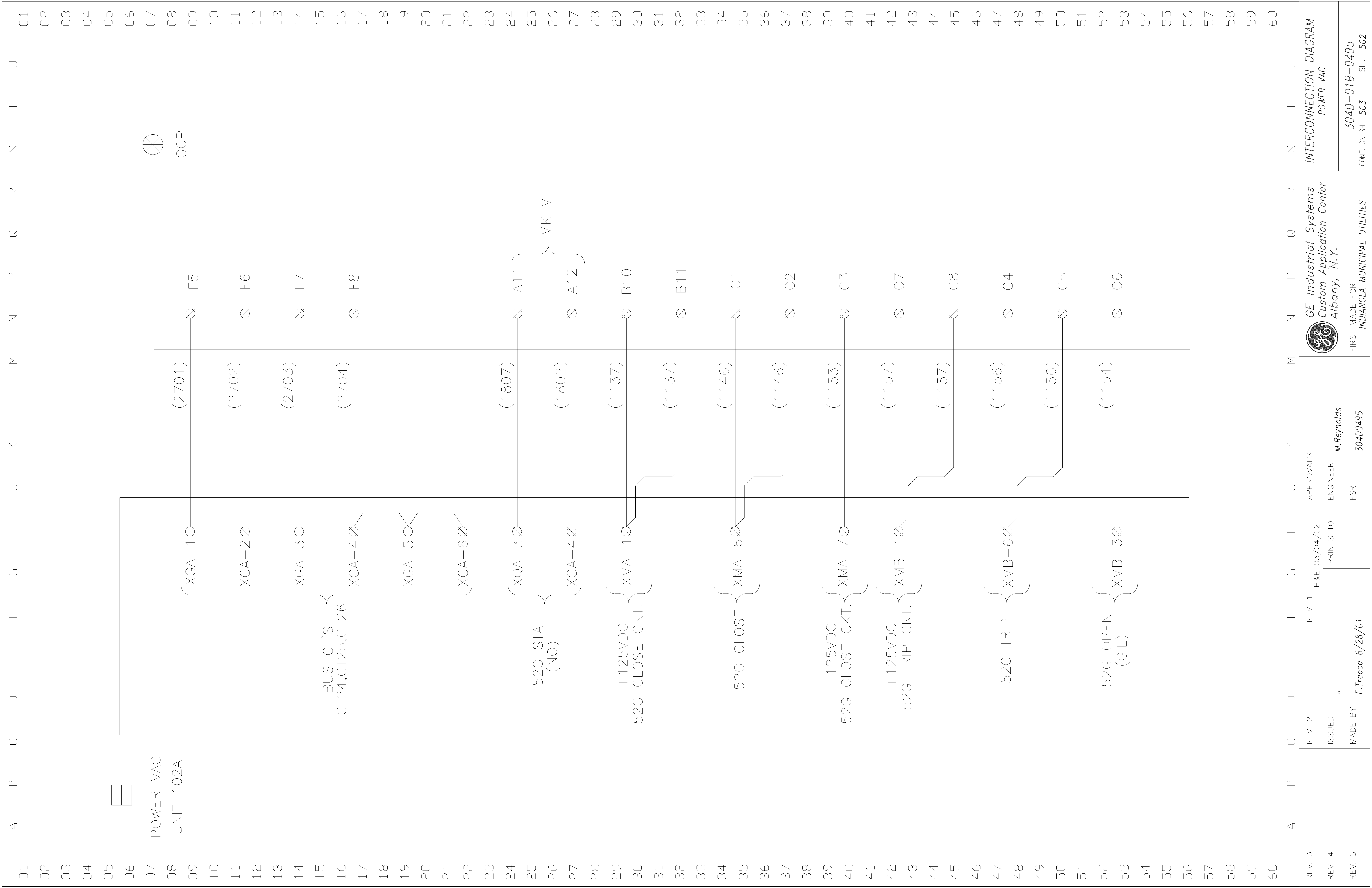
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REV. 5						MADE BY			FSR											
										FIRST MADE FOR INDIANOLA MUNICIPAL UTILITIES					304D-01B-0495 CONT. ON SH. 401 SH. 400					
										GE Industrial Systems Custom Application Center Albany, N.Y.										
										M.Reynolds										
										304D0495										
										F.Treece 7/30/01										

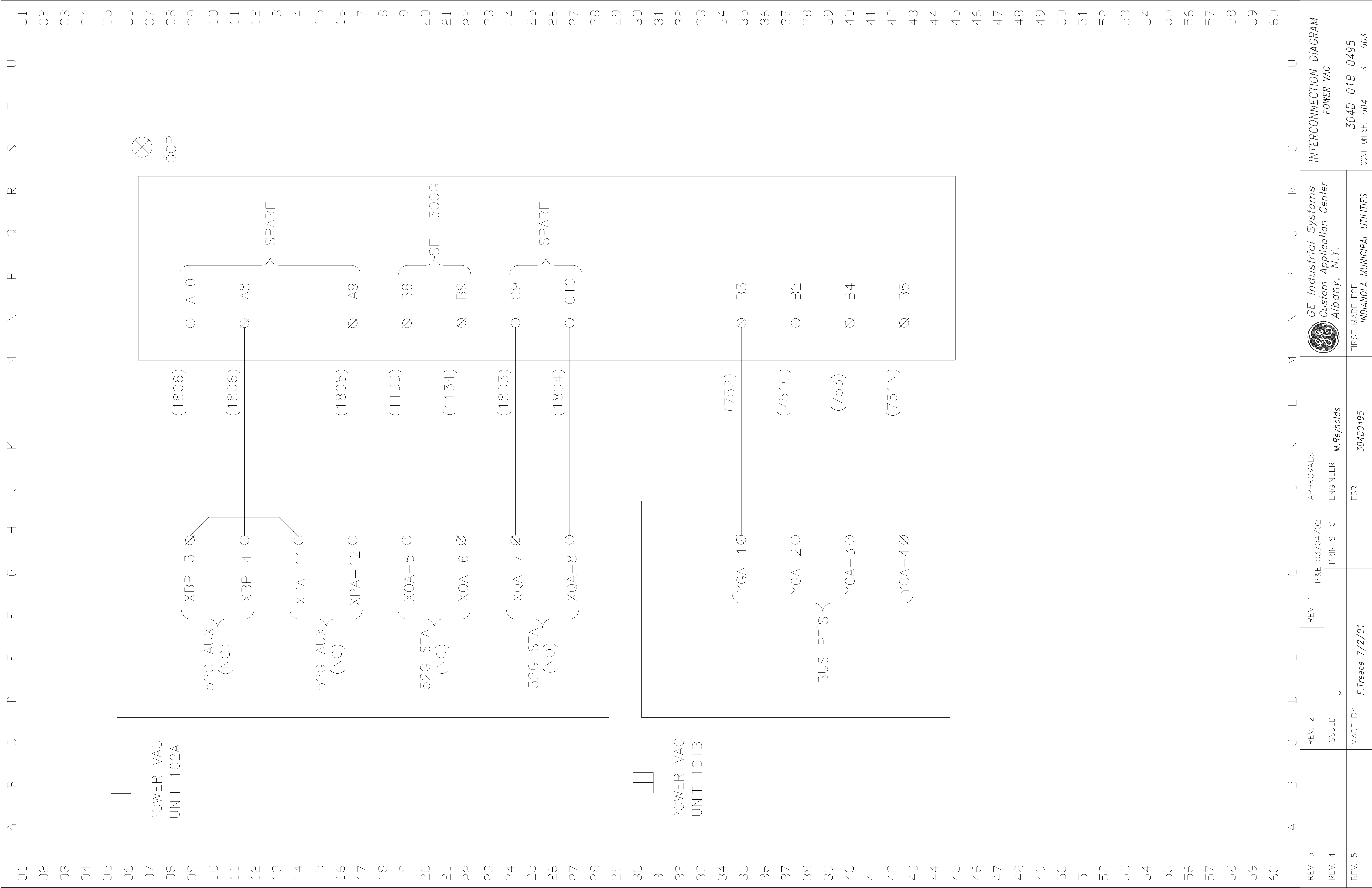


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REV. 3	REV. 2				REV. 1				APPROVALS		GE Industrial Systems Custom Application Center Albany, N.Y.				CONNECTION DIAGRAM GPP RIGHT SUB PANEL																																												
REV. 4	ISSUED *								PRINTS TO		ENGINEER M.Reynolds																																																
REV. 5	MADE BY F.Treece 7/9/01								FSR		FIRST MADE FOR INDIANOLA MUNICIPAL UTILITIES				CONT. ON SH. 402				304D-01B-0495 SH. 401																																								

Appendix R - Control Cab and GAC Interconnection Drawings







SPARE

SEL-300G

SPARE

SPARE

BUS PT'S

GCP

INTERCONNECTION DIAGRAM
POWER VAC

304D-01B-0495
SH. 503

GE Industrial Systems
Custom Application Center
Albany, N.Y.

FIRST MADE FOR
INDIANOLA MUNICIPAL UTILITIES

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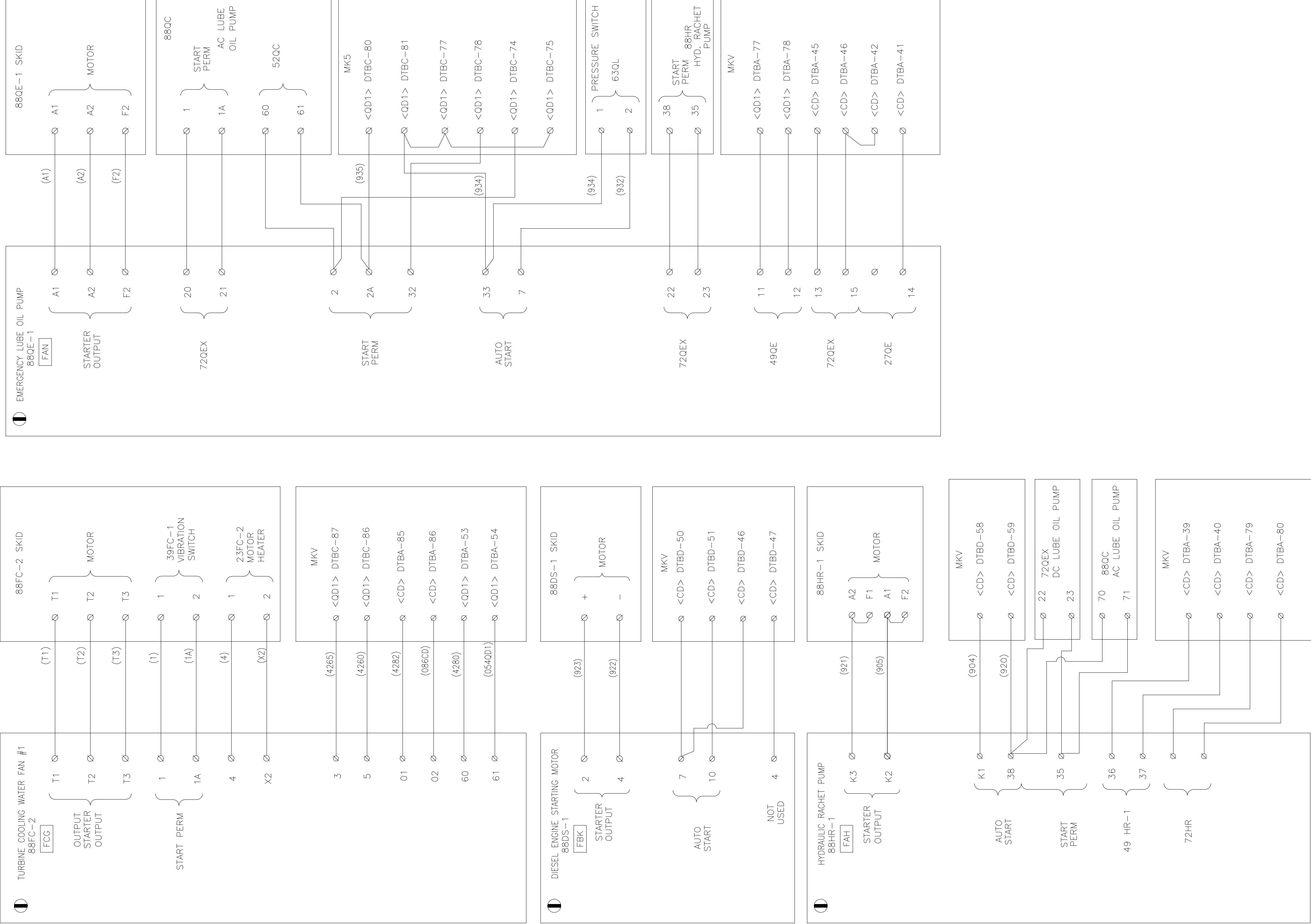
REV. 3	REV. 2	REV. 1	P&E 03/04/02	APPROVALS	GE Industrial Systems Custom Application Center Albany, N.Y.		INTERCONNECTION DIAGRAM MCC	
REV. 4	ISSUED	* PRINTS TO		ENGINEER	M.Reynolds			
REV. 5	MADE BY	F.Treece 7/2/01		FSR	304D0495		FIRST MADE FOR INDIANOLA MUNICIPAL UTILITIES	
					304D-01B-0495		CONT. ON SH. 506 SH. 505	

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REV. 3		REV. 2		REV. 1	P&E 03/04/02	APPROVALS		GE Industrial Systems Custom Application Center Albany, N.Y.										INTERCONNECTION DIAGRAM MCC			
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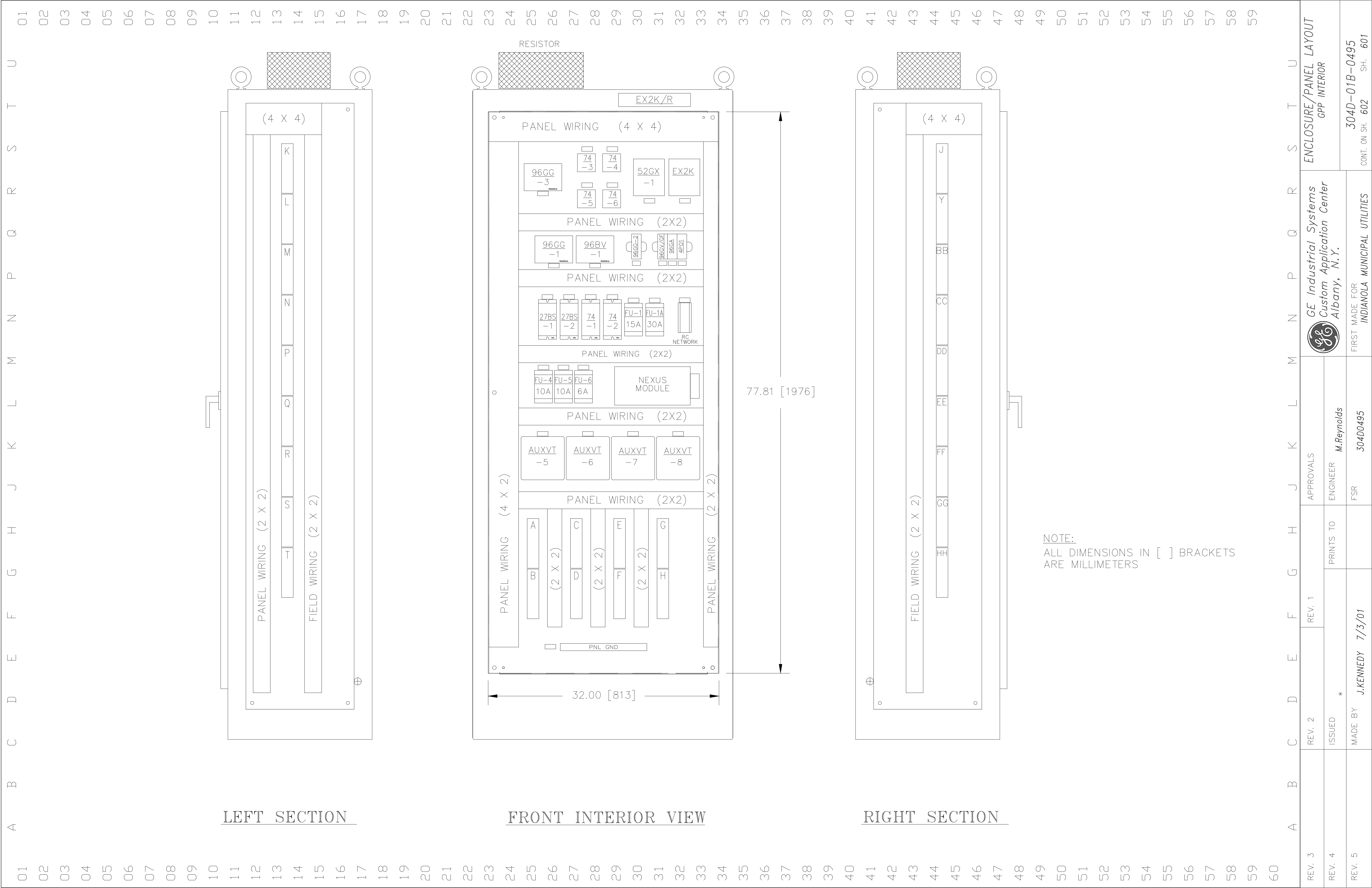
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REV. 3	REV. 2	REV. 1	P&E 03/04/02		APPROVALS		INTERCONNECTION DIAGRAM	
REV. 4	ISSUED	*		PRINTS TO	ENGINEER		MCC	
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					GE Industrial Systems			
					Custom Application Center			
					MCC			



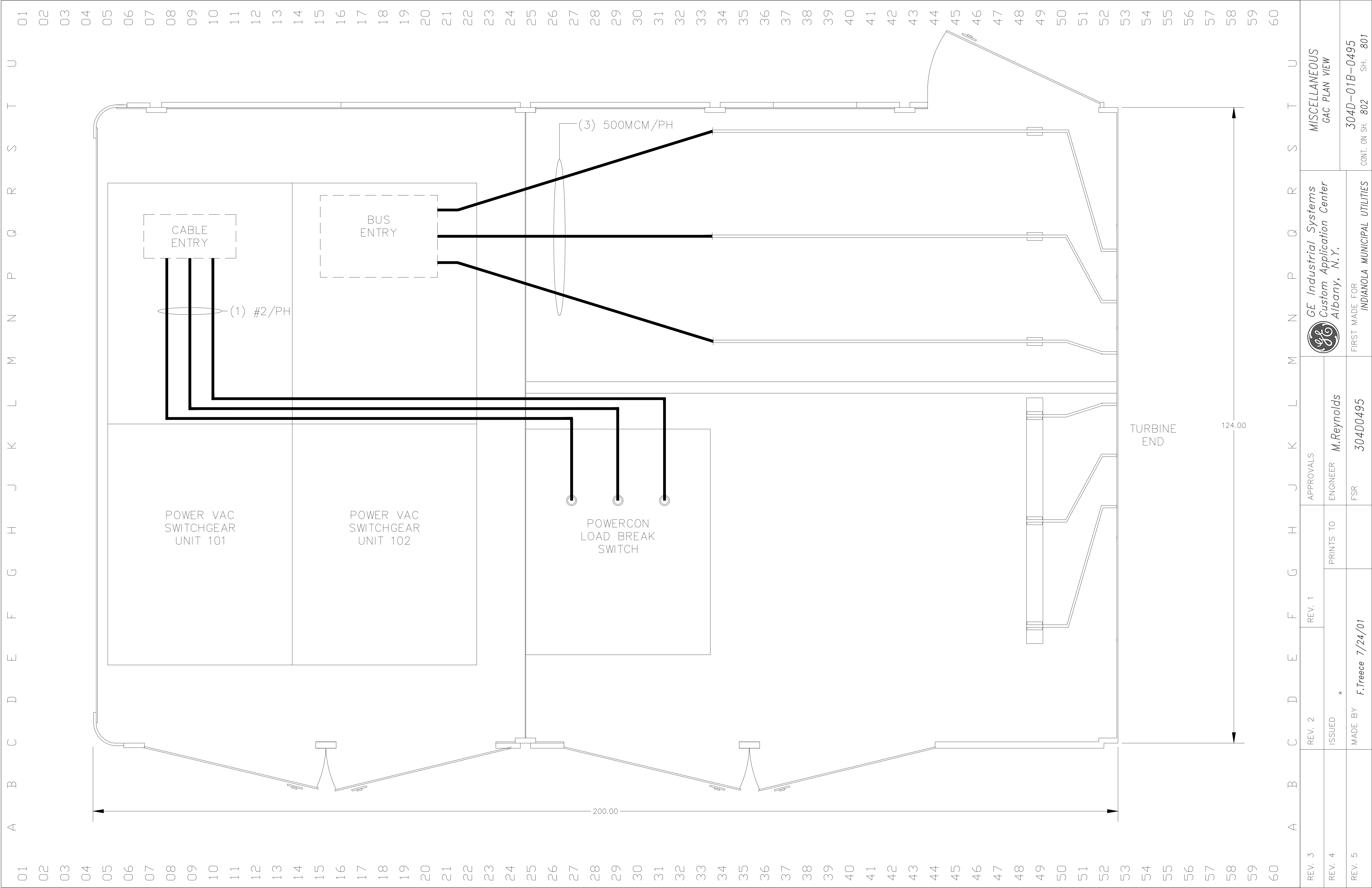
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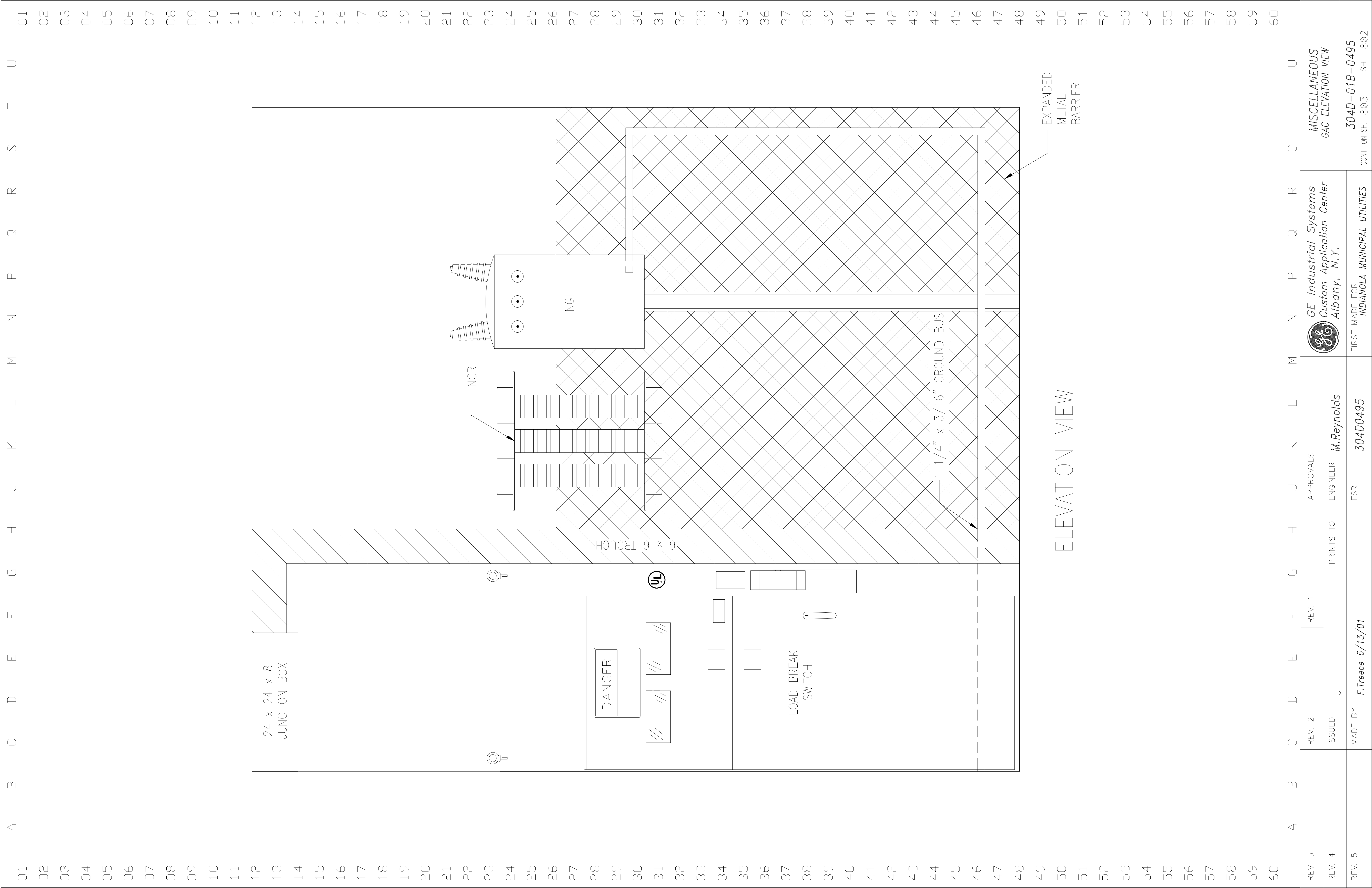
Appendix S - Control Cab and GAC Physical Layout Drawings





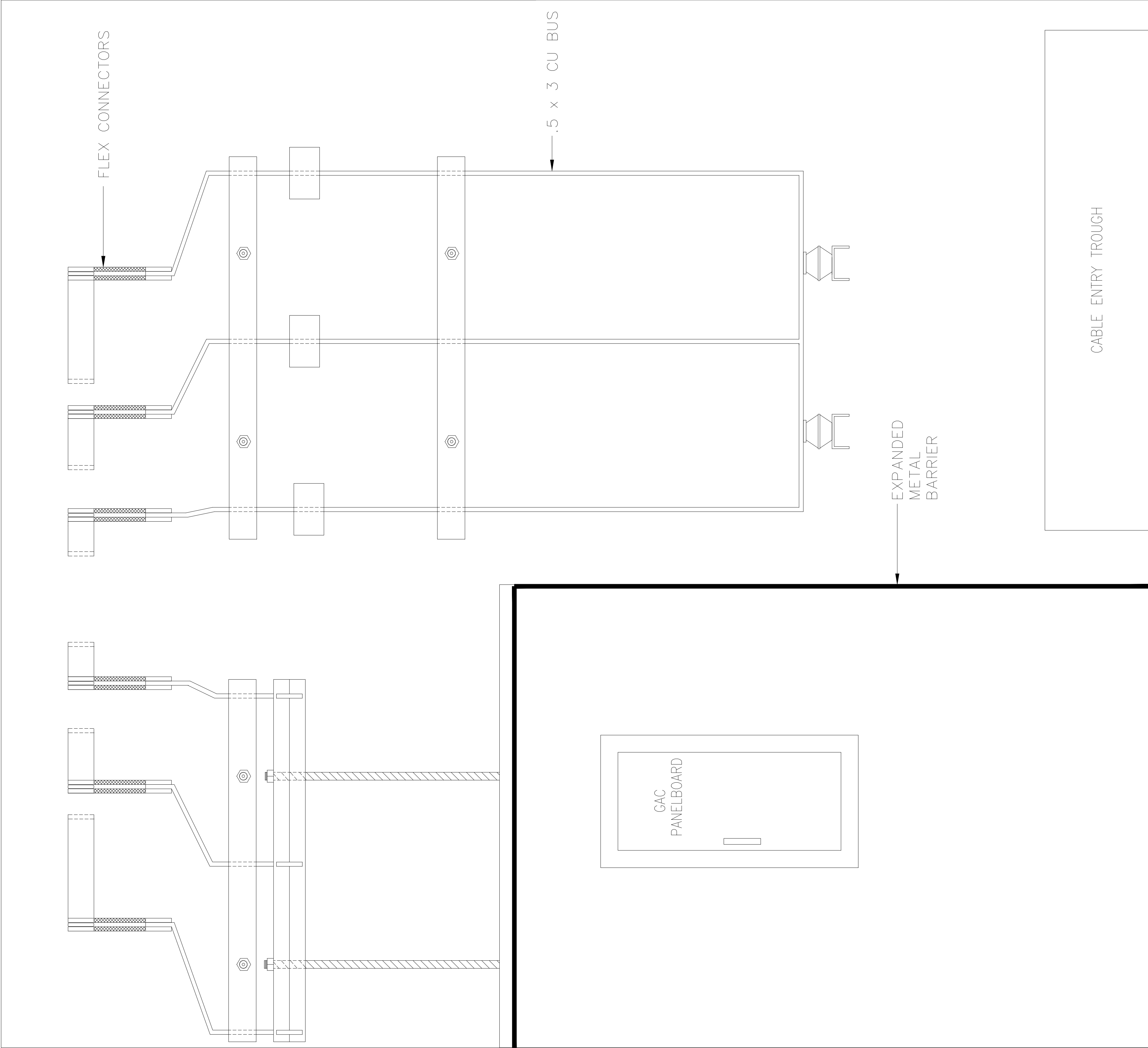


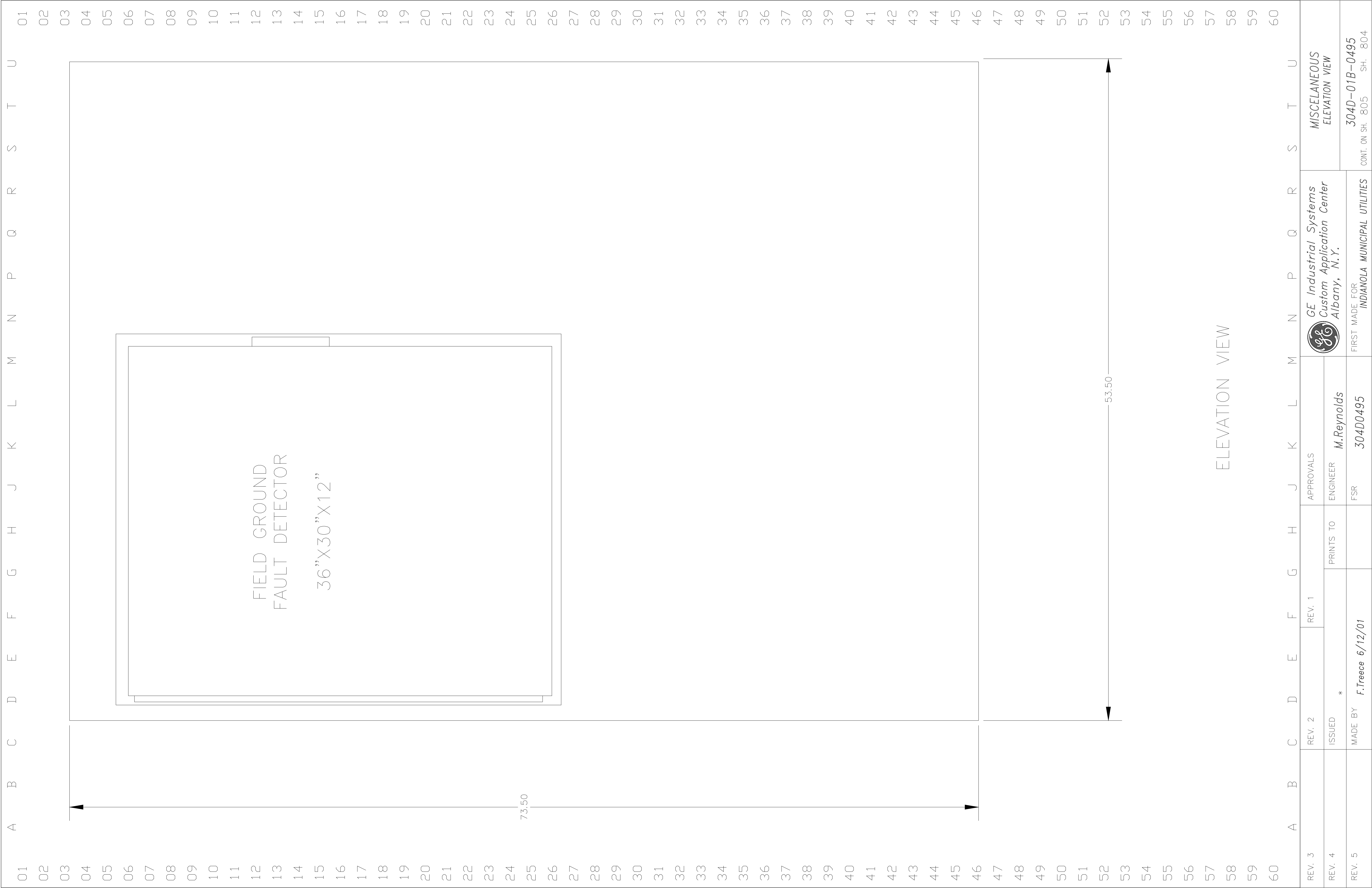


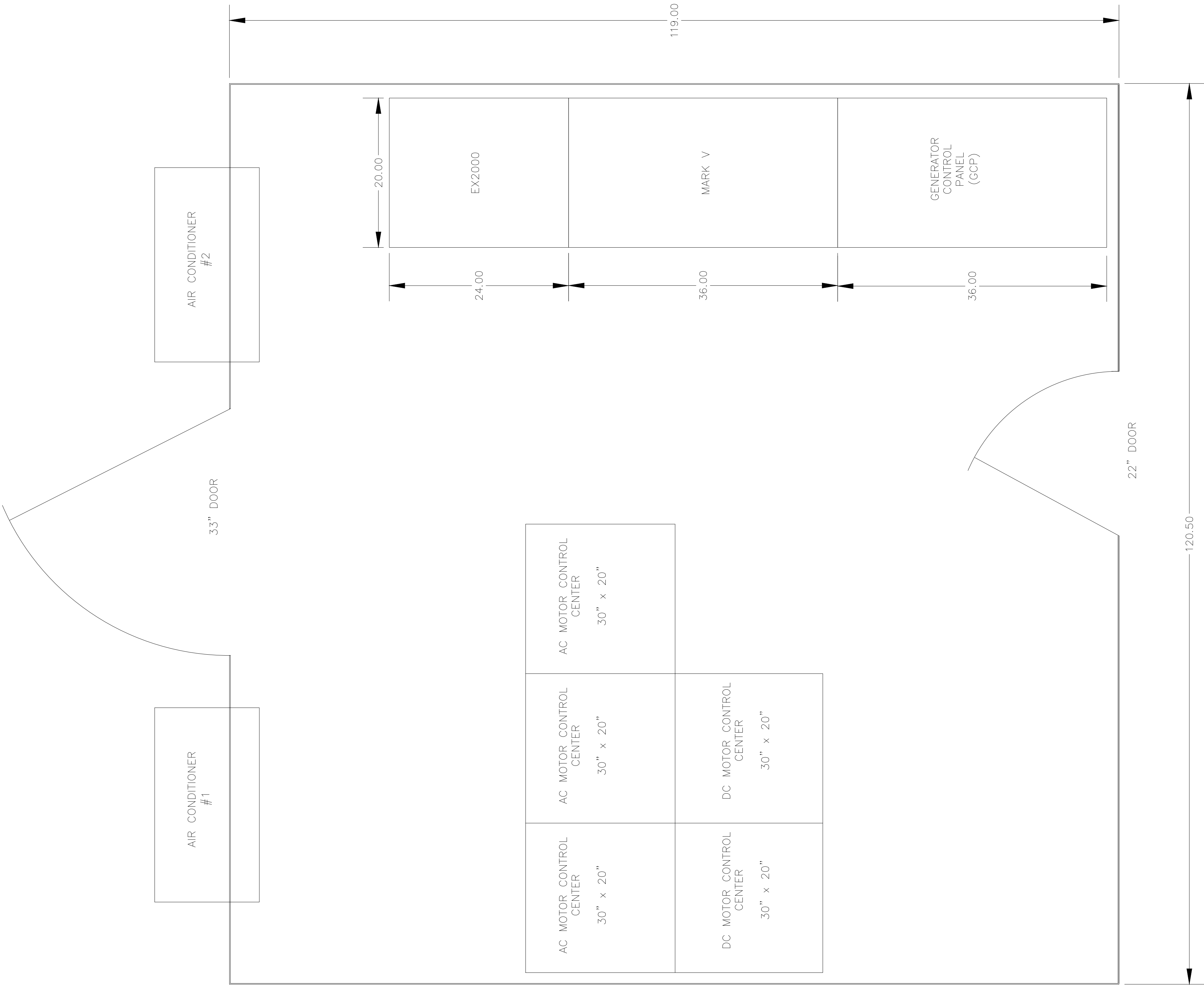


ELEVATION VIEW

EXPANDED METAL BARRIER





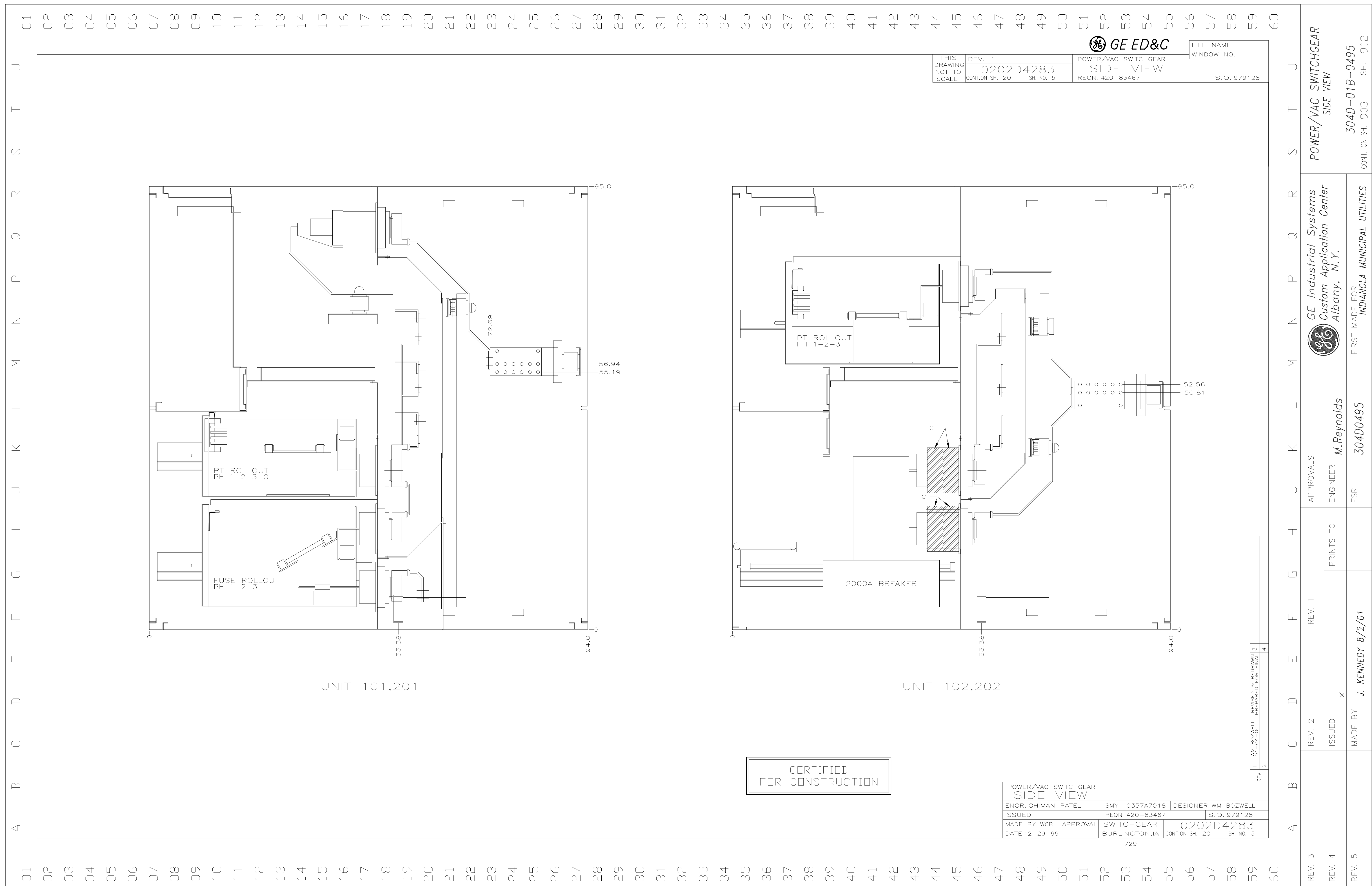


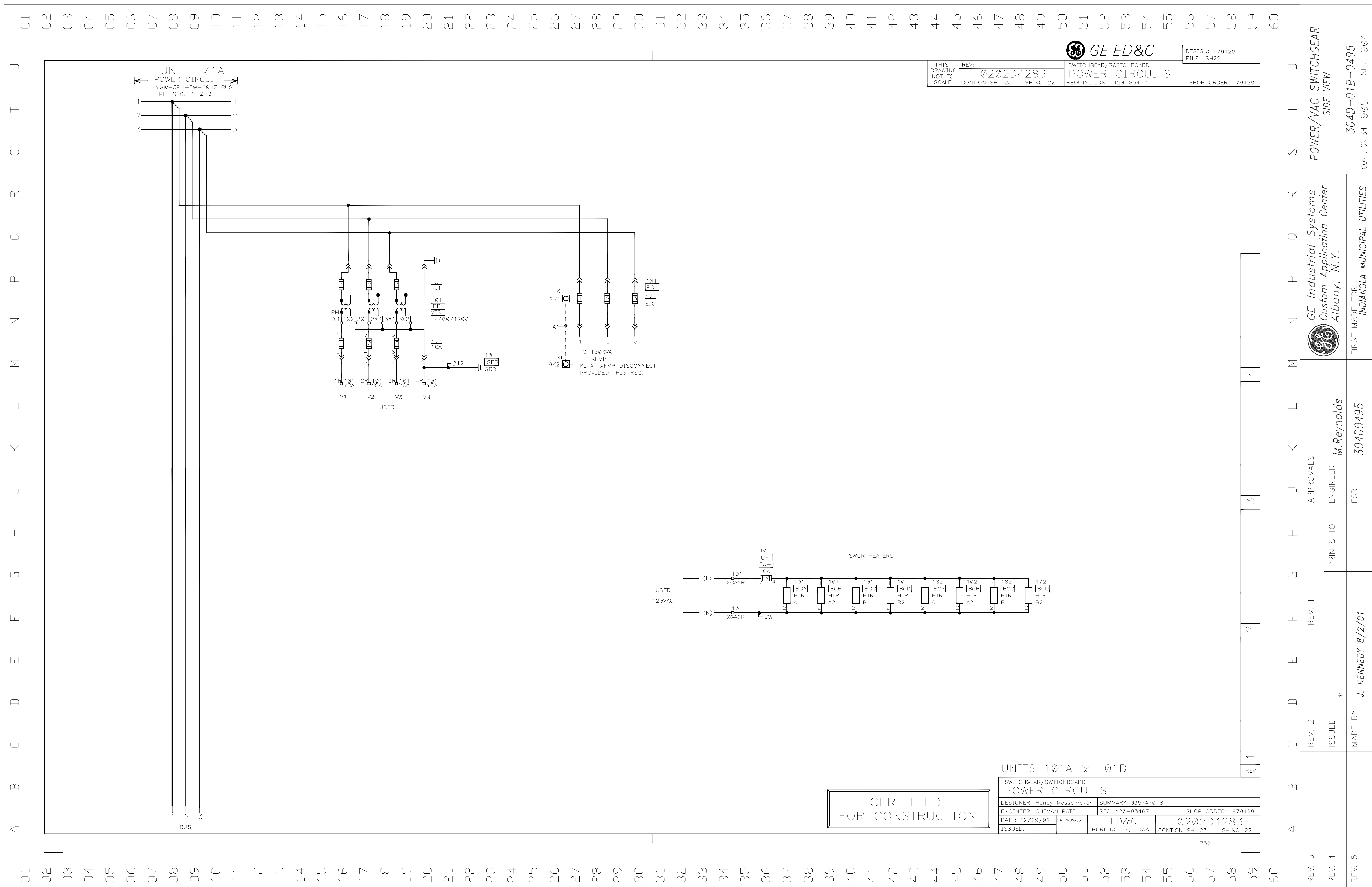
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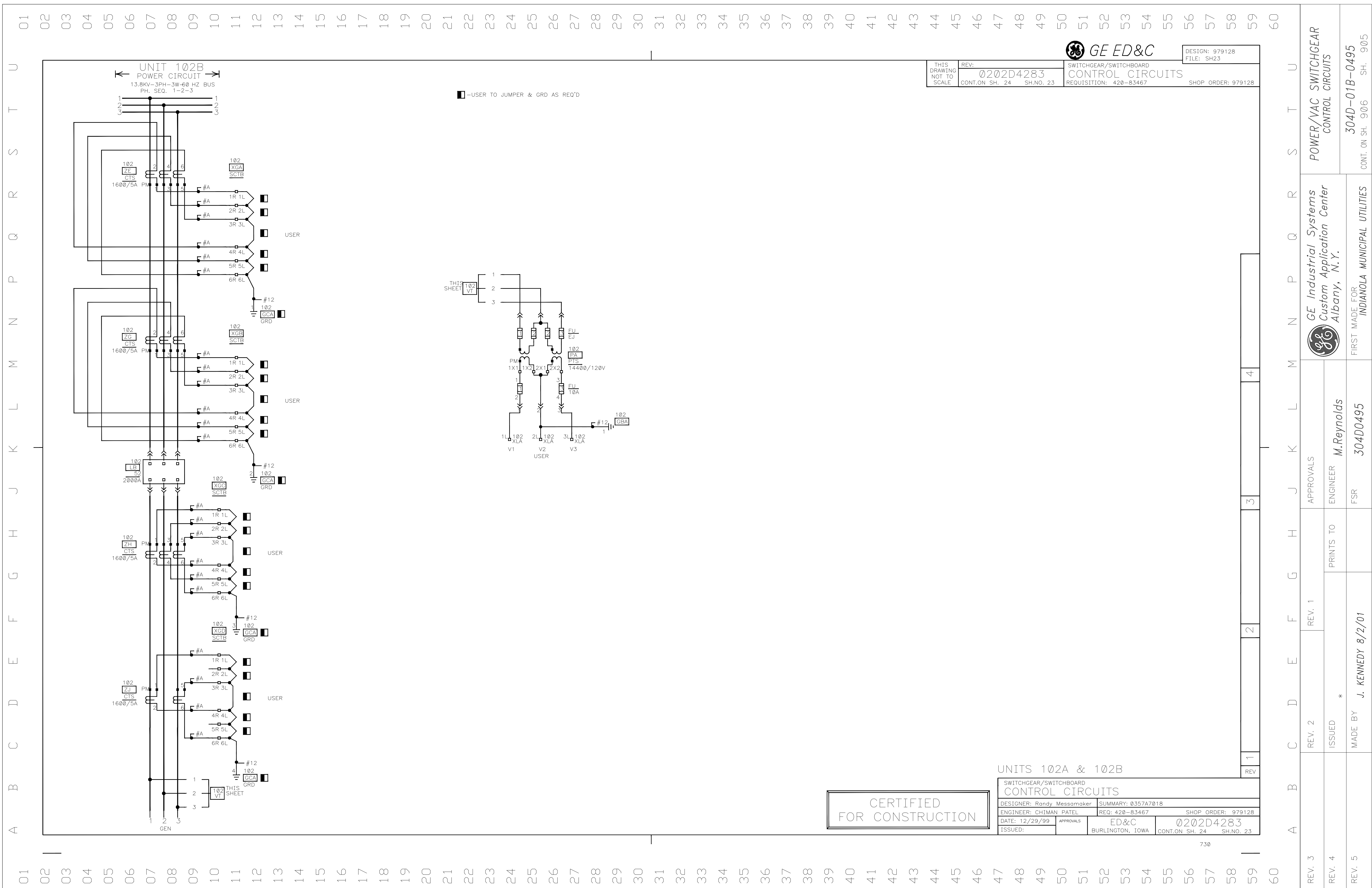


Appendix T - Generator Switchgear Drawings

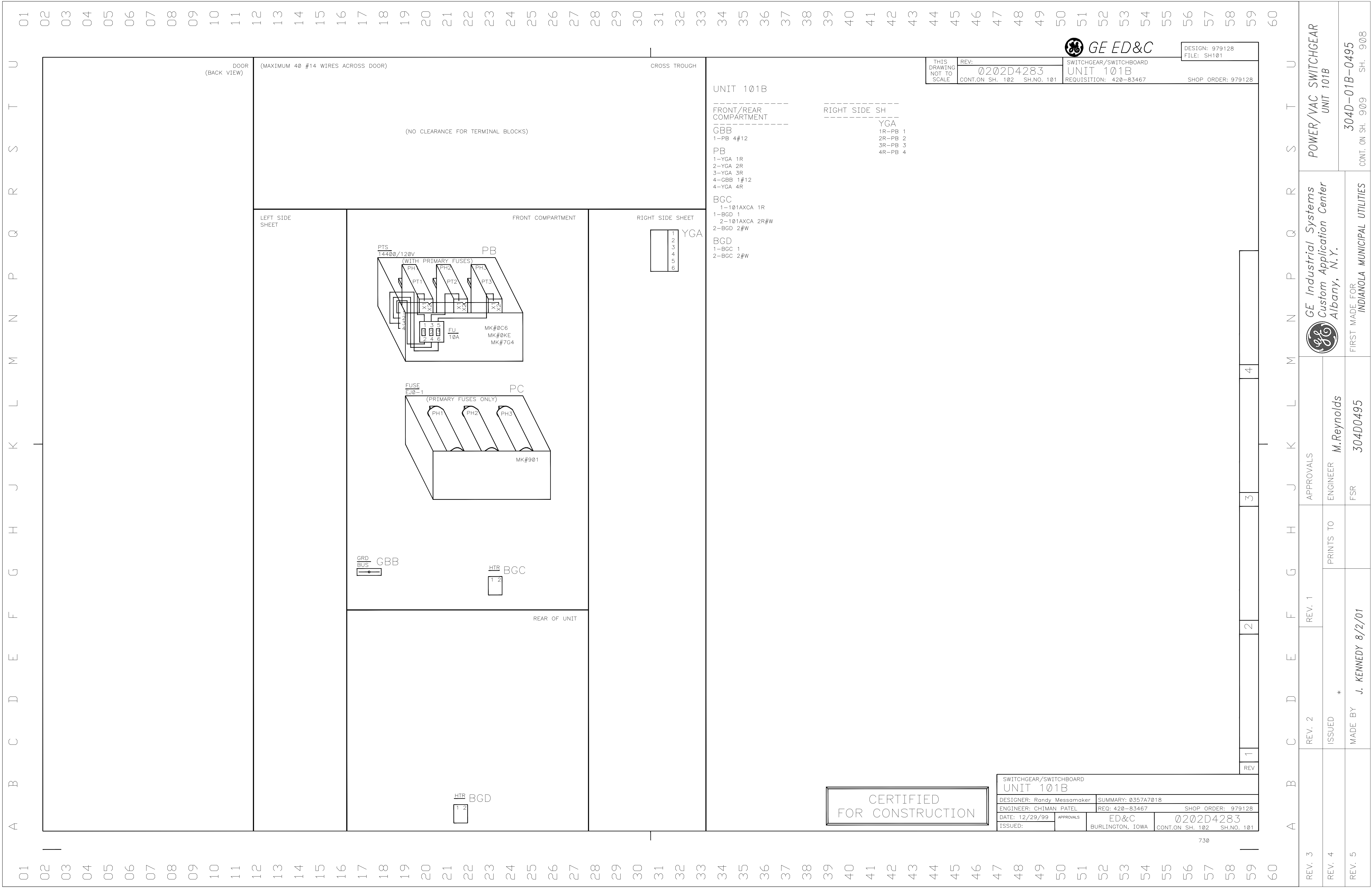














Appendix U - Mk V Input/Output Interface Drawings

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REV 4		ISSUED	04/28/00			PRINTS TO	FIRST MADE FOR REGN. A88K069985									SH. NO. 000
REV 5		MADE BY	L, MUNSEY				IC NO. ZPV 578									CONT. DN. SH. A01 247B1619PI

MARK V CONTROL

INPUT/OUTPUT INTERFACE

REFERENCE DRAWINGS

CASE OUTLINE DRAWING

342A4698CL

MOTOR CONTROL CENTER ELEM.

GENERATOR CONTROL PANEL ELEM.

TURBINE BASE CONNECTION DIAGRAM

GENERATOR BASE CONNECTION DIAGRAM

MKII TURBINE CONTROL ELEM.

206B1284

CATALOG NUMBERS

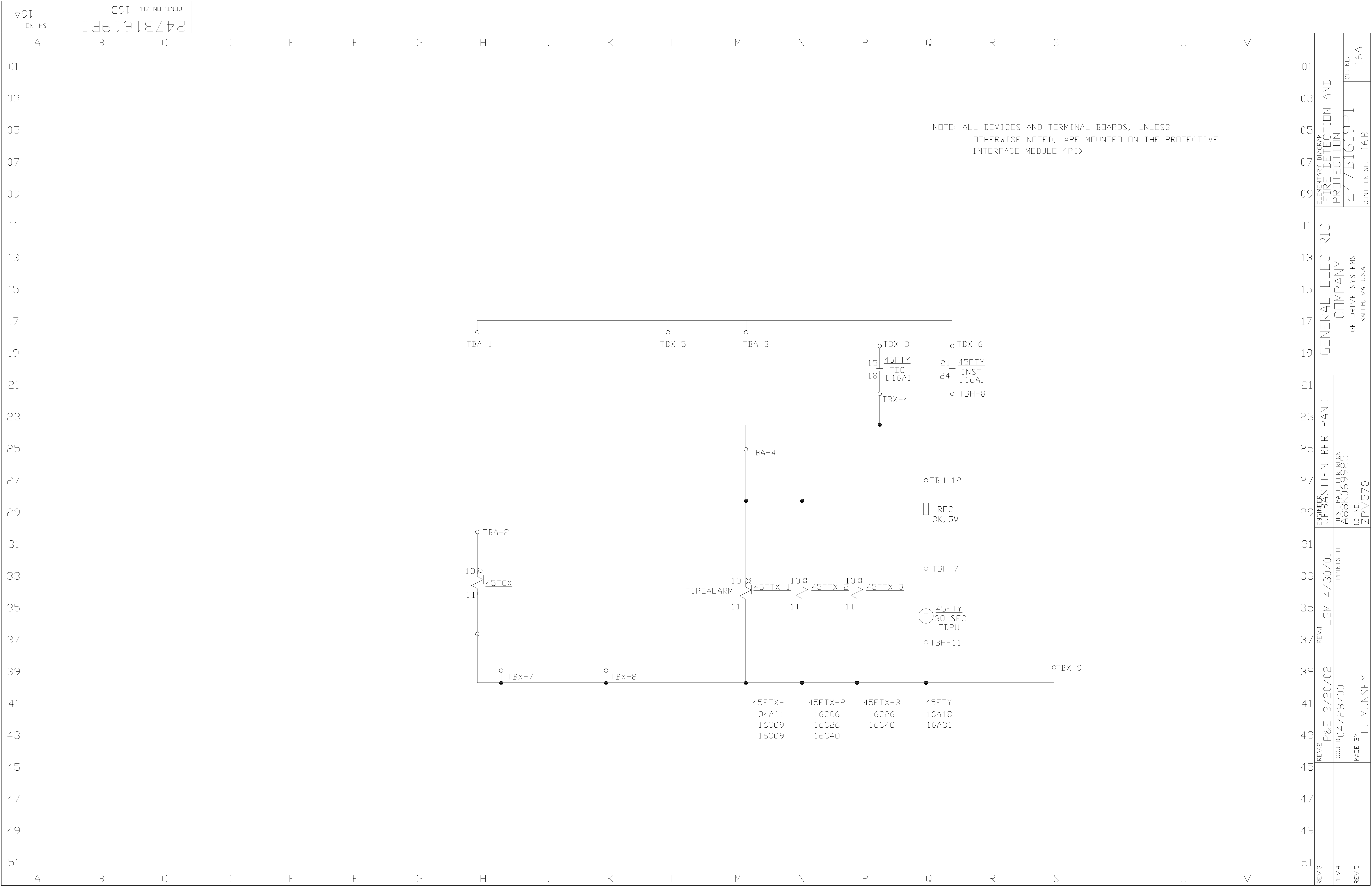
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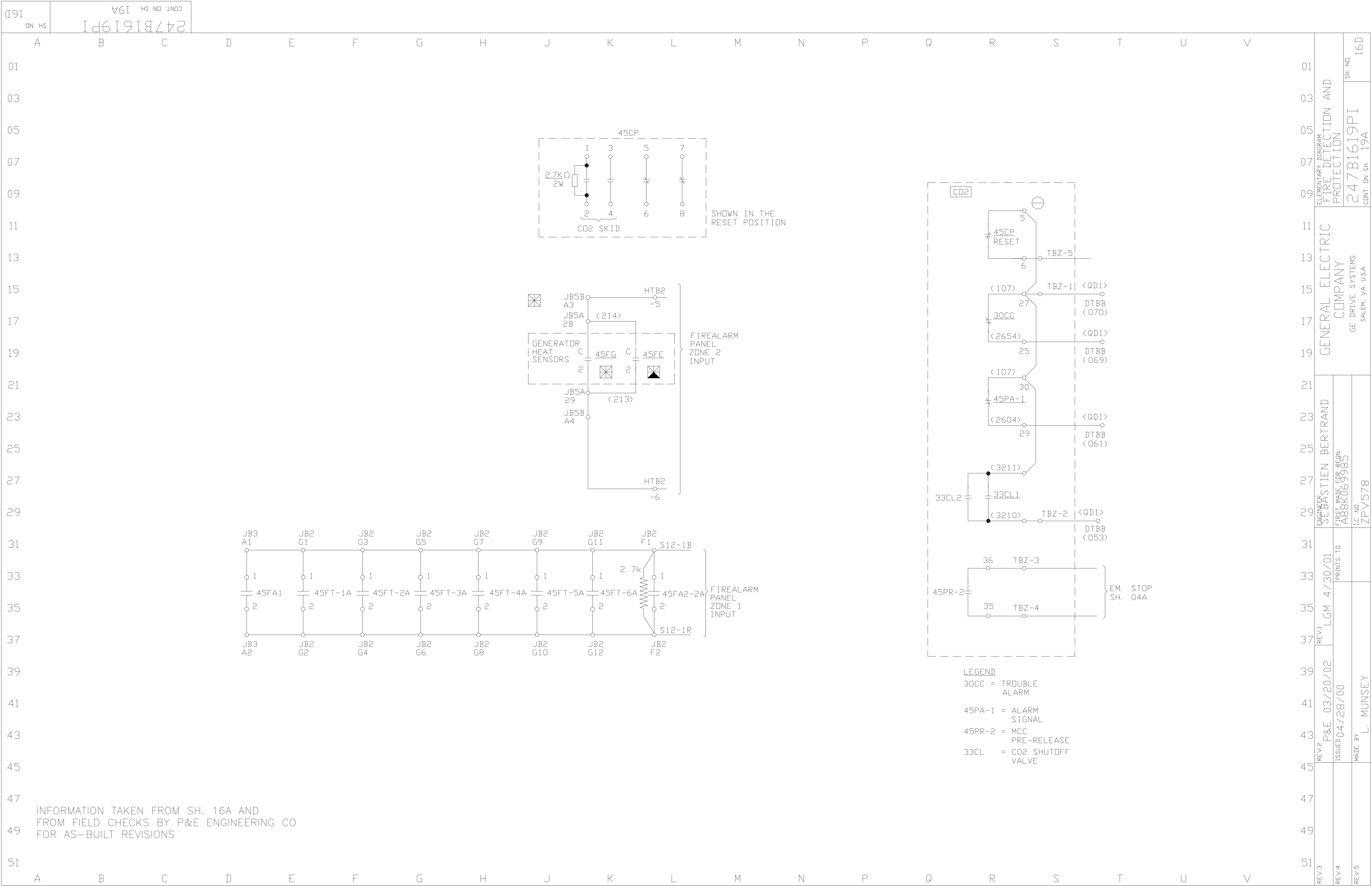
CONTROL EQUIP.
REQ. NO.

CONTROL EQUIP.
ML NO.

CUSTOMER
UNIT NO.

DM F2977G1







ELEMENTARY DIAGRAM

247B1619PI

CONT. ON SH. 19C

GENERAL ELECTRIC COMPANY

GE DRIVE SYSTEMS

SALEM, VA, U.S.A.

ENGINEER SEBASTIEN BERTRAND

FIRST MADE FOR REGN. A88K069985

IC NO. ZPV578

REV.1 LGM 4/30/01

PRINTS TO

REV.2 P&E 02/28/02

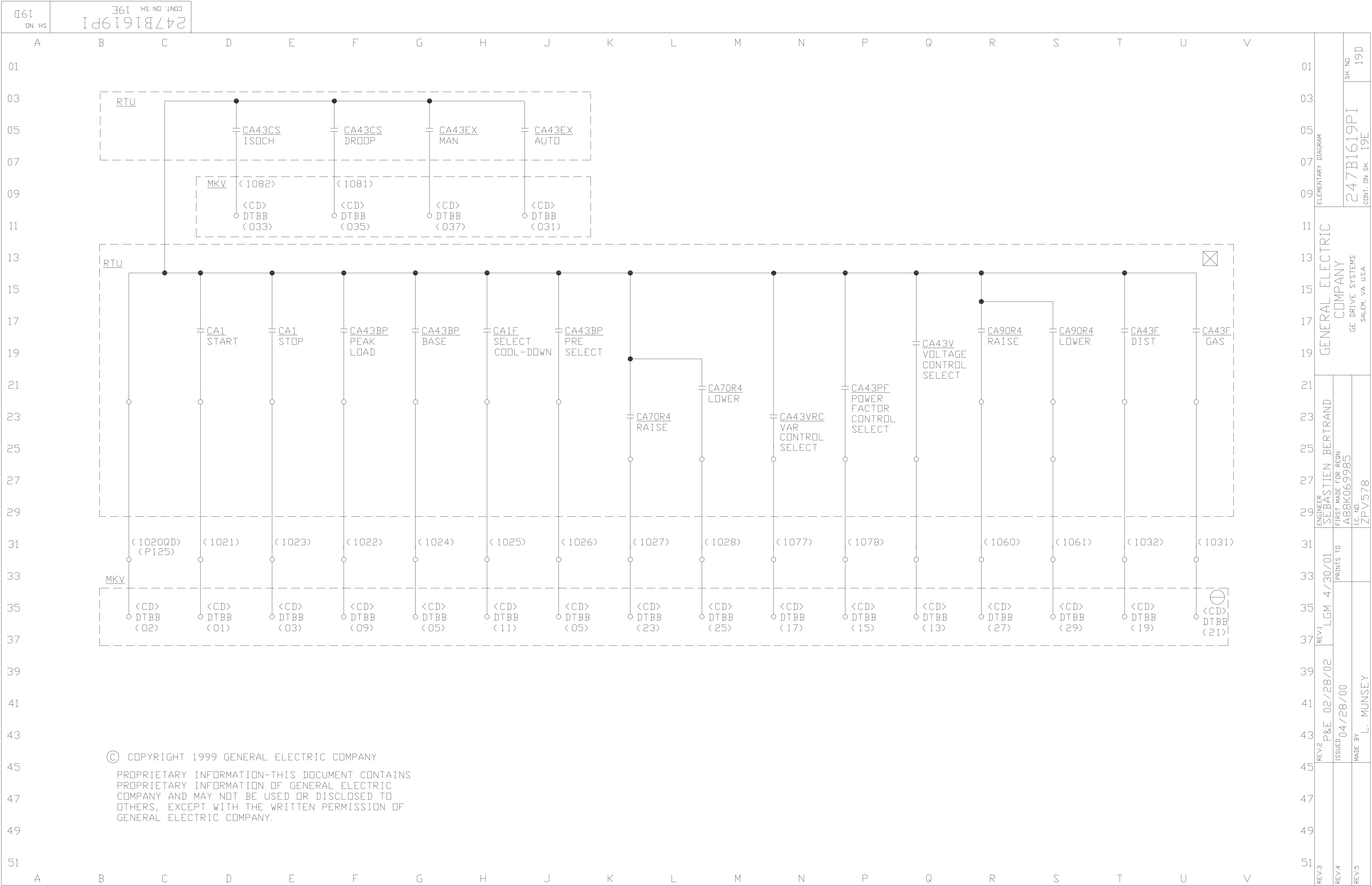
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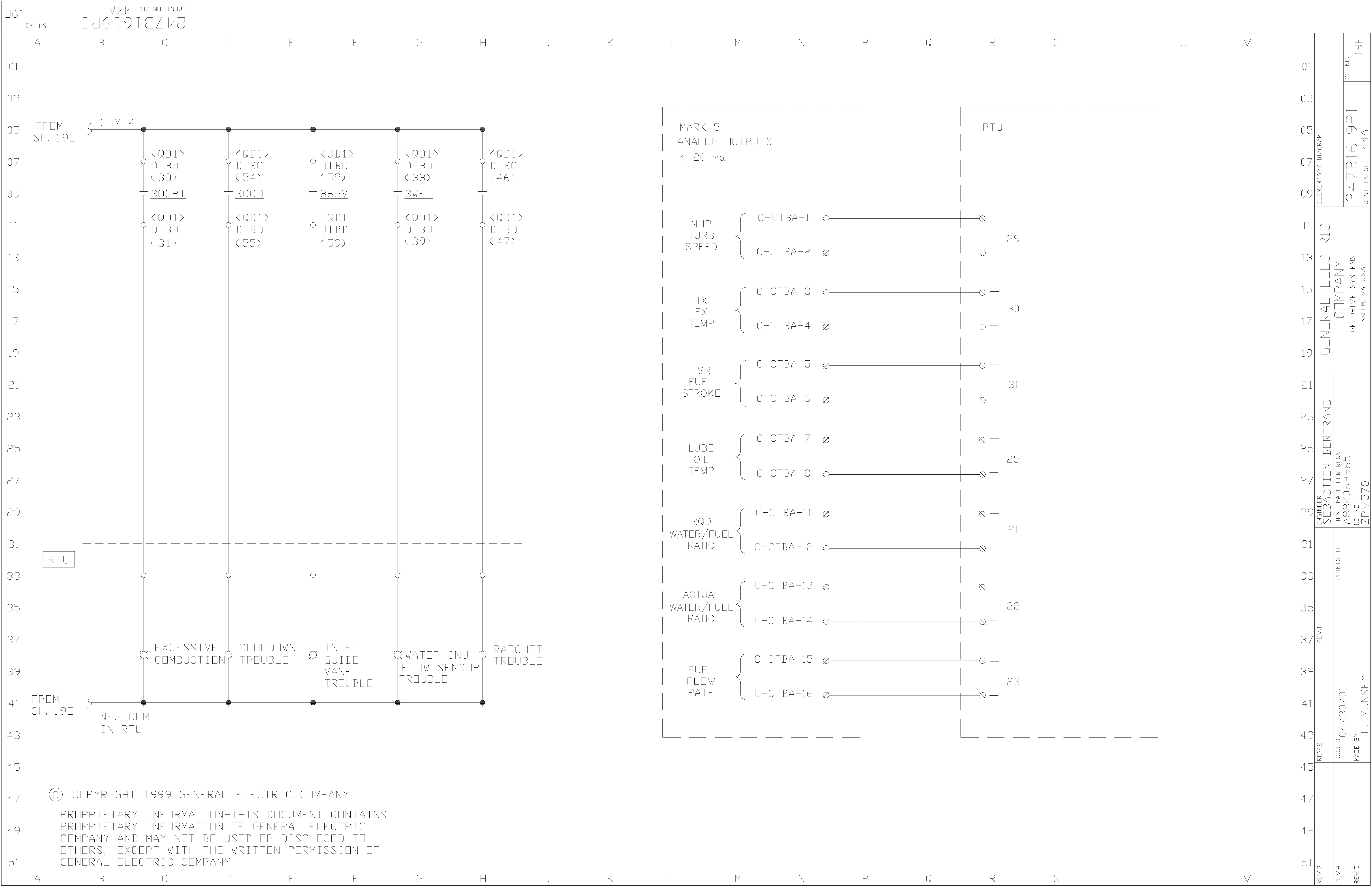
MADE BY L. MUNSEY

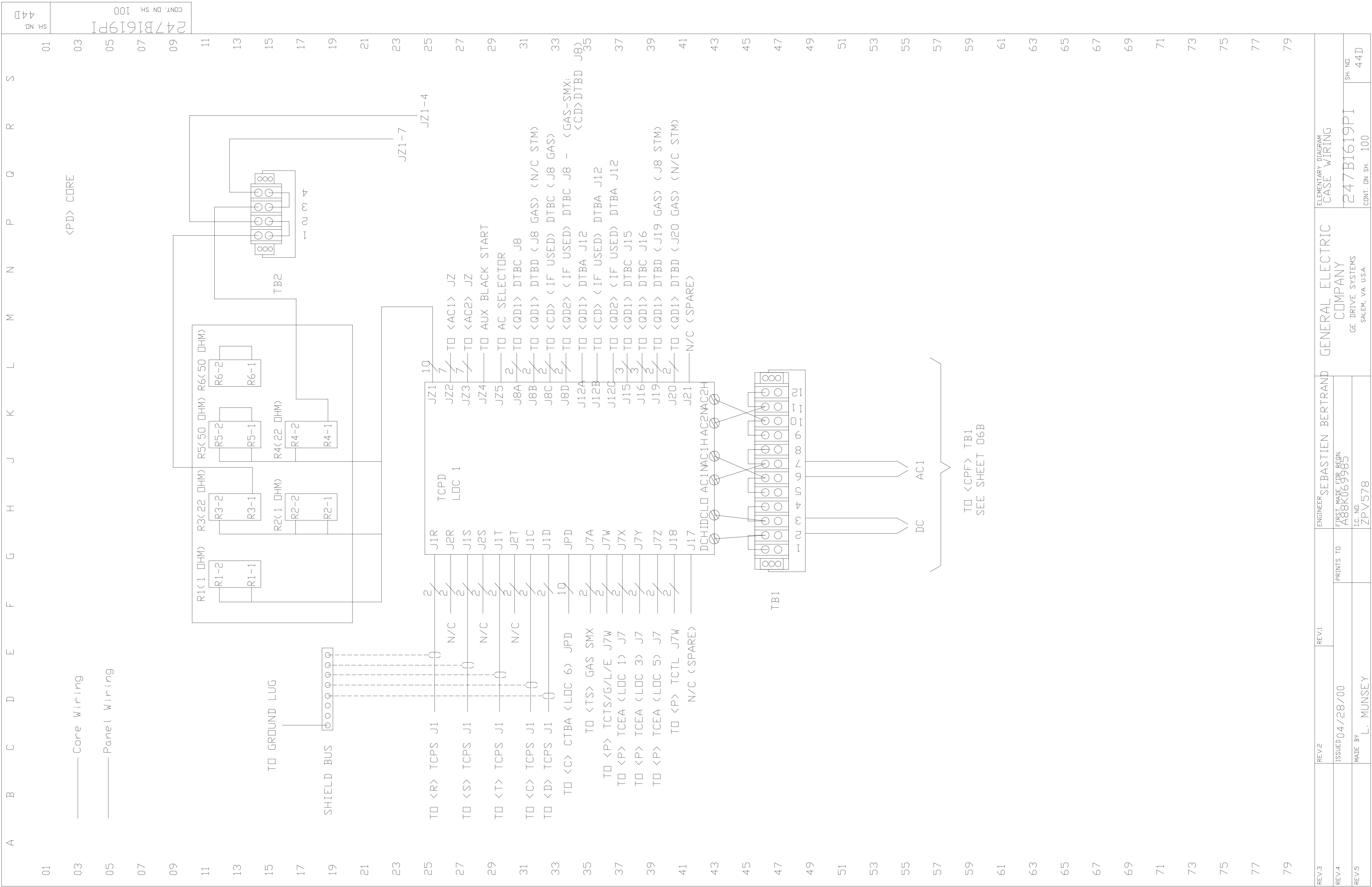
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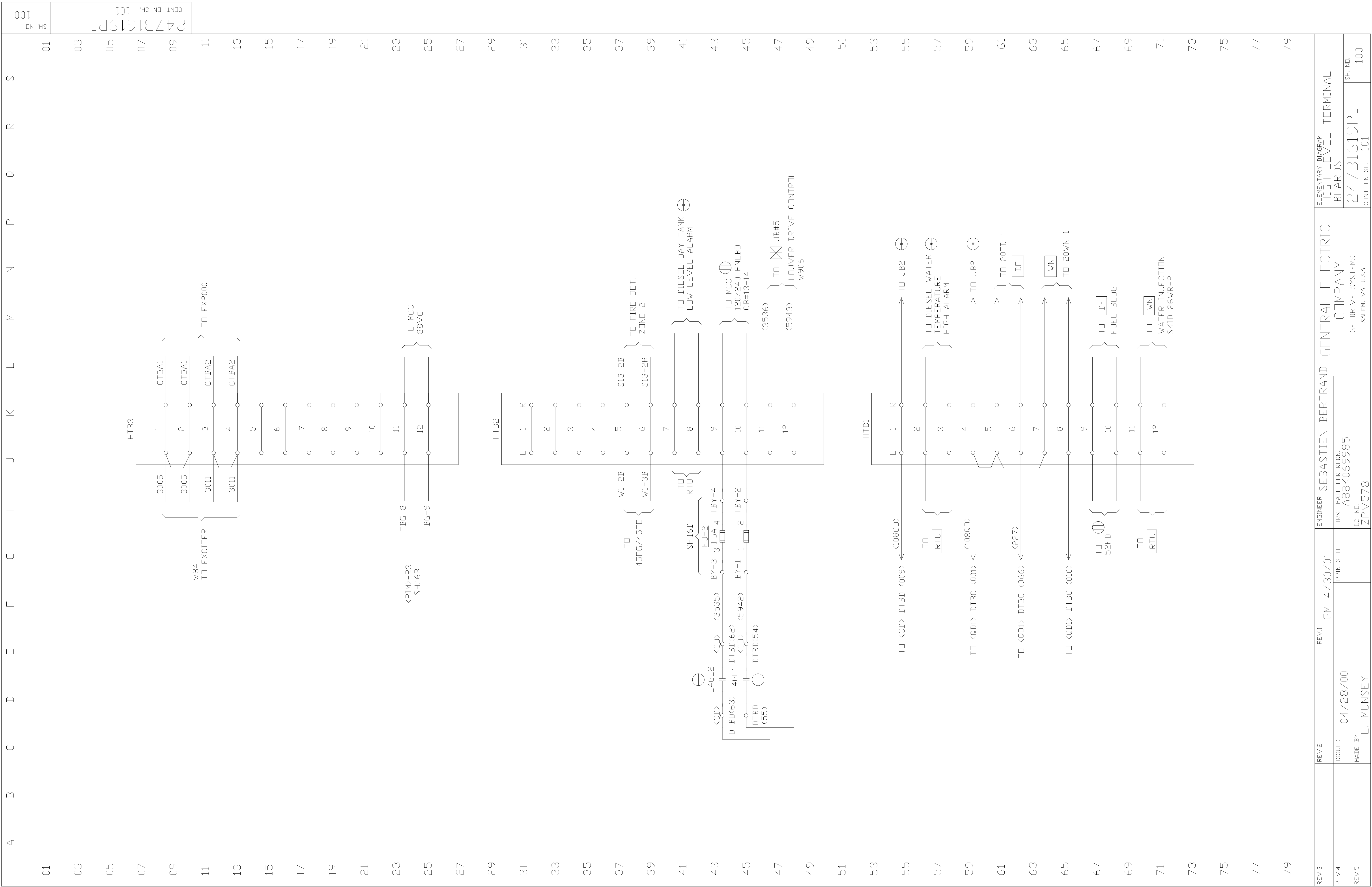
REV.4

REV.5











Appendix V - Turbine Connection and Wiring Diagrams

DM	ML	TURBINE S/N
F2977G1	GT#8	00T143(ALSTHOM)

REFERENCE DRAWINGS:
1. ALSTHOM CONNECTION DIAGRAM 91-300727.

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	UPDATE REV STATUS OF SHEET. REMOVE LIST OF COMPLEMENTARY DOCUMENTS. CD63239 STEVE FRAZIER	00-05-02	RDL
B	UPDATE REV STATUS OF SHEETS CD63814 STEVE FRAZIER	00-05-16	RDL
C	UPDATE REV STATUS OF SHEETS AN#01004441 D MARX SR	01-02-09	RDL

REVISE ON CAD ONLY
UG PART: 330B4899I.PRT

Training
Comm: N1, N1, N6

C	-	-	C	B	C	-	C	B	-	-	-	B	-	C	-	B	-	-	C	C	C	C	C	REV	REV STATUS OF SHEETS	SECTION 3
24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SH		

-	-	C	C	REV	REV STATUS OF SHEETS	SECTION 2
4	3	2	1	SH		

-	-	C	C	C	REV	REV STATUS OF SHEETS	SECTION 1
5	4	3	2	1	SH		

C	REV	REV STATUS OF SHEETS	INDEX
1	SH		

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE	 GE Power Generation		GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY
DIMENSIONS ARE IN INCHES.	DRAWN D MARX SR	00-03-23	DIAGRAM, CONNECTION- TURBINE MOD		
TOLERANCES ON:	CHECKED R LOUCKS	00-03-23			
2 PL DECIMALS ±	ENGRG WE MAGINN	00-03-23			
3 PL DECIMALS ±	ISSUED D MARX SR	00-03-23			
ANGLES ±			FMF: 324A2977G001		0401
FRACTIONS ± ✓			SIZE B	CAGE CODE	DWG NO 352B9322
APPLIED PRACTICES 348A9200	SIM TO: NONE	SCALE NONE	SHEET 1		INDEX

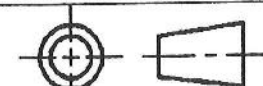
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DT-1N

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	GEN'L ENGINEERING CHANGES CD63814 STEVE FRAZIER	00-05-16	RDL
C	GEN'L ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL

REVISE ON CAD ONLY
UG PART: 352B932201.PRT

DEVICE CODE	SECT	SH.NO.	DESCRIPTION
12A(12HA-1)	3	16	TURBINE OVERSPEED-TRIP AND ALARM
20AA-1	3	11	ATOMIZING AIR BYPASS VALVE SOLENOID VALVE
20CB	3	11	COMPRESSOR BLEED SOLENOID VALVE
20CF	3	11	FUEL CLUTCH SOLENOID (VALVE)
20CS	3	11	STARTING CLUTCH SOLENOID (VALVE)
20DA	3	11	DIESEL ENGINE ACCELERATING SOLENOID VALVE
20DT	3	11	DIESEL ENGINE EMERGENCY TRIP SOLENOID (VALVE)
20DV	3	11	DIESEL ENGINE STOP VALVE SOLENOID (VALVE)
20FG	3	11	FUEL GAS STOP VALVE SOLENOID
20FL	3	11	LIQUID FUEL STOP VALVE SOLENOID (VALVE)
20PG-1,2	3	24	(DV) GAS FUEL SYSTEM PURGE SOLENOID VALVE
20PL	3	11	LIQUID FUEL SYSTEM PURGE SOLENOID (VALVE)
20TU	3	11	TORQUE CONVERTER UNLOADING (DRAIN) SOLENOID VALVE
20TV	3	11	TURBINE COMPRESSOR INLET GUIDE VANE SOLENOID VALVE
20VG-2	3	24	(DV) GAS FUEL VENT SOLENOID VALVE
23HA-1	2	2	SPACE HEATER ACCESSORY COMPARTMENT
	3	21	
23HT-1,2	2	2	SPACE HEATER TURBINE COMPARTMENT
	3	21	
23OT-1,2,3,4	2	2	IMMERSION HEATER-LUBE OIL TANK
	3	21	
26AA-1	3	10	ATOMIZING AIR TEMPERATURE
26BA-1	3	10	TURBINE COMPARTMENT TEMPERATURE-ALARM
26BA-2	3	10	TURBINE COMPARTMENT TEMPERATURE-NORMAL
26HA	3	21	ACCESSORY COMPARTMENT THERMOSTAT
26HT	3	21	TURBINE COMPARTMENT THERMOSTAT
26QA	3	10	LUBE OIL HEADER-HIGH TEMPERATURE ALARM
26QL	3	10	LUBE OIL TANK TEMPERATURE-LOW
26QM	3	10	LUBE OIL TANK TEMPERATURE-MODERATE
26QN	3	10	LUBE OIL TANK TEMPERATURE-NORMAL
26QT	3	10	LUBE OIL HEADER-HIGH TEMPERATURE TRIP
28FD-7	3	16	#7 FLAME DETECTOR-COMBUSTION CHAMBER #7
28FD-8	3	16	#8 FLAME DETECTOR-COMBUSTION CHAMBER #8
33CB-3,4	3	12	COMPRESSOR BYPASS VALVE LIMIT SWITCH
33CS	3	12	STARTING CLUTCH LIMIT SWITCH
33FL	3	12	LIQUID FUEL STOP VALVE LIMIT SWITCH
33HR	3	12	HYDRAULIC RATCHET LIMIT SWITCH
33PG-1,2,3,4	3	24	(DV) GAS FUEL SYSTEM PURGE VALVE LIMIT SWITCH
33TV	3	12	TURBINE COMPRESSOR INLET GUIDE VANES LIMIT SWITCH
39V-1	3	19	VIBRATION #1 SENSOR BEARING CAP
39V-2	3	19	VIBRATION #2 SENSOR COMPRESSOR

DEVICE CODE	SECT	SH.NO.	DESCRIPTION
43DE	3	16	DIESEL ENGINE-CONTROL SWITCH (TEST)
43HR	3	16	HYDRAULIC RATCHET-CONTROL SWITCH (JOG)
45FA1-1A	3	15	FIRE DETECTOR-ACCESSORY COMPARTMENT
45FA2-2A	3	15	FIRE DETECTOR-ACCESSORY COMPARTMENT
45FT-1A,2A	3	15	FIRE DETECTOR-TURBINE COMPARTMENT (FWD)
45FT-3A	3	15	FIRE DETECTOR-TURBINE COMPARTMENT (OVHD)
45FT-4A,5A	3	15	FIRE DETECTOR-TURBINE COMPARTMENT (AFT)
45FT-6A	3	15	FIRE DETECTOR-LOAD GEAR COMPARTMENT
49HA-1	2	2	ACCESSORY COMPARTMENT SPACE HEATER
	3	21	OVERTEMPERATURE
49HT-1,2	2	2	TURBINE COMPARTMENT SPACE HEATER
	3	21	OVERTEMPERATURE
52FC-1,2,3 (NOT USED)	3	9	WATER COOLING FAN MOTOR-CIRCUIT BREAKER
63AD-1	3	13	ATOMIZING AIR PRESSURE DIFFERENTIAL
63DM	3	13	DIESEL ENGINE-MINIMUM SPEED
63FG	3	13	GAS FUEL PRESSURE (UPSTREAM)
63FL-2	3	13	LIQUID FUEL PRESSURE (UPSTREAM)
63HG-1	3	14	HYDRAULIC TRIP CIRCUIT PRESSURE-GAS FUEL SYSTEM
63HL-1	3	14	HYDRAULIC TRIP CIRCUIT PRESSURE-LIQUID FUEL SYSTEM
63HQ	3	13	LOW HYDRAULIC SUPPLY PRESSURE-AUXILIARY HYDRAULIC PUMP START
63PG-1	3	24	FUEL GAS SYSTEM PRESSURE SWITCH
63QA	3	13	LOW LUBE OIL PRESSURE-ALARM
63OD	3	13	DIESEL ENGINE LUBE OIL PRESSURE
63OL	3	13	LOW LUBE OIL EMERGENCY PUMP START
63ON	3	13	NORMAL LUBE OIL PRESSURE-EMERGENCY PUMP STOP
65DE	3	19	TACHOMETER GENERATOR-DIESEL ENGINE
65FP	3	18	LIQUID FUEL PUMP SERVO VALVE
65GC	3	20	GAS CONTROL VALVE SERVO VALVE

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 GENERAL ELECTRIC COMPANY GE Power Generation Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9322 SECT1
DRAWN D MARX SR 00-03-23	ISSUED D MARX SR 00-03-23	SCALE NONE	SHEET 1	DISTR TO

DT-1N

FCTD

SIZE DWG NO 352B9322 SECT1 2 C

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	GEN'L ENGINEERING CHANGES CD63814 STEVE FRAZIER	00-05-16	RDL
C	GEN'L ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL

REVISE ON CAD ONLY
UG PART: 352B932201.PRT

DEVICE CODE	SECT	SH. NO.	DESCRIPTION
71QH	3	15	HIGH LUBE OIL LEVEL
71QL	3	15	LOW LUBE OIL LEVEL
77FD-1,2	3	19	FLOW DIVIDER MAGNETIC PICKUP-SPEED
77HC-1,2(77NH-1,2)	3	19	HIGH PRESSURE SET MAGNETIC PICKUP (SPEED CONTROL)
77HT-1(77NH-3)	3	19	HIGH PRESSURE SET MAGNETIC PICKUP (OVERSPEED)
77HT-4(SPARE)	3	19	HIGH PRESSURE SET MAGNETIC PICKUP (OVERSPEED)
88BA	2,3	1,8	COOLING AIR FAN TURBINE & ACCESSORY COMPARTMENT MOTOR
88CA(NO LONGER USED)	2,3	2,8	CONTROL AIR COMPRESSOR
88DS	2,3	1,8	DIESEL (STARTER) ENGINE STARTER
88HA-1	2,3	2,21	ACCESSORY COMPARTMENT SPACE HEATER-BLOWER MOTOR
88HR	2,3	1,8	HYDRAULIC RATCHET PUMP MOTOR
88HT-1,2	2	2	TURBINE COMPARTMENT SPACE HEATER-BLOWER MOTOR
88QC	3	21	
	2	1	COOLDOWN LUBE OIL PUMP MOTOR
	3	8	
88QE	2	1	EMERGENCY LUBE OIL PUMP MOTOR
	3	8	
88TL-1,2	3	17	TURBINE COMPARTMENT MOTOR OPERATED CO ₂ LOUVERS
90SR	3	20	STOP/SPEED (PRESSURE) RATIO VALVE
95SP-1	3	2	SPARK PLUG FOR COMBUSTION CHAMBER #1
95SP-2	3	2	SPARK PLUG FOR COMBUSTION CHAMBER #2
95TR-1	3	2	IGNITION TRANSFORMER FOR 95SP-1
95TR-2	3	2	IGNITION TRANSFORMER FOR 95SP-2
96CD	3	18	COMPRESSOR DISCHARGE PRESSURE TRANSDUCER
96FG	3	20	FUEL GAS PRESSURE TRANSMITTER
96GC-1,2	3	20	FUEL GAS CONTROL VALVE LVDT
96SR	3	20	STOP/SPEED RATIO VALVE LVDT

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GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9322 SECT1
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ISSUED	D MARX SR 00-03-23			

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SIZE DWG NO 352B9322 SECT 1 SH 3 REV C

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
C	GENERAL ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL

DEVICE CODE	SECT	SH	NO.	DESCRIPTION
AL-2,3,4	3	17		AC LIGHT-ACCESSORY COMPARTMENT
AL-5 THRU 8	3	17		AC LIGHT-TURBINE COMPARTMENT
ASW-13	3	17		AC LIGHT SWITCH
CT-DA-2	3	7		COMPRESSOR TEMPERATURE-DISCHARGE ANNULUS (LEFT)
CT-DA-3	3	7		COMPRESSOR TEMPERATURE-DISCHARGE ANNULUS (RIGHT)
DL-2	3	17		STANDBY DC LIGHT-ACCESSORY COMPARTMENT
DL-3,4	3	17		STANDBY DC LIGHT-TURBINE COMPARTMENT
J25	2,3	1,8		PLUG FOR AIR FAN MOTOR
JB1	3	1		JUNCTION BOX #1
JB2	3	2,3,4		JUNCTION BOX #2
JB3	3	5		JUNCTION BOX #3
JB18	3	11		JUNCTION BOX #18 FOR TURBINE-TEMP-WHEELSPACE
JB25	3	20		JUNCTION BOX #25 FOR GAS ACCESSORIES
JB67	3	22		JUNCTION BOX #67 (TT-XD-1,2,3)
JB68	3	22		JUNCTION BOX #68 (TT-XD-4,5,6 & TT-WS2A0-1)
JB69	3	23		JUNCTION BOX #69 (TT-XD-7,8,9 & TT-WS2A0-2)
JB70	3	23		JUNCTION BOX #70 (TT-XD-10,11,12)
JB129	3	10		JUNCTION BOX #129 (26AA-1)
JB135	3	11		JUNCTION BOX #135 (20AA-1, 20PL-1)
JB207	3	24		JUNCTION BOX #207 (PURGE DEVICES)
P25	2,3	1,8		MATING PLUG FOR AIR FAN MOTOR
PJ20	3	16		TELEPHONE RECEPTACLE
PS1	3	19		DIESEL TACHOMETER POWER SUPPLY
SL1-1	3	15		STROBE LIGHT AND HORN-ACCESSORY COMPARTMENT
TACH SWITCH	3	5		TACHOMETER SWITCH
TB1	3	19		MAGNETIC PICKUPS-TERMINAL BOARD
TB2	3	19		FLOW DIVIDER MAGNETIC PICKUP-SPEED-TERMINAL BOARD
TB4	3	18		TERMINAL BOARD FOR 96CD
TB8	3	18		TERMINAL BOARD FOR 65FP

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UG PART: 352B932201.PRT

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 GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY GE Power Generation		SIZE	CAGE CODE	DWG NO
DRAWN		D MARX SR 00-03-23	B	352B9322 SECT 1
ISSUED		D MARX SR 00-03-23	SCALE NONE	SHEET 3

DISTR TO

352B932201_C_3 klikst Mon Apr 2 11:48:30 2001 gvl_tc2_oce

SIZE B DWG NO 352B9322 SECT1 SH 4 REV -

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B932201.PRT

DEVICE CODE	SECT	SH. NO.	DESCRIPTION
TT-WS1A0-2	3	6	TURBINE TEMPERATURE-WHEELSPACE 1ST STAGE AFT OUTER
TT-WS1A0-3	3	6	TURBINE TEMPERATURE-WHEELSPACE 1ST STAGE AFT OUTER
TT-WS1F0-2	3	6	TURBINE TEMPERATURE-WHEELSPACE 1ST STAGE FWD OUTER
TT-WS1F0-3	3	6	TURBINE TEMPERATURE-WHEELSPACE 1ST STAGE FWD OUTER
TT-WS2A0-1	3	22	TURBINE TEMPERATURE-WHEELSPACE 2ND STAGE AFT OUTER
TT-WS2A0-2	3	23	TURBINE TEMPERATURE-WHEELSPACE 2ND STAGE AFT OUTER
TT-WS2F0-2	3	6	TURBINE TEMPERATURE-WHEELSPACE 2ND STAGE FWD OUTER
TT-WS2F0-3	3	6	TURBINE TEMPERATURE-WHEELSPACE 2ND STAGE FWD OUTER
TT-XD-1	3	22	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-2	3	22	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-3	3	22	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-4	3	22	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-5	3	22	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-6	3	22	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-7	3	23	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-8	3	23	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-9	3	23	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-10	3	23	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-11	3	23	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XD-12	3	23	TURBINE TEMPERATURE-EXHAUST DUCT
TT-XDT-1			TURBINE TEMPERATURE-EXHAUST DUCT-TRIP
TT-XDT-2			TURBINE TEMPERATURE-EXHAUST DUCT-TRIP
TT-XDT-3			TURBINE TEMPERATURE-EXHAUST DUCT-TRIP
TT-XDT-4			TURBINE TEMPERATURE-EXHAUST DUCT-TRIP
TT-XDT-5			TURBINE TEMPERATURE-EXHAUST DUCT-TRIP
TT-XDT-6			TURBINE TEMPERATURE-EXHAUST DUCT-TRIP

NOTE:
DISCONNECT WIRING IN JB15 & JB16 TO
TT-XDT-1 THRU TT-XDT-6 WHICH ARE
STILL INSTALLED BUT NO LONGER USED.

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 GE Power Generation		GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9322 SECT1		DISTR
DRAWN D MARX SR 00-03-23								
ISSUED D MARX SR 00-03-23		SCALE NONE				SHEET 4		

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B932202.PRT

NOTES:

1. BARE PORTIONS OF UNUSED LEADS ON ANY DEVICE TO BE TAPED.
2. ALL CONNECTIONS TO BE MADE TO PROPER SIDE OF TERMINAL BLOCKS AS SHOWN.
3. ALL THERMOCOUPLE CONNECTIONS TO BE MADE CHROMEL (+) YEL TO ODD NUMBERS AND ALUMEL (-) RED TO EVEN NUMBERS. (SEE NOTE 20)
4. FLAME DETECTOR, VIBRATION DETECTOR AND THERMOCOUPLE LEADS MUST NOT BE RUN IN THE SAME CONDUIT WITH CONTROL OR POWER WIRING.
5. NO NORMALLY OPEN
NC NORMALLY CLOSED
NC (3) NORMALLY CLOSED THREE-WAY SOLENOID VALVE
6. LEGEND. EXAMPLE 84TG/b₉ MEANS FUEL TRANSFER DEVICE 84TG.
CONTACT CLOSED ONLY WHEN DEVICE IS FULLY ON GAS.

EXAMPLE 33HR MEANS THAT THE LIMIT SWITCH FOR END POSITION OF
HYDRAULIC RACKET RACK (33HR) IS CLOSED (b) WHEN THE RACK IS FULLY
RETRACTED (r) AND OPEN (a) WHEN THE RACK IS FULLY FOWARD (f).

FIRST LETTER AFTER (/)	SECOND LETTER AFTER (/)	
a = OPEN	h = OPEN	l = LIQUID
b = CLOSED	i = LOW	o = OPEN
	e = ENERGIZED	c = CLOSED
	d = DEENERGIZED	f = FOWARD
	g = GAS	r = RETRACTED

7. ALL WIRING TO BE #14 WIRE UNLESS OTHERWISE SPECIFIED. ALL WIRES TO TURBINE COMPARTMENT TO BE WHITE TEFLON INSULATED.
8. CORRESPONDING PLUGS MATE WITH CORRWSpondING RECEPTACLES. P25 MATES WITH J25 ETC.
9. J25, J33 ETC DENOTES STATIONARY PORTION OF A CONNECTOR OR PLUG.

10. P25, P33 ETC DENOTES MOVABLE PORTION OF A CONNECTOR OR PLUG.
11. ** INDICATES SPARE WIRE. DESTINATIONS WITH THIS SYMBOL SHALL HAVE A "SP" FOR SPARE LABELLED ON THE WIRE.
12. 23QT-4 IS A SPARE HEATER INSTALLED IN THE BASE WITH LEADS LONG ENOUGH TO REPLACE ANY OF THE OTHER IMMERSION HEATERS THAT FAIL.
13. THERMOSTAT LEADS ARE NOT TO BE CONNECTED. TAPE AND COIL THERMOSTAT LEADS.
14. --- = SHIELDED PAIRS, AWG #18, ONE WHITE OR ORANGE AND ONE BLACK. CONNECT WHITE LEADS TO ODD WIRE NUMBERS. CONNECT BLACK LEADS TO EVEN WIRE NUMBERS.
15. ALL SHIELDED PAIRS MUST HAVE SHIELDING RUN TO WITHIN 3 INCHES OF THE BACK OF THE RECEPTACLES AND/OR PLUGS. SHIELDS MUST NOT BE ALLOWED TO TOUCH OTHER SHIELDS OR GROUND EXCEPT AS SPECIFICALLY CALLED FOR. TUBING OR TAPE MUST BE APPLIED AS REQUIRED TO MAINTAINED PROPER ISOLATION OF SHIELDS.
16. ALL CONNECTORS OR PLUGS MUST HAVE ALL HOLES FILLED WITH PINS OR SOCKETS AS APPLICABLE TO MAINTAIN WATERTIGHT INTEGRITY OF ASSEMBLY.
17. CONTROL LEADS C1 AND C2 (IF SUPPLIED) IS/ARE NOT USED AND SHOULD BE SEPARATELY TAPED.
18. ALL WIRE NO'S WITH ASTERISK (*) ARE TO BE RUN TO JB#5. WIRE TO BE 50 FT. LONG AND COILED AT THE END OF THE TURBINE BASE IN ACCORDANCE WITH CONDUIT ARRANGEMENT, TURBINE COMPARTMENT ON UNIT ML.
19. ALL WIRE R TOTAL 1 OHM/100mV.
DIESEL ☒
(START) ELECTRIC MOTOR ☒
20. TC CONNECTIONS TO BE MADE WIRE TO WIRE WITHOUT TERMINALS. SCRAPE ENAMEL OFF WIRE ENDS. TWIST EXPOSED ENDS OF CONNECTING WIRE TOGETHER AND LOOP CONNECTING WIRES AROUND TERMINAL BOARD SCREWS.
ON KULKA TERMINAL BOARDS, TC CONNECTIONS ARE TO BE MADE WITHOUT TERMINALS. SCAPE ENAMEL OFF WIRE ENDS, PUSH ENDS UNDER WASHER ON OPPOSITE SIDES OF THE TERMINAL SCREW AND TIGHTEN.

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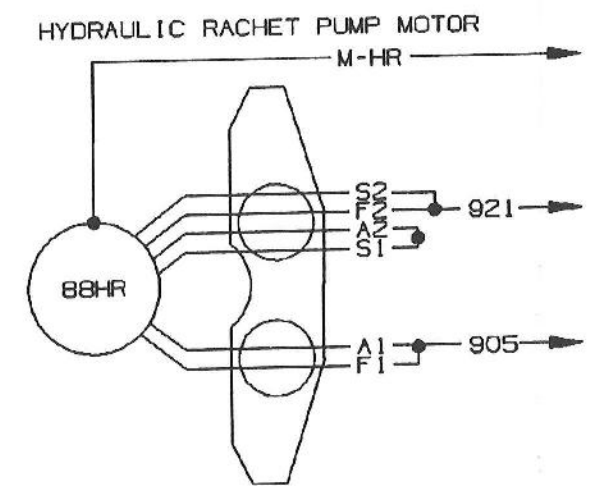
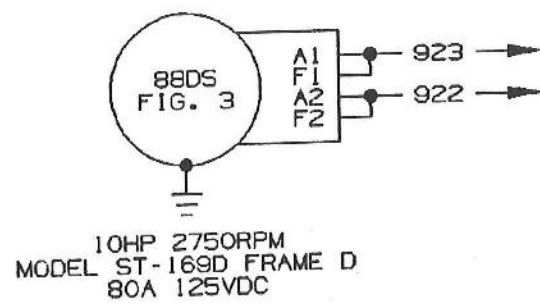
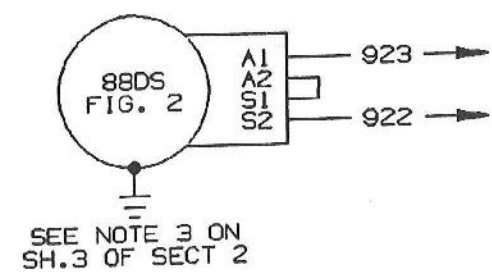
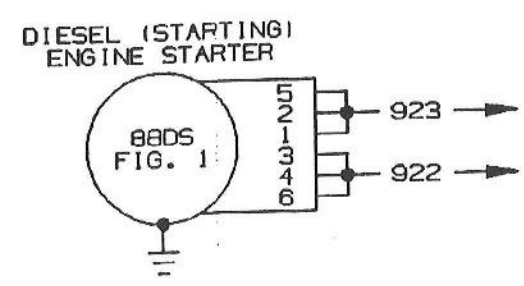
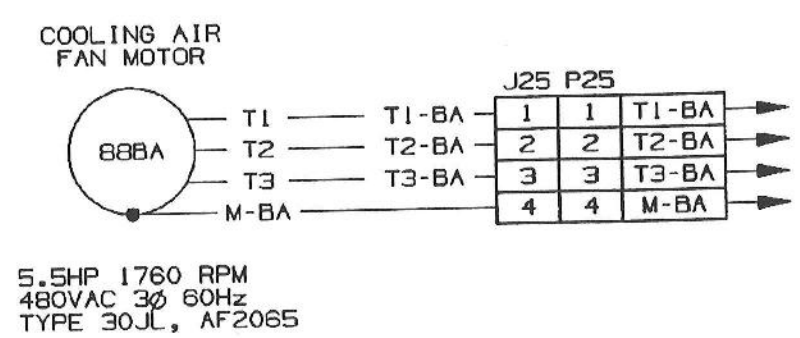
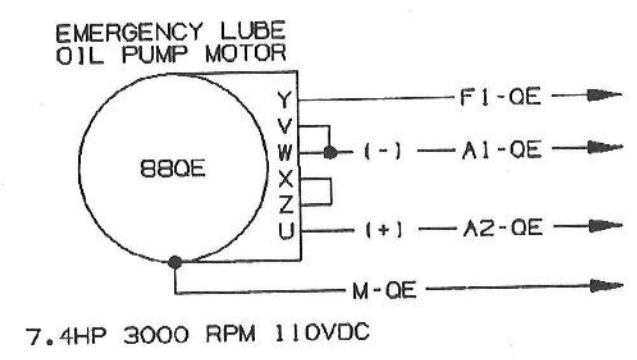
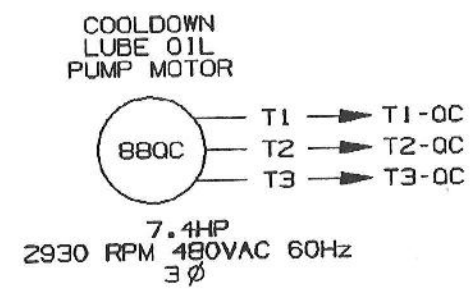
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GE Power Generation		B		352B9322 SECT 1	
DRAWN	D MARX SR 00-03-23	SCALE	NONE	SHEET 5	
ISSUED	D MARX SR 00-03-23				

352B932202_C_1 klikst Mon Apr 2 11:48:11 2001 gvl_tc2_ocr

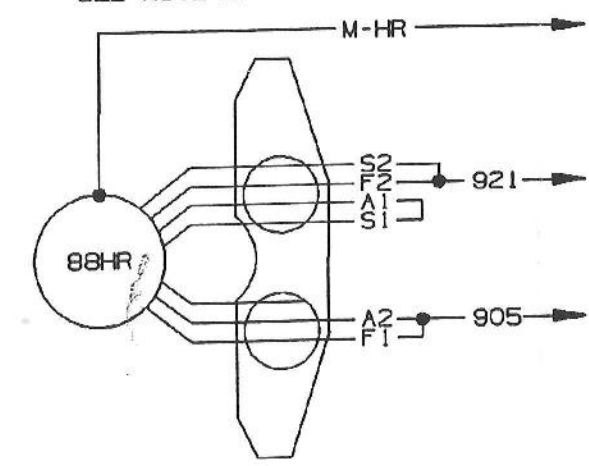
SIZE DWG NO 352B9322 SECT2 SH 1 REV C

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	GEN'L ENGINEERING CHANGES CD63814 STEVE FRAZIER	00-05-16	RDL
C	GEN'L ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL

REVISE ON CAD ONLY
UG PART: 352B932202.PRT



MODEL NO. 5BCJ56BA49 OR 5BCJ56EA49
3/4HP FRAME 56
DRIP PROOF 1725 RPM 125 VDC
SEE NOTE 2 ON SH.3 OF SECT 2



REVERSED ROTATION

FOR ALTERNATE MOTOR CONNECTIONS
SEE SHEETS 4 & 5 OF SECT 2
SEE NOTES ON SH.4 OF SECT 1

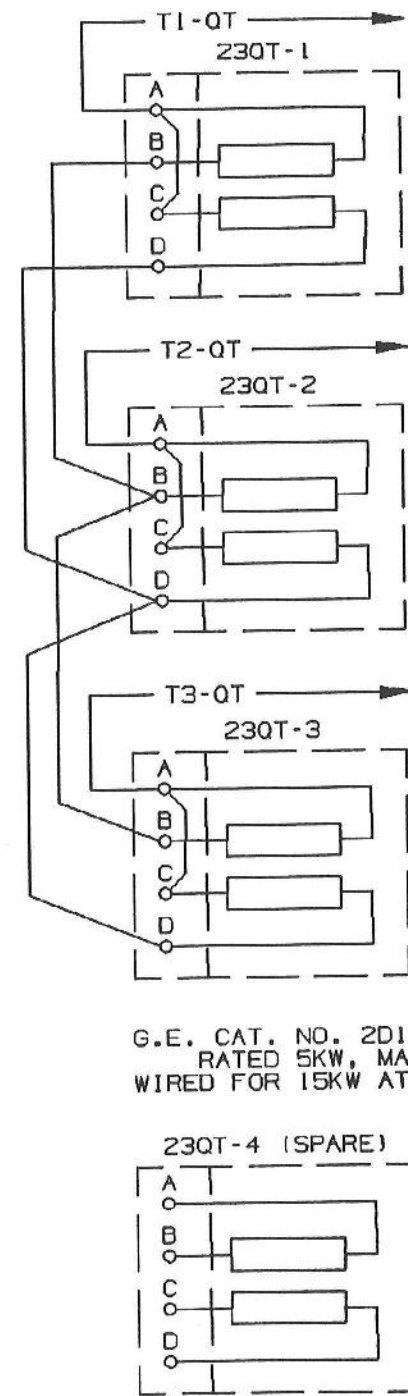
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GE Power Generation		SIZE	CAGE CODE	DWG NO	DISTR TO
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ISSUED D MARX SR 00-03-23		SCALE NONE		SHEET 1	

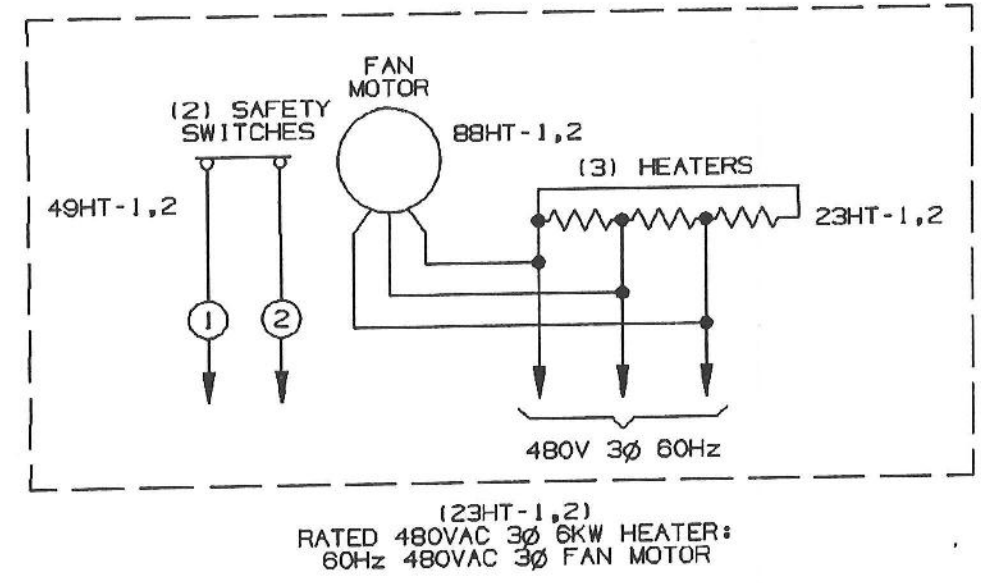
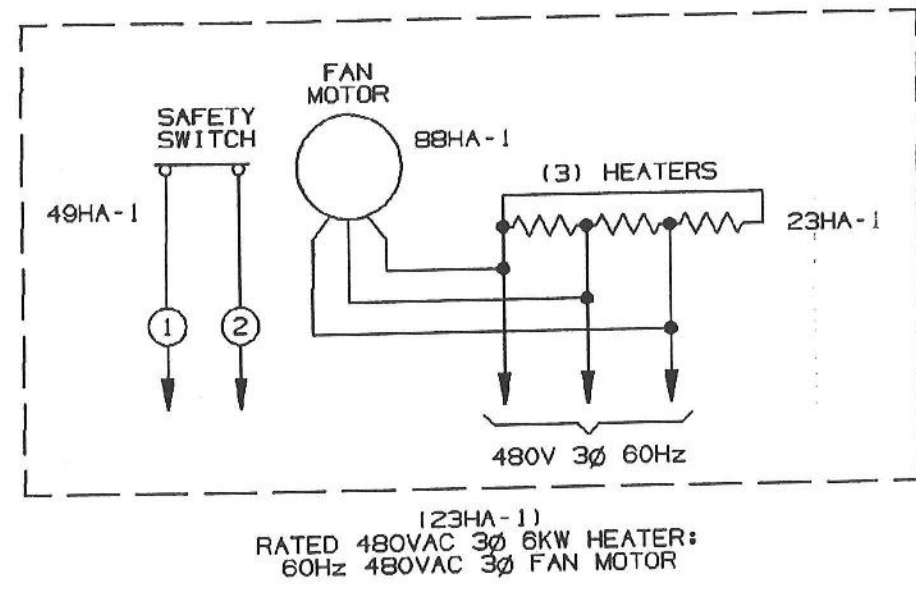
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
C	GENERAL ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL

REVISE ON CAD ONLY
UG PART: 352B932202.PRT

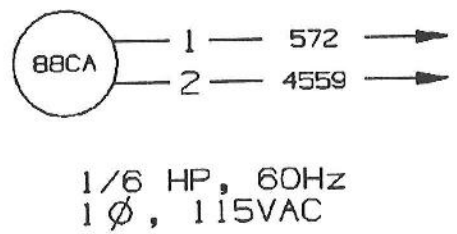
LUBE OIL TANK HEATERS



G.E. CAT. NO. 2D186G21
RATED 5KW, MAX
WIRED FOR 15KW AT 440V



CONTROL AIR
COMPRESSOR
(NO LONGER USED)



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GENERAL ELECTRIC COMPANY Schenectady, NY	SIZE	CAGE CODE	DWG NO
GE Power Generation	B		352B9322 SECT2
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ISSUED	D MARX SR 00-03-23		
SCALE NONE		SHEET	2

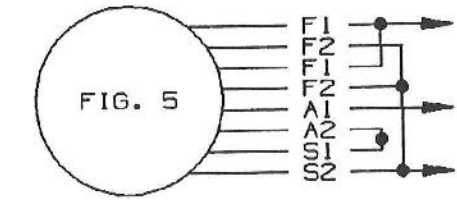
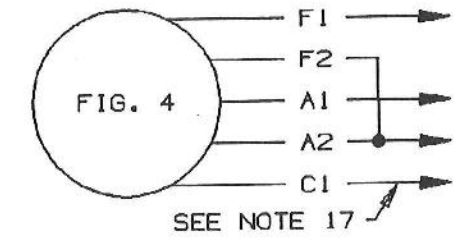
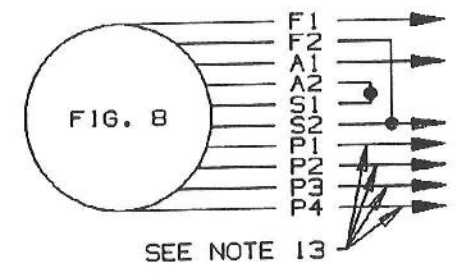
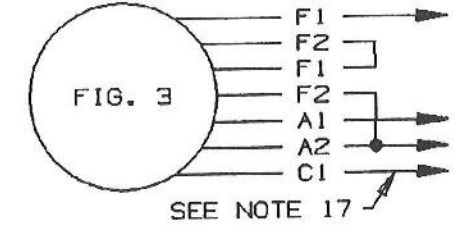
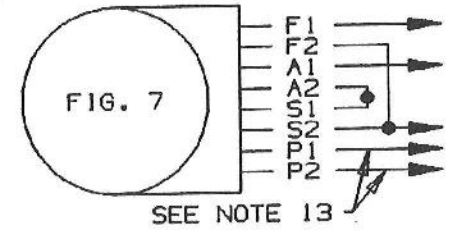
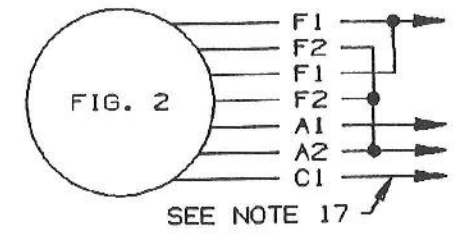
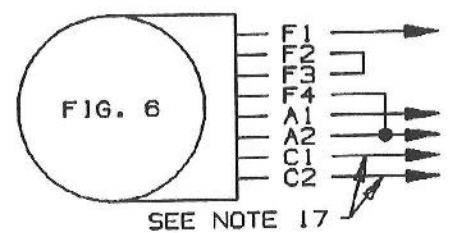
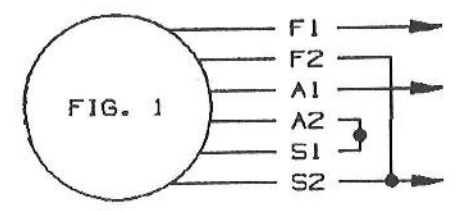
DISTR TO

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

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UG PART: 352B932202.PRT

1. WHEN LEADS AND LEAD MARKINGS ON MOTORS FURNISHED DIFFER FROM THOSE SHOWN ON OTHER SHEETS OF THIS CONNECTION DIAGRAM. CHOOSE THE DIAGRAM FROM THIS SHEET OR SH. 4 SECT 2 WHICH MATCHES THE LEADS ON THE MOTOR FURNISHED.
2. CONNECTIONS AS SHOWN ARE FOR CCW ROTATION AS VIEWED FROM COMMUTATOR END. FOR CW ROTATION REVERSE LEADS A1 AND A2 OF MOTOR.
3. FOR CW ROTATION REVERSE LEADS S1 AND S2 OF MOTOR.
4. SPEED CHANGE IS MADE ONLY WITH A FIELD RHEOSTAT.



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 GE Power Generation		GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9322 SECT2	DISTR TO
DRAWN D MARX SR 00-03-23							
ISSUED D MARX SR 00-03-23		SCALE NONE		SHEET 3			

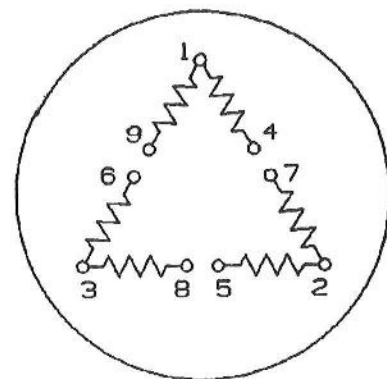
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REVISIONS

REV	DESCRIPTION	DATE	APPROVED

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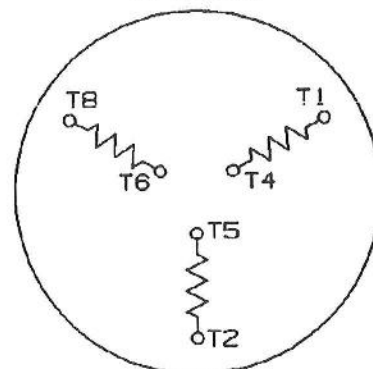
AC MOTOR Δ CONNECTED



NOTE:
WHEN LEADS AND LEAD MARKINGS ON MOTORS FURNISHED
DIFFER FROM THOSE SHOWN ON OTHER SHEETS OF THIS
CONNECTION DIAGRAM FROM THIS SHEET OR SH. 3 SECT 2
WHICH MATCHES THE LEADS ON THE MOTOR FURNISHED.

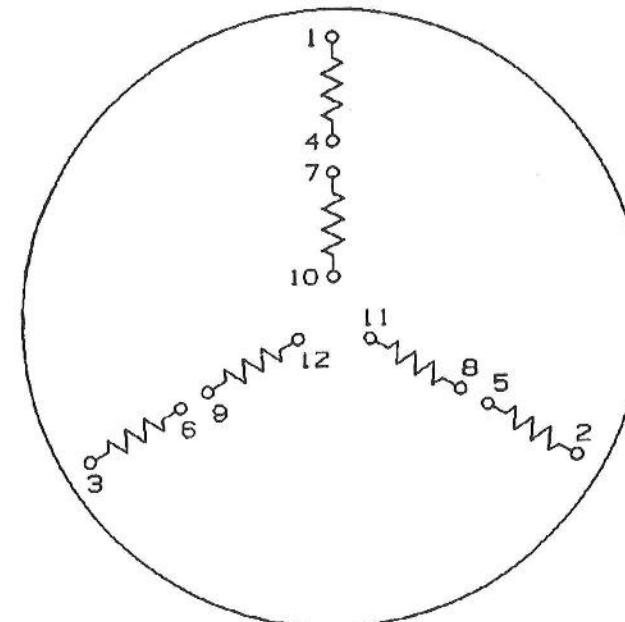
FOR 230V SERVICE	CONNECT POWER TO 1, 2, & 3 JUMPER 1, 6, & 7/2, 4 & 8/3, 5 & 9
FOR 460V SERVICE	CONNECT POWER TO 1, 2, & 3 JUMPER 4 & 7/5 & 8/6 & 9

AC MOTOR



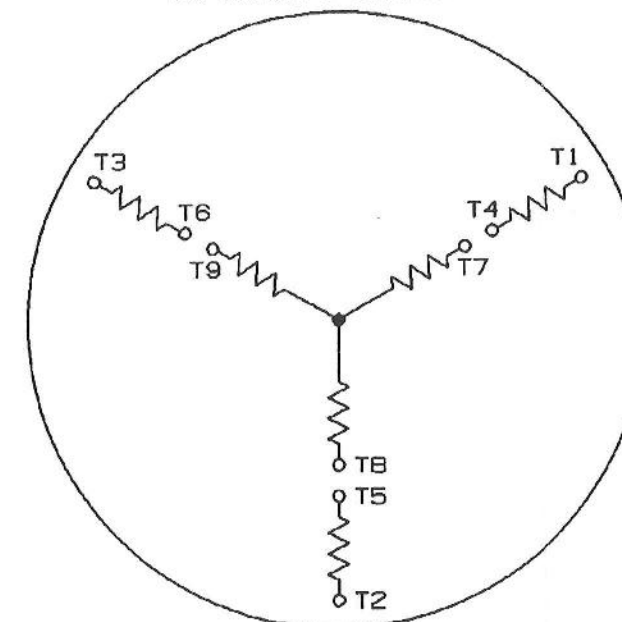
VOLTS	L1	L2	L3	TOGETHER
220	T1-T6	T2-T4	T3-T5	
380	T1	T2	T3	T4-T5-T6

AC MOTOR



FOR 230V SERVICE	CONNECT POWER TO 1, 2, & 3 JUMPER 1 & 7/2 & 8/3 & 9 CONNECT 4, 5, 6, 10, 11 & 12
FOR 460V SERVICE	CONNECT POWER TO 1, 2, & 3 JUMPER 4 & 7/5 & 8/6 & 9 CONNECT 10, 11 & 12

AC MOTOR Y CONNECTED



FOR 230V SERVICE	CONNECT POWER TO T1, T2, & T3 JUMPER T1 & T7/T2 & T8/T3 & T9 CONNECT T4, T5 & T6
FOR 460V SERVICE	CONNECT POWER TO T1, T2, & T3 JUMPER T4 & T7/T5 & T8/T6 & T9

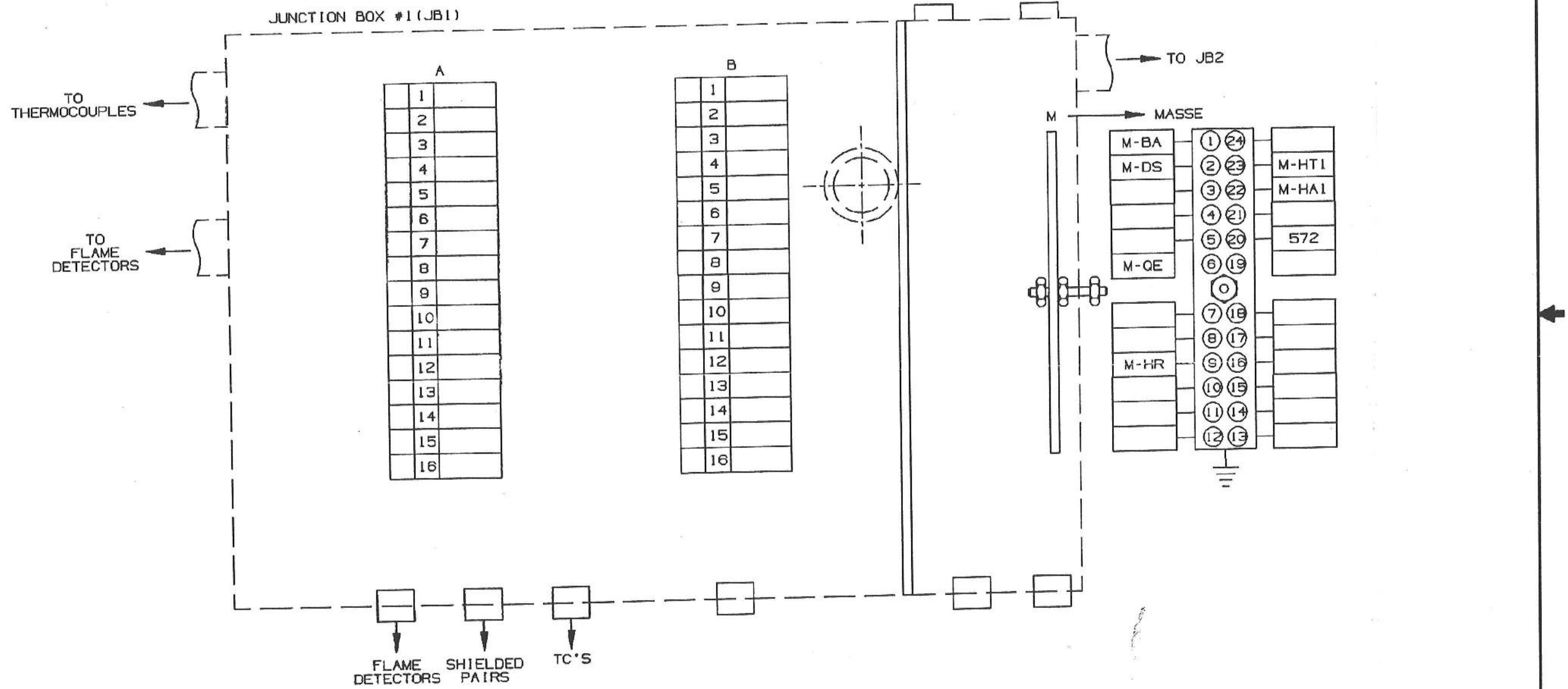
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DRAWN D MARX SR 00-03-23		SCALE NONE		SHEET 4	
ISSUED D MARX SR 00-03-23					

352B932202_C_4 klikst Mon Apr 2 11:47:53 2001 gvl_tc2_oce

REVISE ON CAD ONLY
UG PART: 352B932203.PRT

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	GEN'L ENGINEERING CHANGES CD63814 STEVE FRAZIER	00-05-16	RDL
C	TECHNICAL UPDATE PER ISSUING PRACTICE AN# 01004441 D MARX SR	01-02-09	RDL



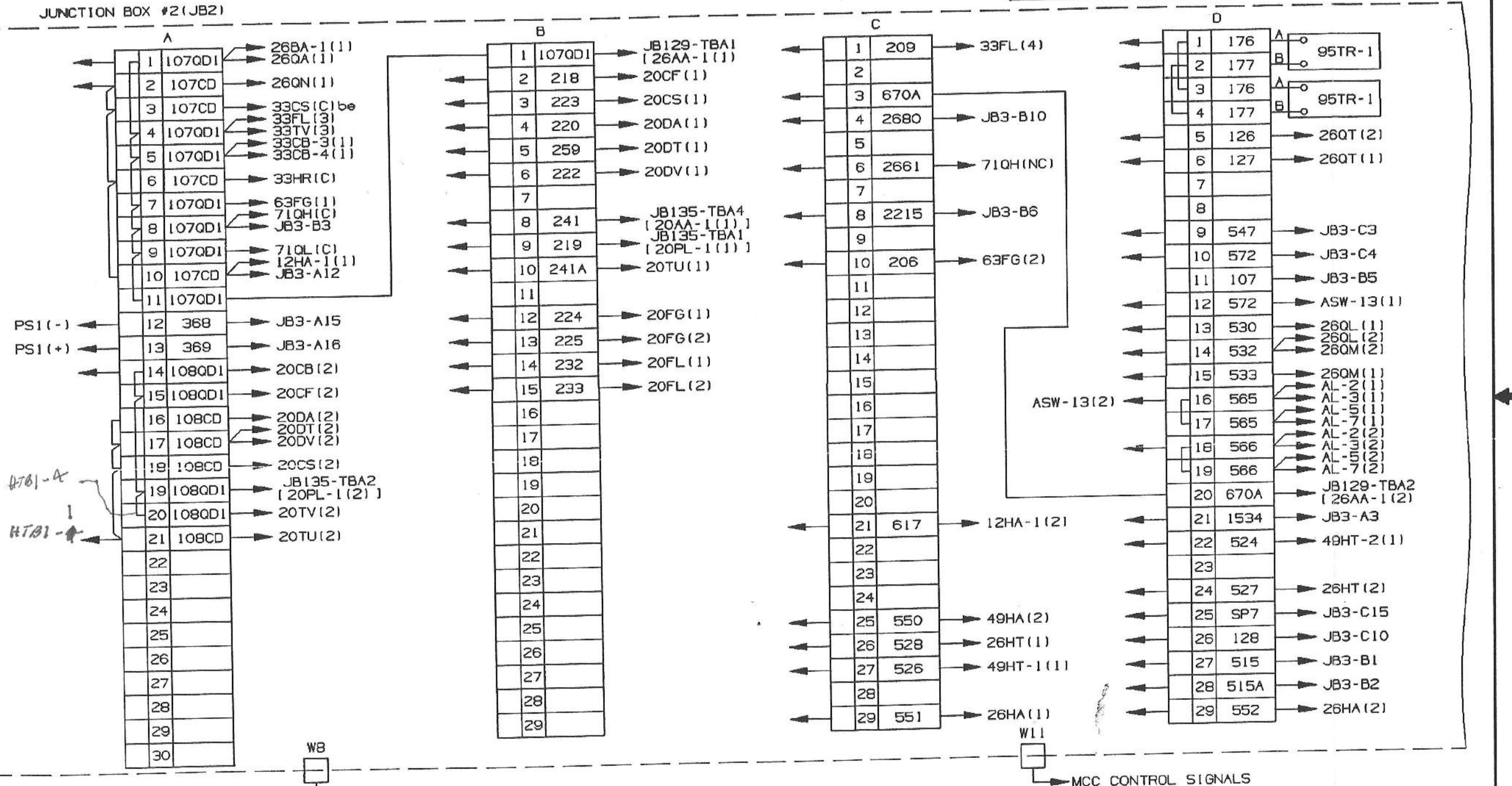
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 GE Power Generation	GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY	SIZE B	CAGE CODE	DWG NO 352B9322 SECT3	DISTR TO
	DRAWN D MARX SR 00-03-23	SCALE NONE			
	ISSUED D MARX SR 00-03-23	SHEET 1			

352B932203_C_1 klikst Mon Apr 2 11:47:48 2001 gvl_tc2_oce

REVISE ON CAD ONLY
UG PART: 352B932203.PRT

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
C	GEN'L ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL



MARK V
LEVEL 3
SIGNALS

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GE Power Generation		SIZE	CAGE CODE	DWG NO
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ISSUED D MARX SR 00-03-23		SCALE NONE	SHEET	2

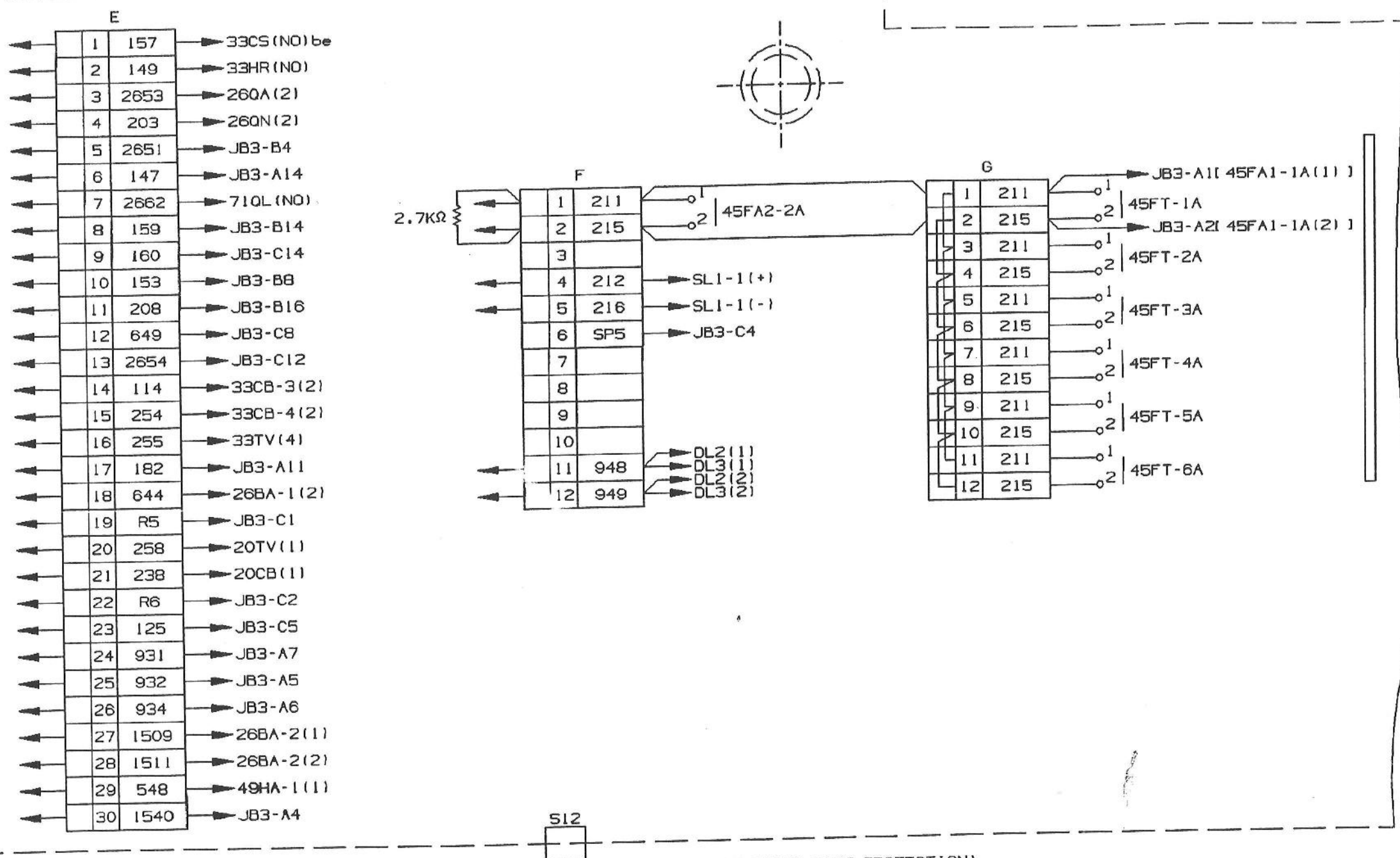
DISTR
TO

352B932203_C_2 klikst Mon Apr 2 11:47:42 2001 gvl_tc2_oce

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UG PART: 352B932203.PRT

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
C	GEN'L ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL

JUNCTION BOX #2(JB2)



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GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE	CAGE CODE	DWG NO
GE Power Generation		B		352B9322 SECT3
DRAWN	D MARX SR 00-03-23	SCALE NONE		SHEET 3
ISSUED	D MARX SR 00-03-23			

DISTR TO

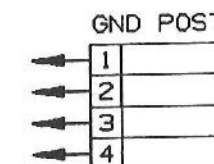
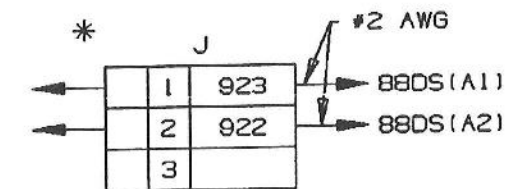
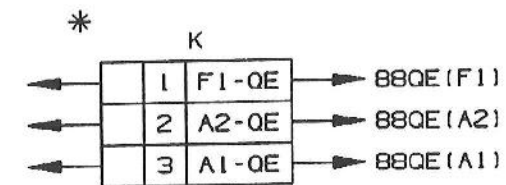
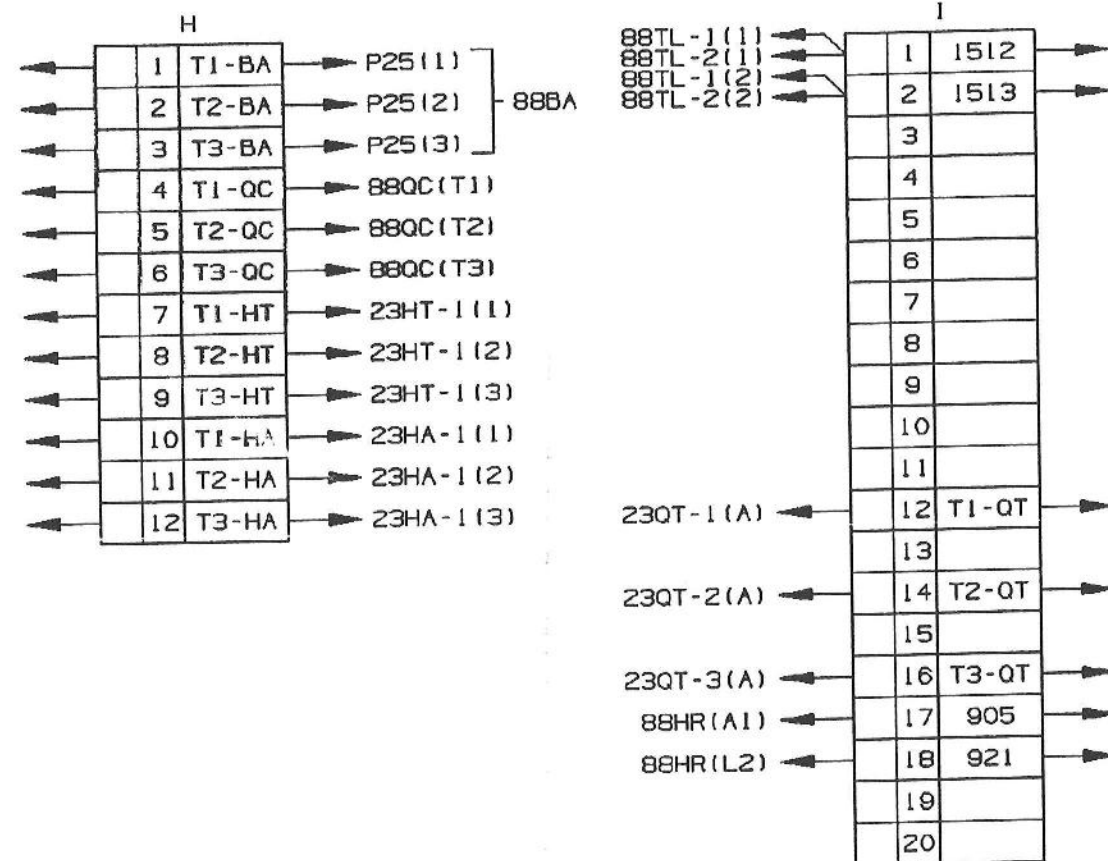
352B932203_C_3 klikst Mon Apr 2 11:47:36 2001 gvl_tc2_oce

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UG PART: 352B932203.PRT

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	GEN'L ENGINEERING CHANGES CD63814 STEVE FRAZIER	00-05-16	RDL
C	GEN'L ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL

TO
88HA, 88DS, 88QC
88QE AL-2, 3, 4

JUNCTION BOX #2 (JB2)



TO
23QT-1,2,3
88BA
88HR

TO
71QH
71QL

*
TERMINAL
BLOCKS
J & K
MOUNTED ON
SIDEWALL

W10
23HA-1, -2
23HT-1, -2
88BA
88OC

W13
23QT
88HR

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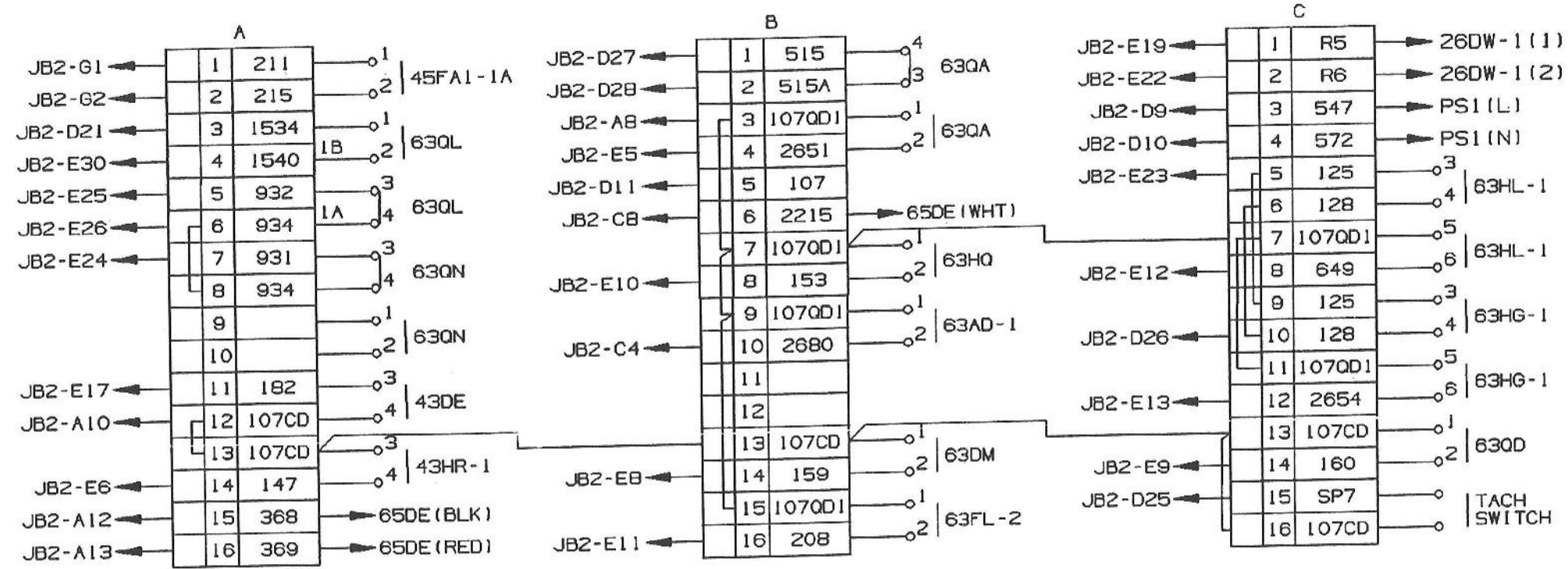
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ISSUED D MARX SR 00-03-23							
		SCALE		NONE		SHEET 4	

DISTR
TO

352B932203_C_4 klickst Mon Apr 2 11:47:31 2001 gvl_tc2_oce

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
C	GENERAL ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL

JUNCTION BOX #3 (JB3)



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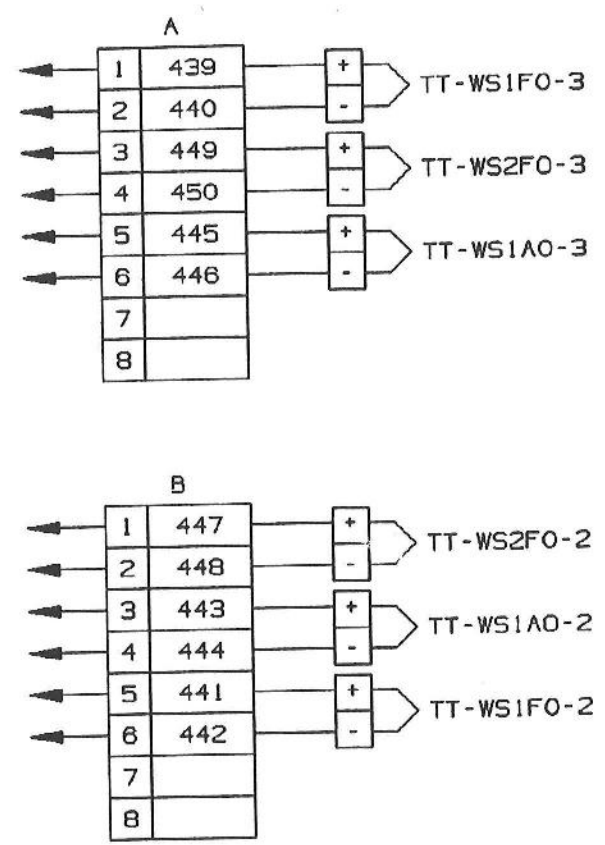
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ISSUED D MARX SR 00-03-23					

352B932203_C_5 klikst Mon Apr 2 11:47:25 2001 gvl_tc2_oce

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

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JUNCTION BOX #18(JB18)



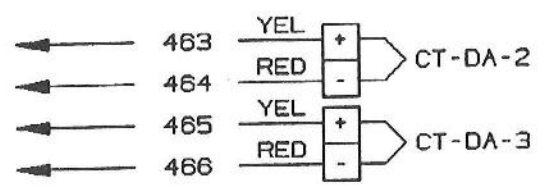
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 GE Power Generation		SIZE B	CAGE CODE	DWG NO 352B9322 SECT3	DISTR TO
DRAWN D MARX SR 00-03-23		SCALE NONE			
ISSUED D MARX SR 00-03-23		SHEET 6			

352B932203_C_6 klikst Mon Apr 2 11:47:19 2001 gvl_tc2_oce

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

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UG PART: 352B932203.PRT



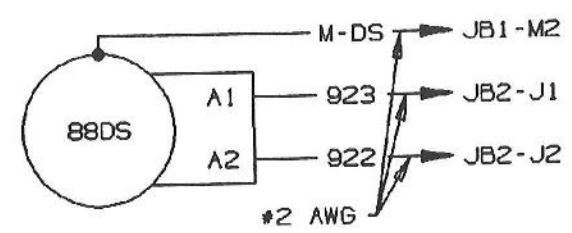
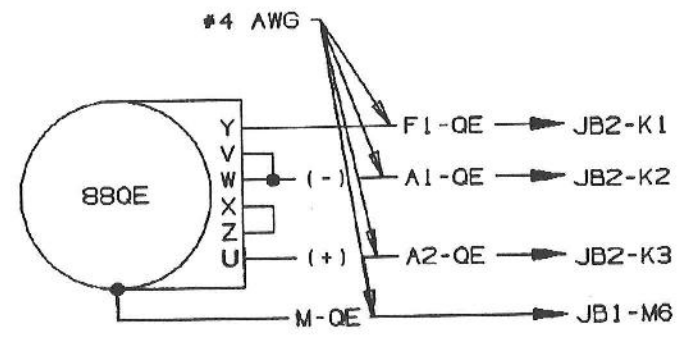
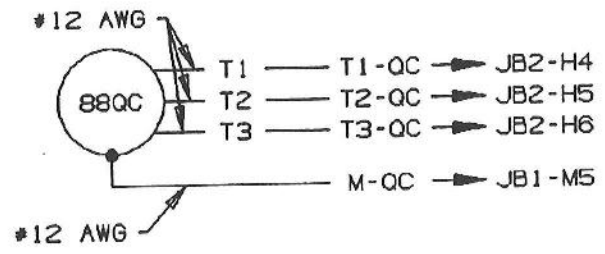
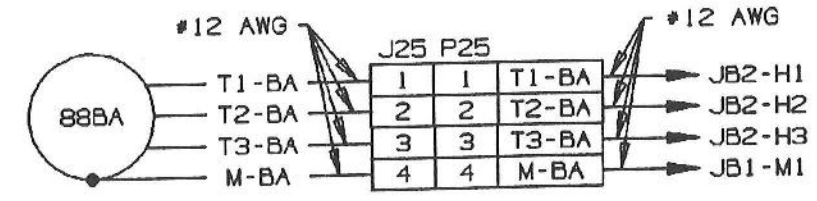
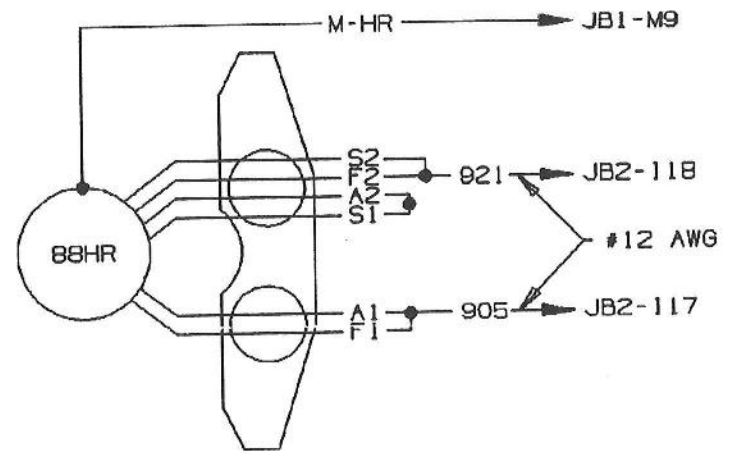
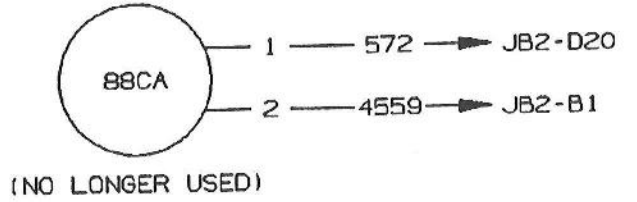
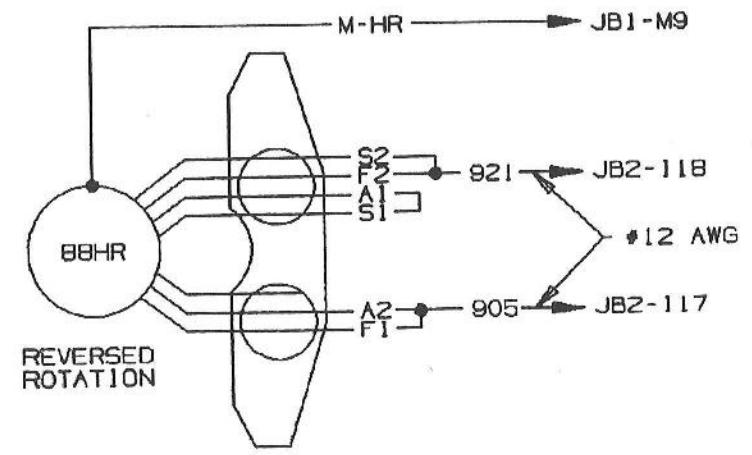
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DRAWN D MARX SR 00-03-23	SCALE NONE		SHEET 7	
ISSUED D MARX SR 00-03-23				

352B932203_C_7 klikst Mon Apr 2 11:47:13 2001 gvl_tc2_oce

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
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U6 PART: 352B932202.PRT



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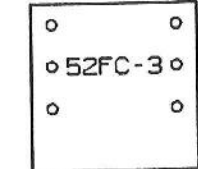
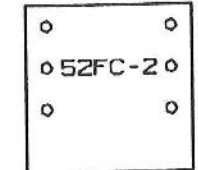
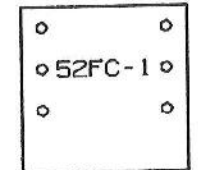
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ISSUED D MARX SR 00-03-23					

352B932203_C_8 klikst Mon Apr 2 11:47:06 2001 gvl_tc2_oce

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REV	DESCRIPTION	DATE	APPROVED

52FC-1,2,3 CIRCUIT BREAKERS
EXIST BUT ARE NO LONGER USED

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UG PART: 352B932203.PRT



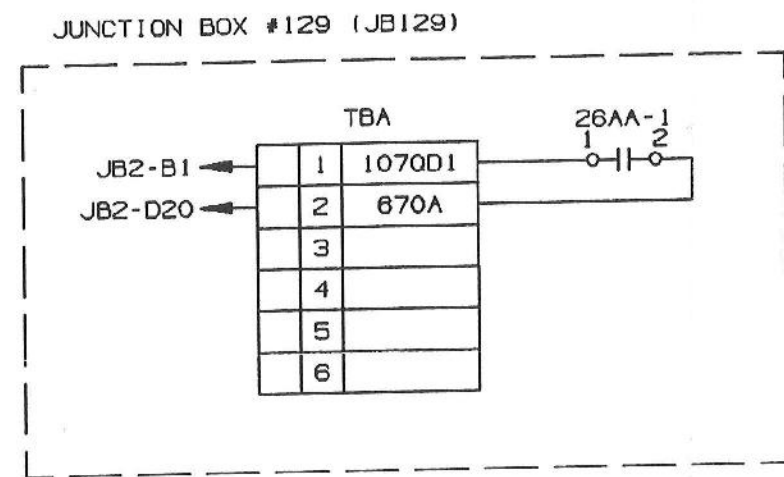
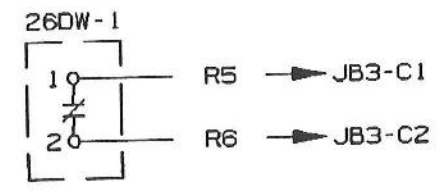
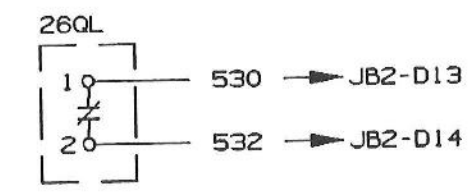
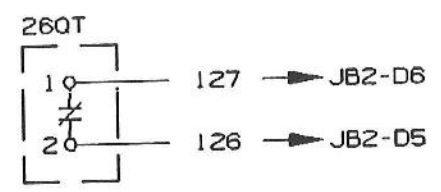
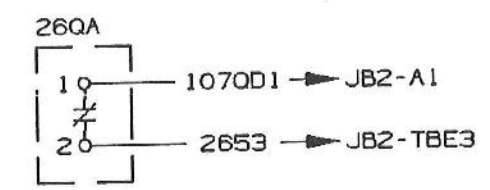
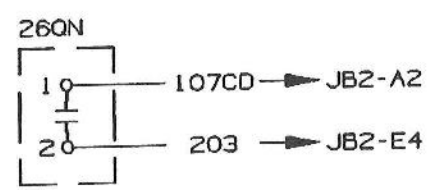
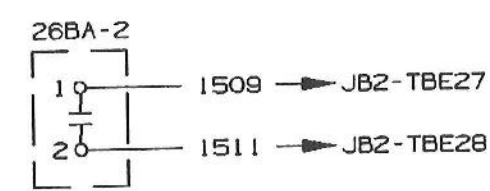
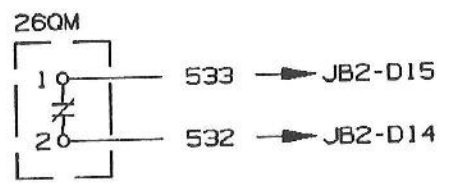
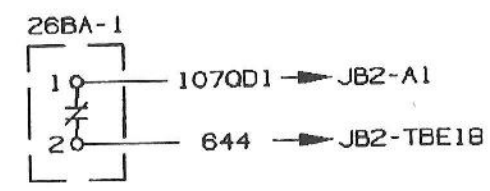
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 GENERAL ELECTRIC COMPANY Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9322 SECT3	DISTR TO
GE Power Generation					
DRAWN D MARX SR 00-03-23	ISSUED D MARX SR 00-03-23	SCALE NONE	SHEET 9		

352B932203_C_9 klickst Mon Apr 2 11:47:00 2001 gvl_tc2_ocr

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
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UG PART: 352B932203.PRT



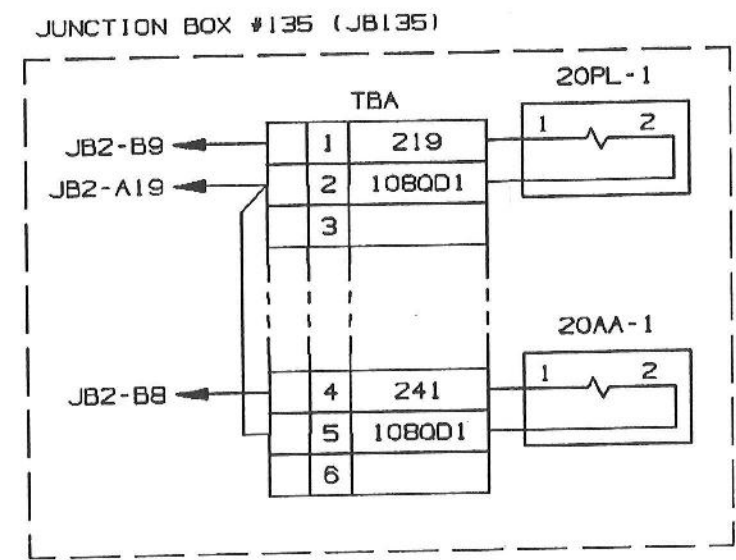
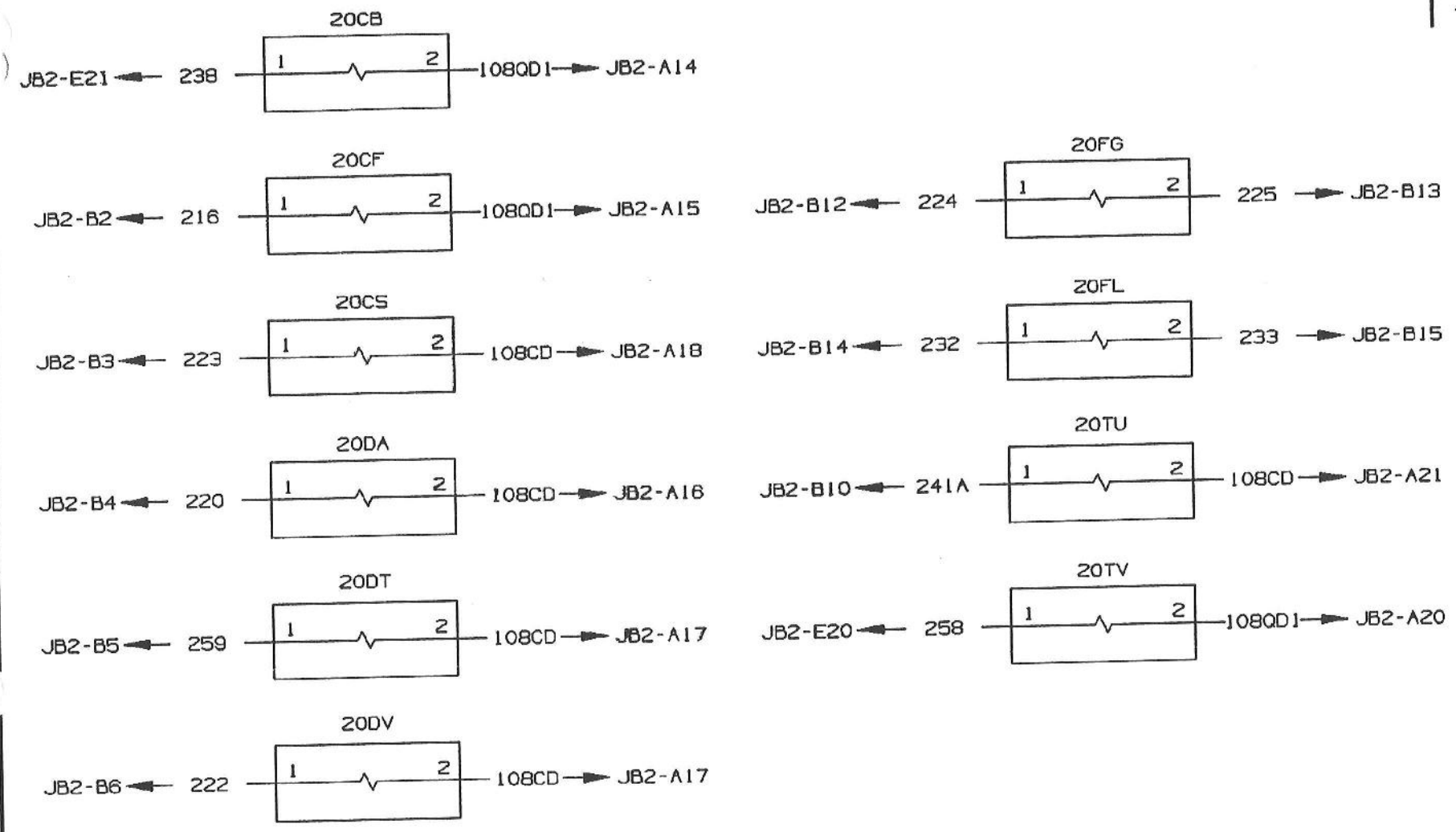
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 GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY GE Power Generation		SIZE B	CAGE CODE	DWG NO 352B9322 SECT3	DISTR TO
DRAWN D MARX SR 00-03-23	SCALE NONE	SHEET 10			
ISSUED D MARX SR 00-03-23					

352B932203_C_10 klikst Mon Apr 2 11:46:55 2001 gvl_tc2_oce

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

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UG PART: 352B932203.PRT



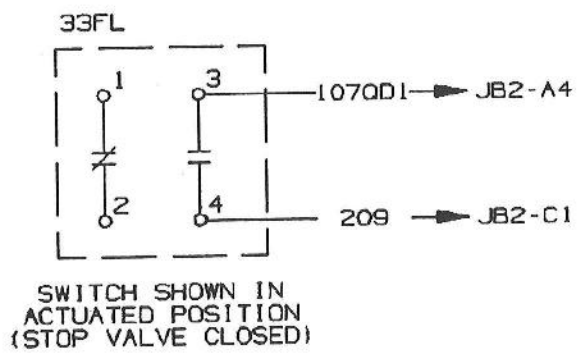
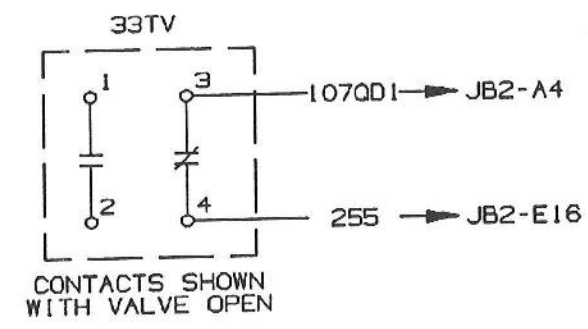
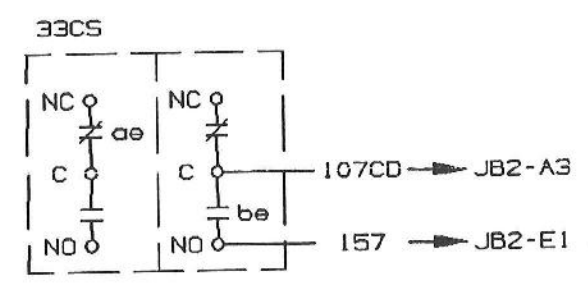
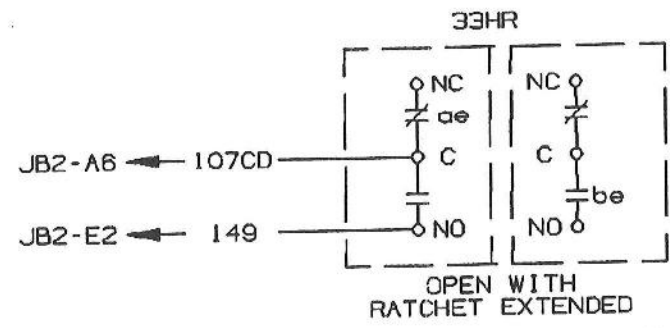
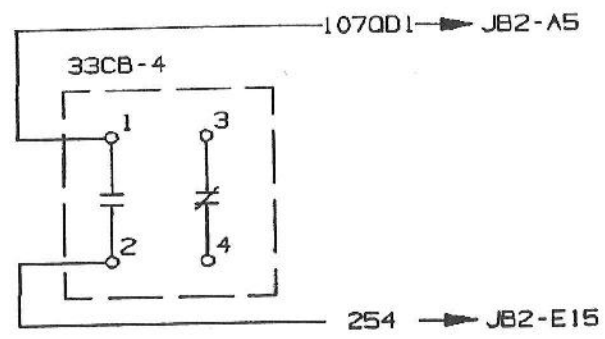
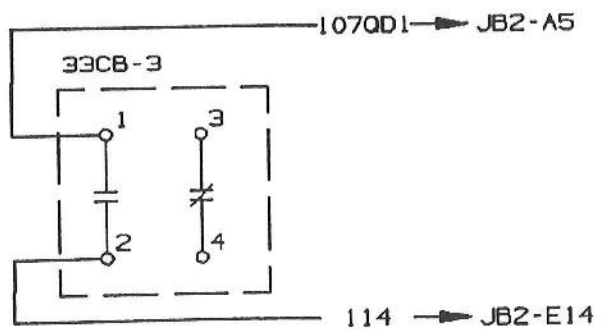
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 GE Power Generation		GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9322 SECT3	DISTR TO
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ISSUED D MARX SR 00-03-23		SCALE NONE			SHEET 11		

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	GEN'L ENGINEERING CHANGES CD63814 STEVE FRAZIER	00-05-16	RDL

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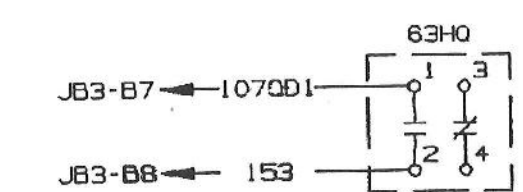
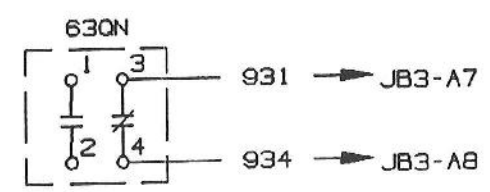
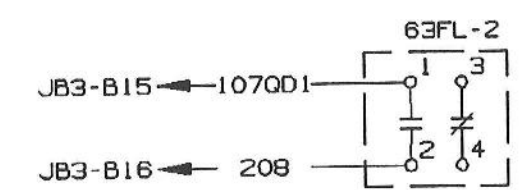
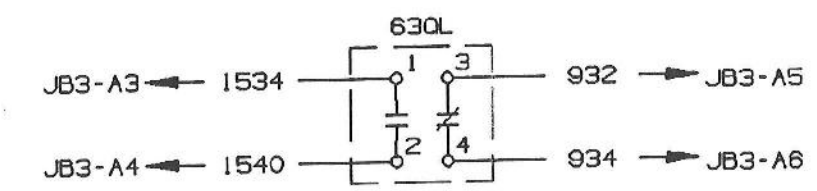
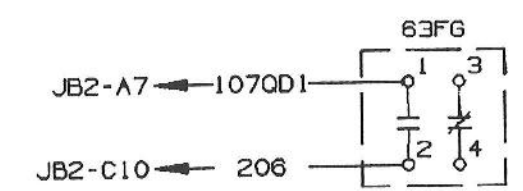
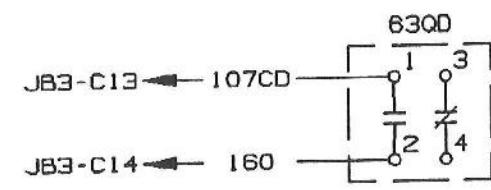
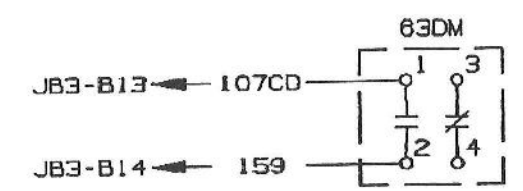
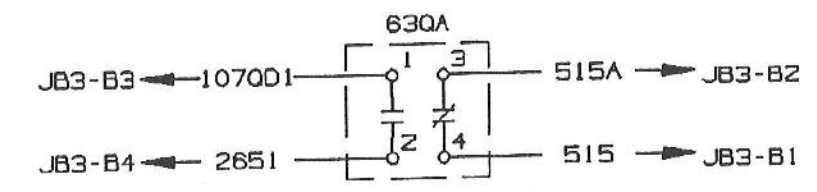
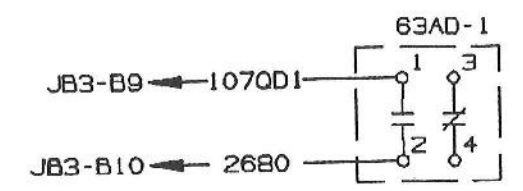
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ISSUED D MARX SR 00-03-23			

DISTR
TO

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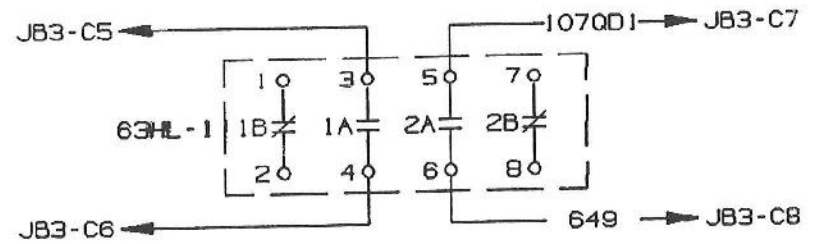
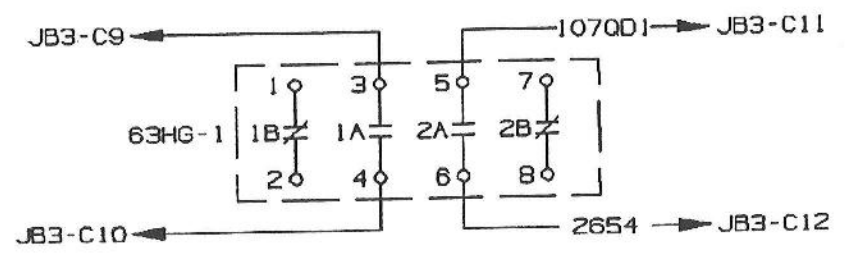
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	GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE	CAGE CODE	DWG NO	DISTR TO
	GE Power Generation		B		352B9322 SECT3	
DRAWN		D MARX SR 00-03-23		SHEET 13		
ISSUED		D MARX SR 00-03-23		SCALE NONE		

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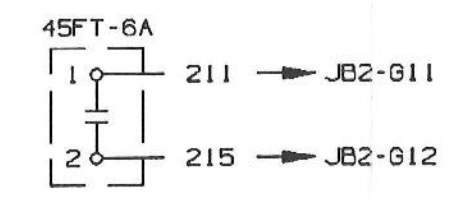
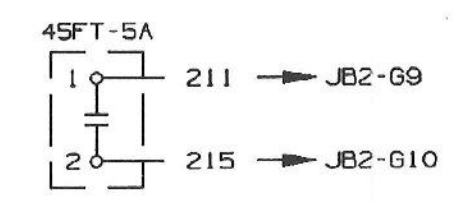
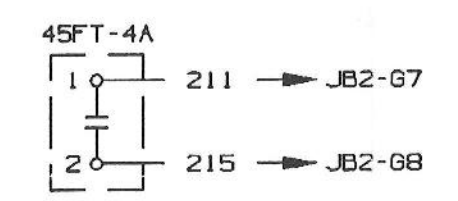
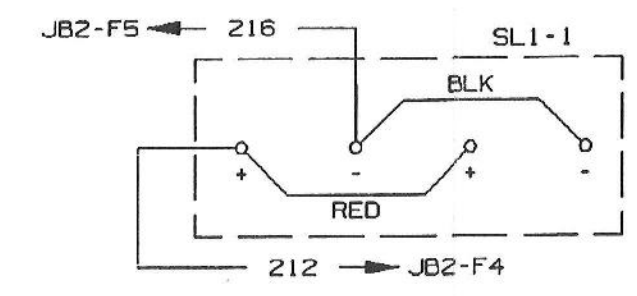
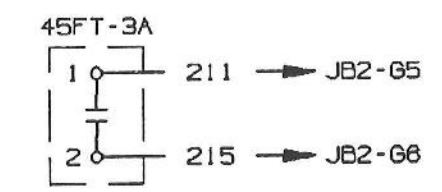
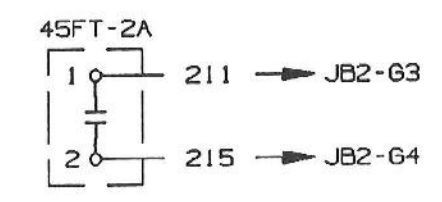
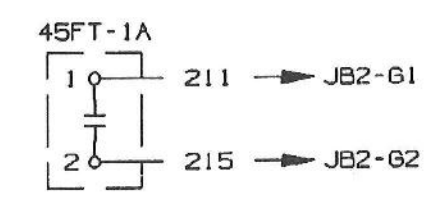
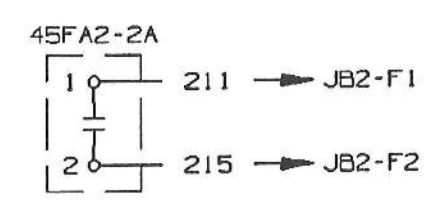
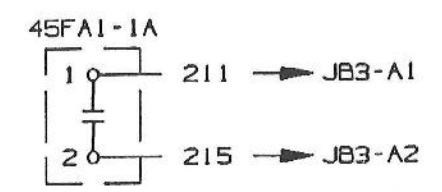
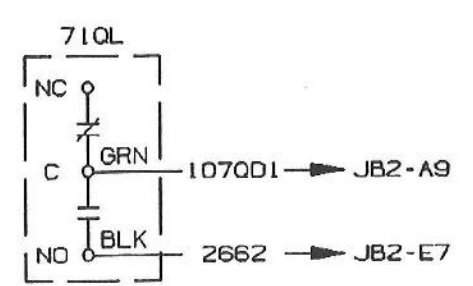
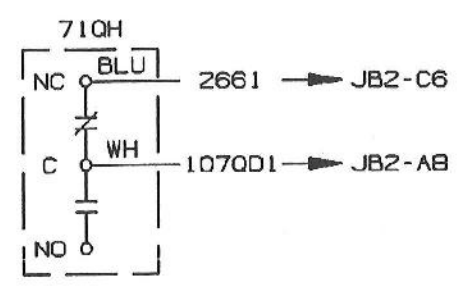
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GE Power Generation		SIZE	CAGE CODE	DWG NO	DISTR TO
GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		B		352B9322 SECT3	
DRAWN	D MARX SR 00-03-23	SCALE NONE		SHEET 14	
ISSUED	D MARX SR 00-03-23				

352B932203_C_14 klikst Mon Apr 2 11:46:28 2001 gvl_tc2_oce

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REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B932203.PRT



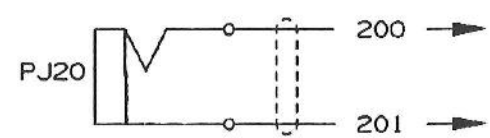
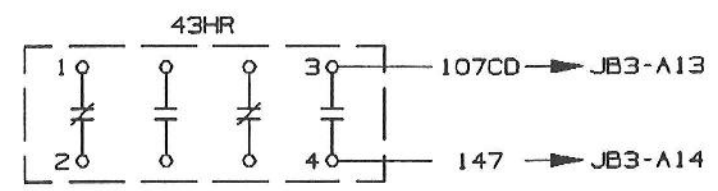
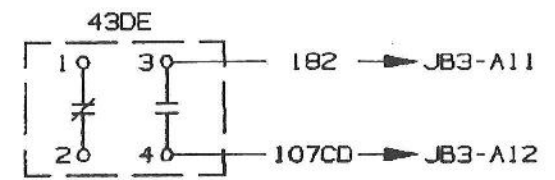
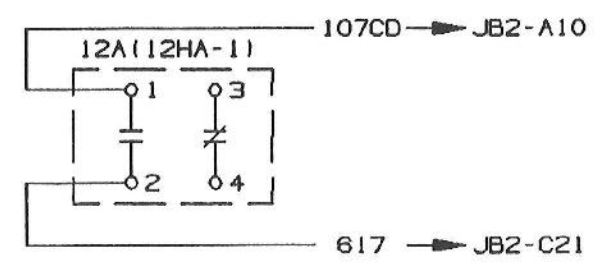
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GE Power Generation		SIZE	CAGE CODE	DWG NO	DISTR TO
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ISSUED D MARX SR 00-03-23		SCALE NONE		SHEET 15	

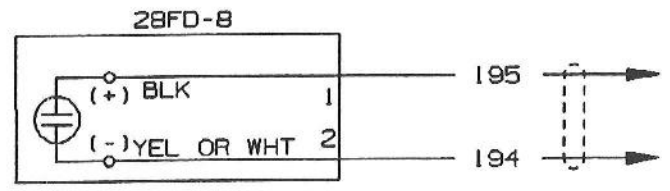
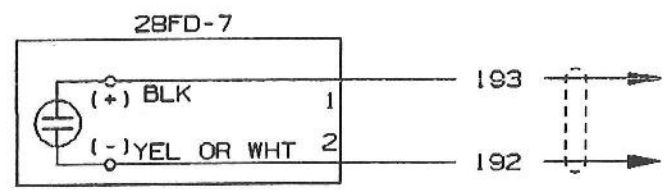
352B932203_C_15 klikst Mon Apr 2 11:46:22 2001 gvl_tc2_0ce

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	GEN'L ENGINEERING CHANGES CD63B14 STEVE FRAZIER	00-05-16	RDL

SWITCH SHOWN IN
RESET POSITION



REVISE ON CAD ONLY
UG PART: 352B932203.PRT



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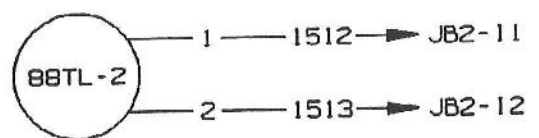
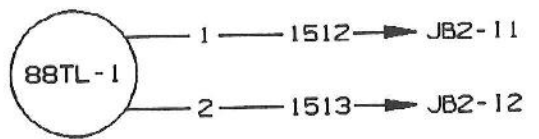
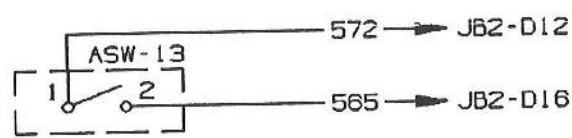
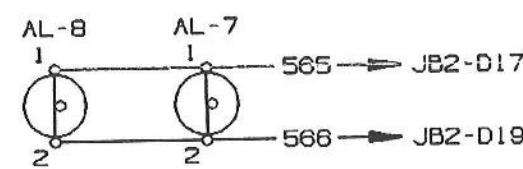
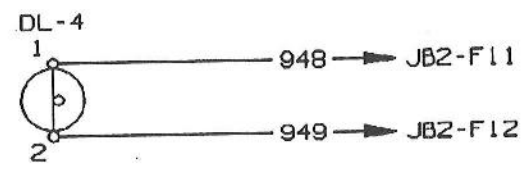
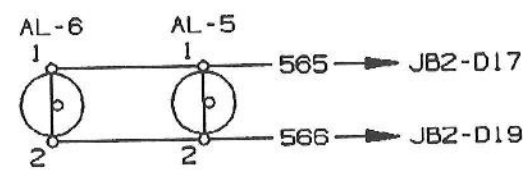
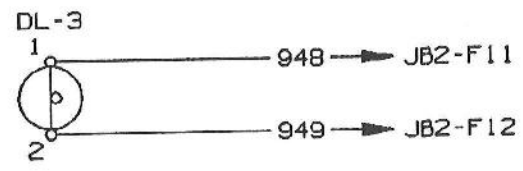
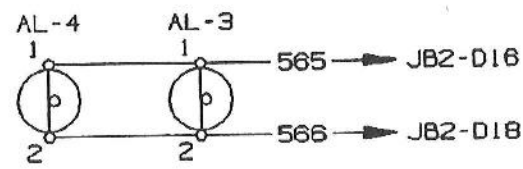
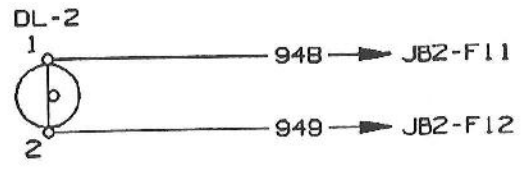
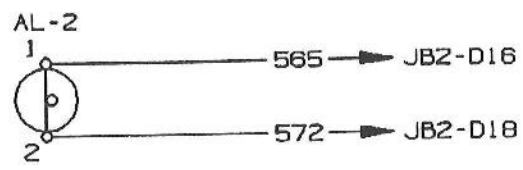
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GE Power Generation	B		352B9322 SECT3
DRAWN	D MARX SR 00-03-23	SCALE	NONE
ISSUED	D MARX SR 00-03-23	SHEET	16

DISTR
TO

352B932203_C_16 klikst Mon Apr 2 11:46:16 2001 gvl_tc2_ocr

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
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UG PART: 352B932203.PRT



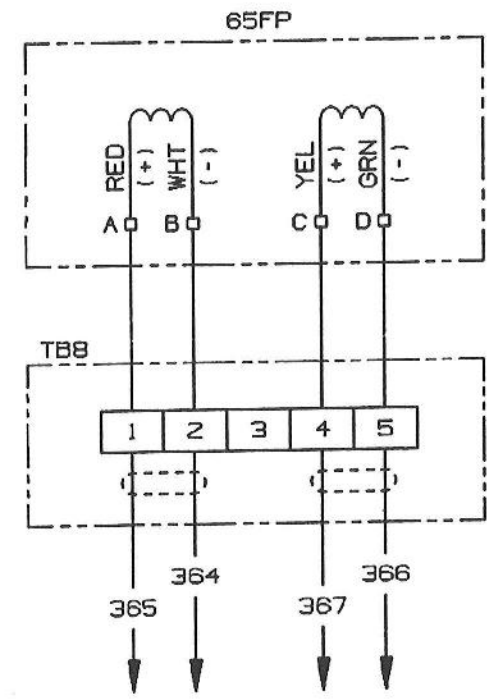
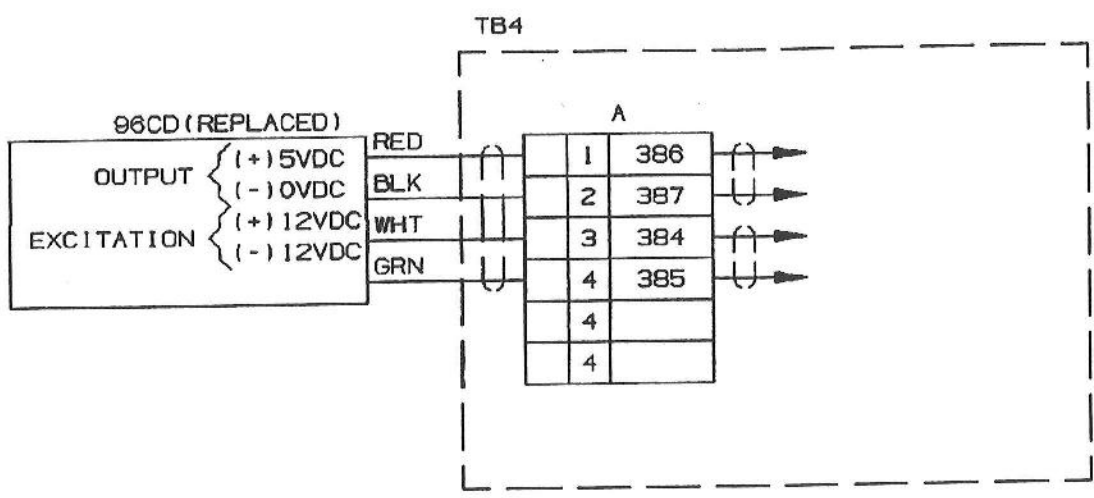
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 GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY GE Power Generation		SIZE B	CAGE CODE	DWG NO 352B9322 SECT3	DISTR TO
DRAWN D MARX SR 00-03-23		SCALE NONE		SHEET 17	
ISSUED D MARX SR 00-03-23					

352B932203_C_17 klikst Mon Apr 2 11:46:11 2001 gvl_tc2_ocr

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B932203.PRT



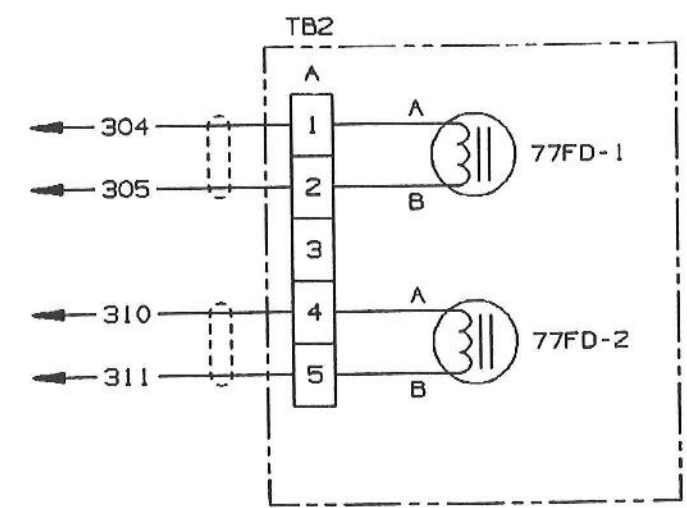
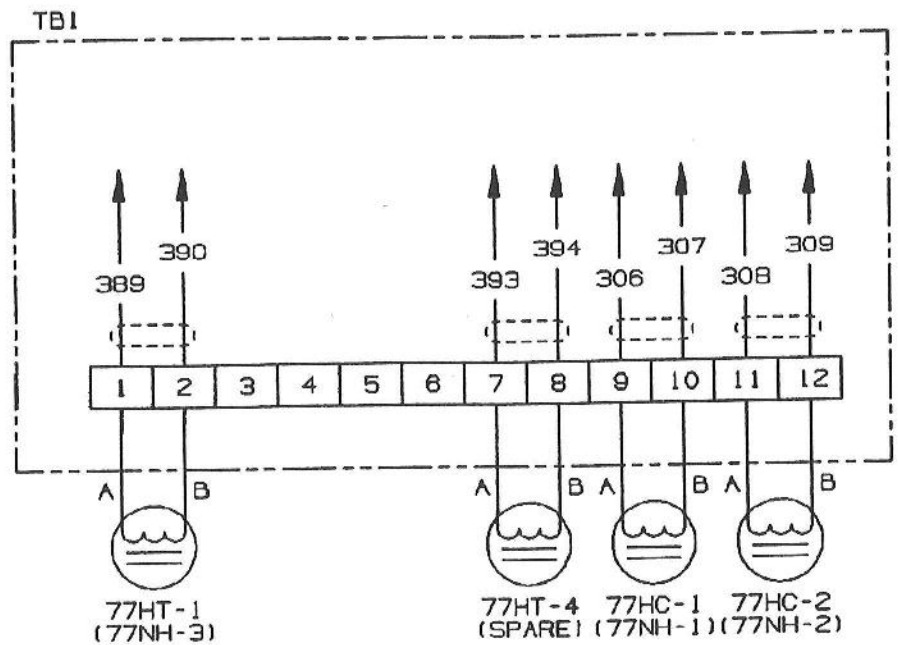
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GE Power Generation		SIZE	CAGE CODE	DWG NO	DISTR TO
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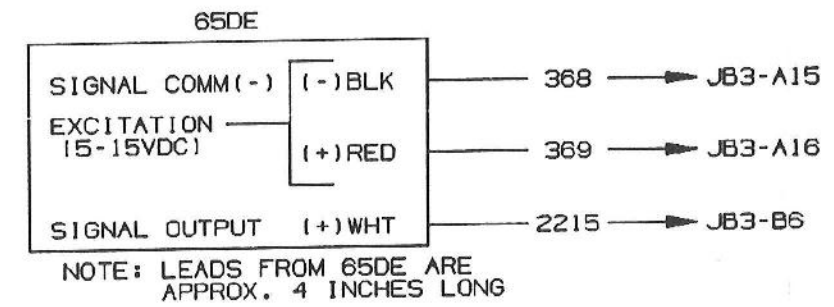
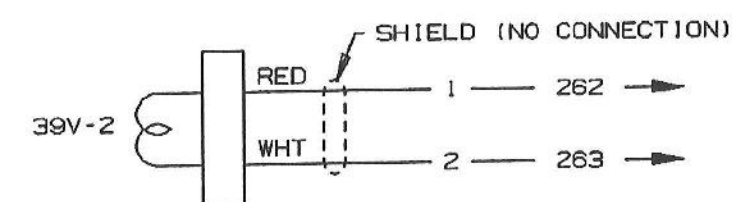
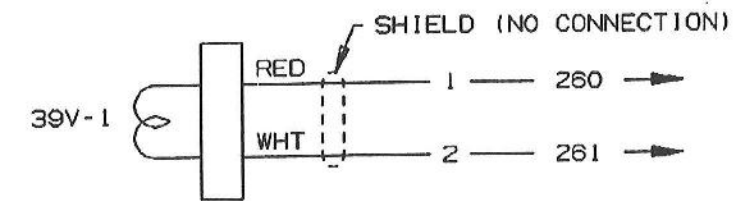
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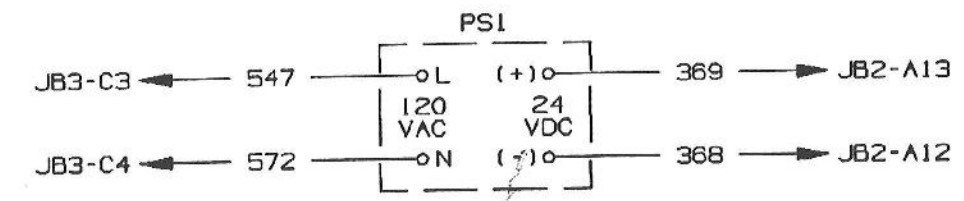
MAGNETIC PICKUPS



REVISE ON CAD ONLY
UG PART: 352B932203.PRT



NOTE: LEADS FROM 65DE ARE APPROX. 4 INCHES LONG



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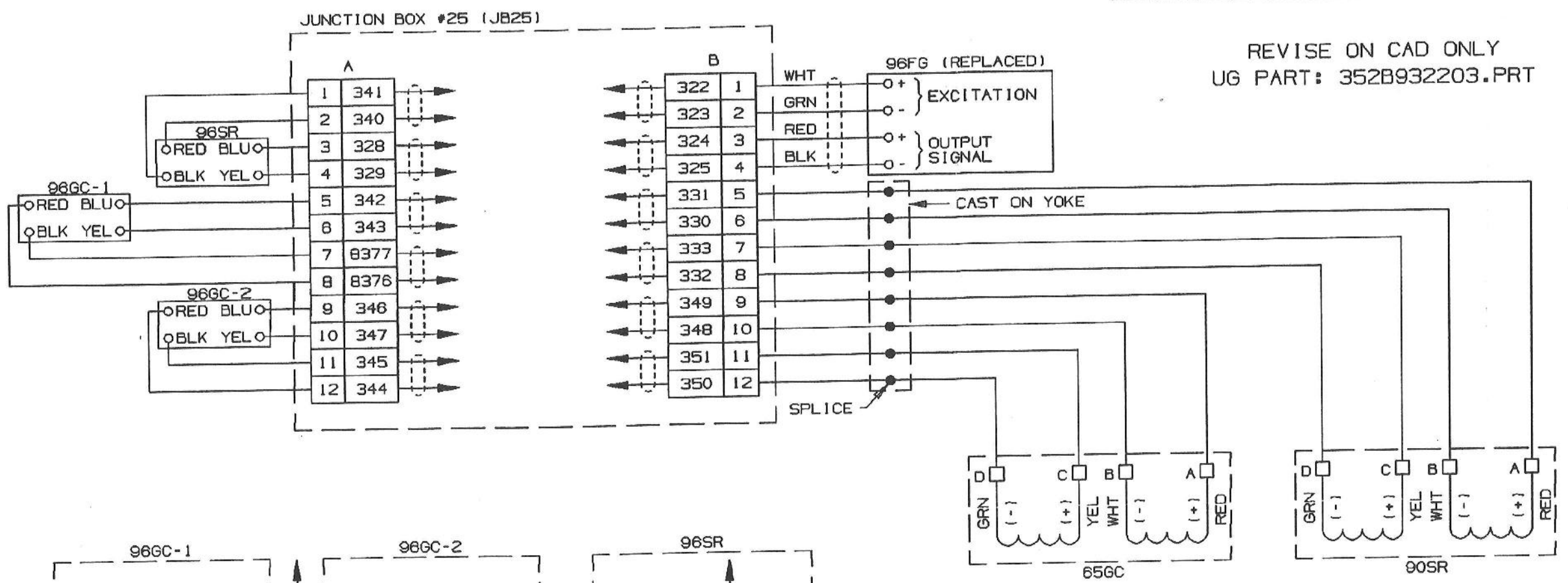
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GE Power Generation		B		352B9322 SECT3
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ISSUED	D MARX SR 00-03-23			

DISTR TO

352B932203_C_19 klikst Mon Apr 2 11:45:55 2001 gvl_tc2_oce

REVISIONS			
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REVISE ON CAD ONLY
UG PART: 352B932203.PRT

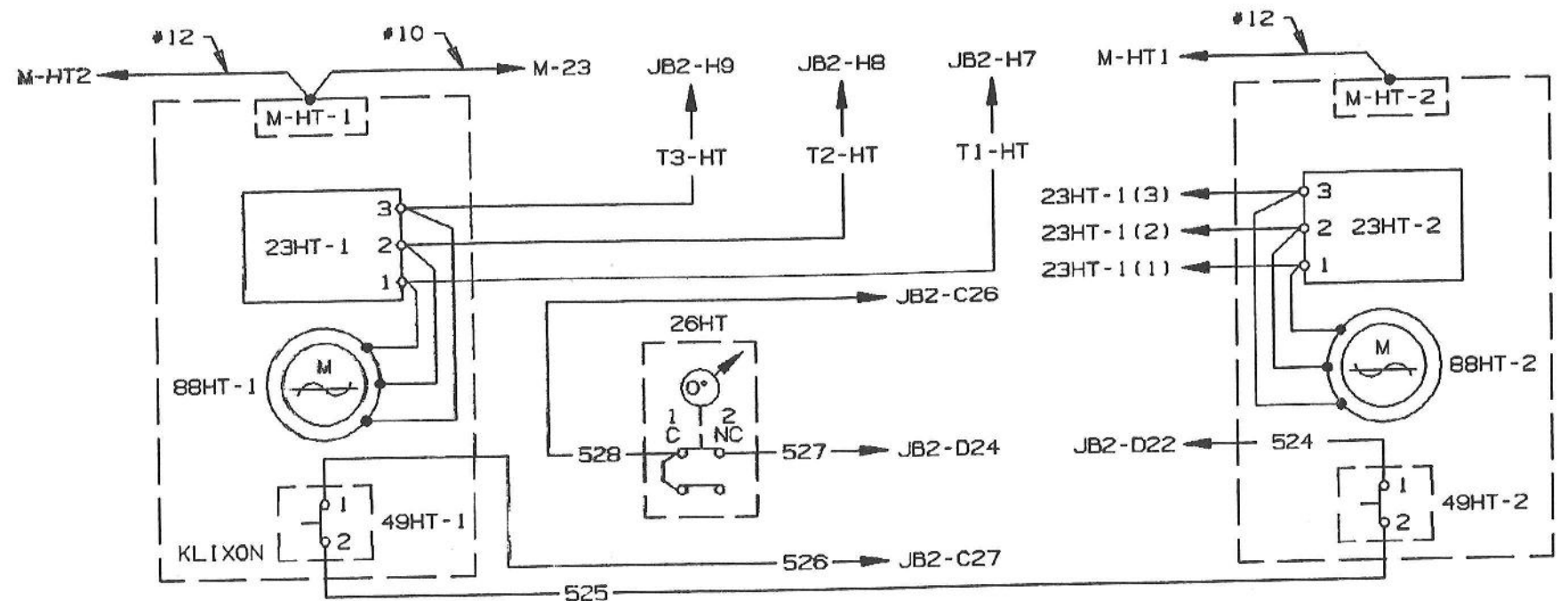


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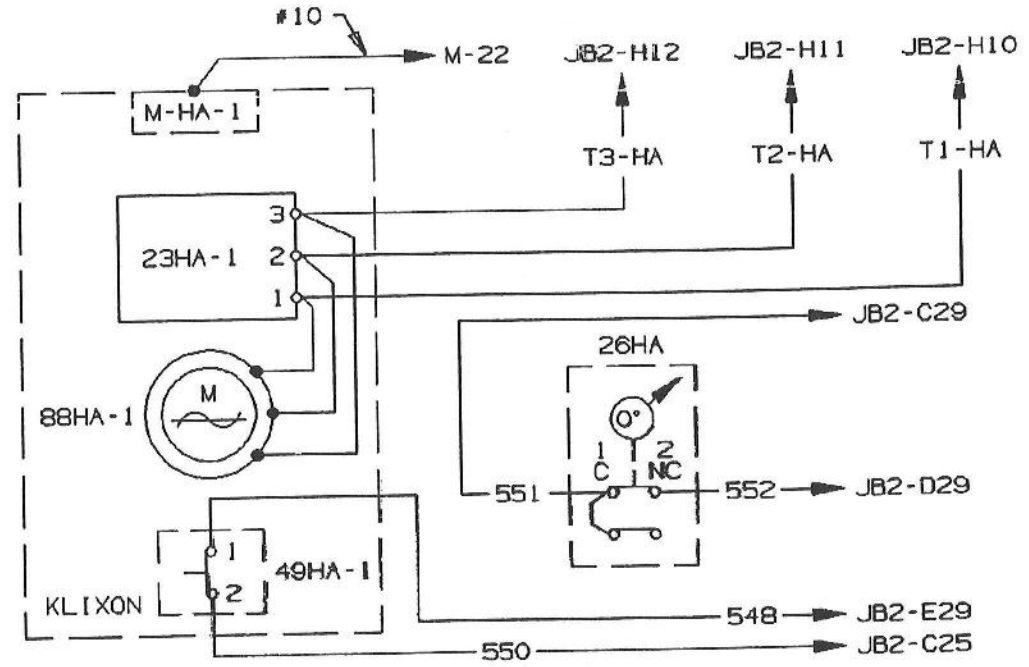
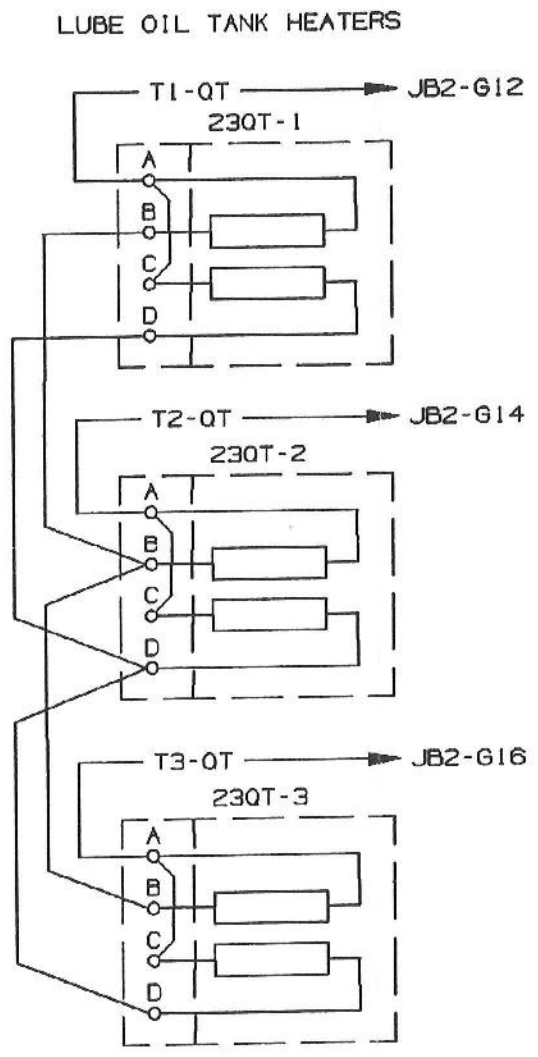
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ISSUED D MARX SR 00-03-23					

352B932203_C_20 klikst Mon Apr 2 11:45:48 2001 gvl_tc2_oce

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
C	GENERAL ENGINEERING CHANGES AN# 01004441 D MARX SR	01-02-09	RDL



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UG PART: 352B932203.PRT



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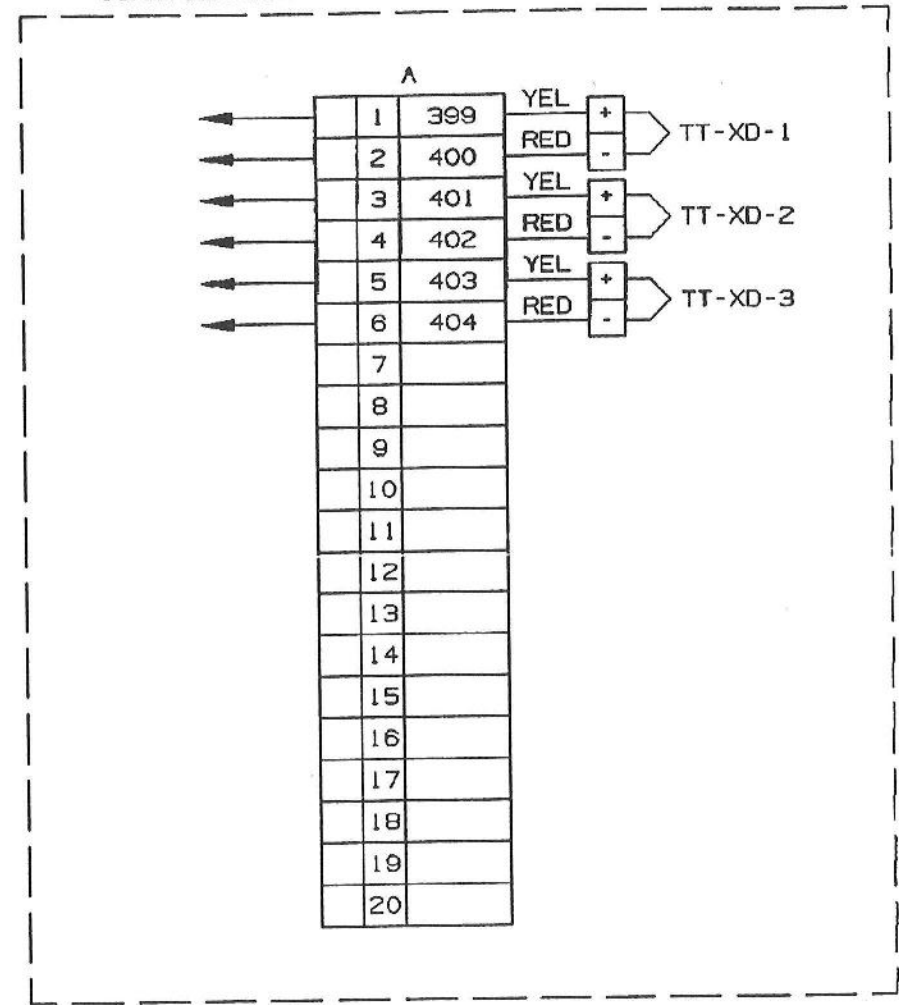
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ISSUED D MARX SR 00-03-23					

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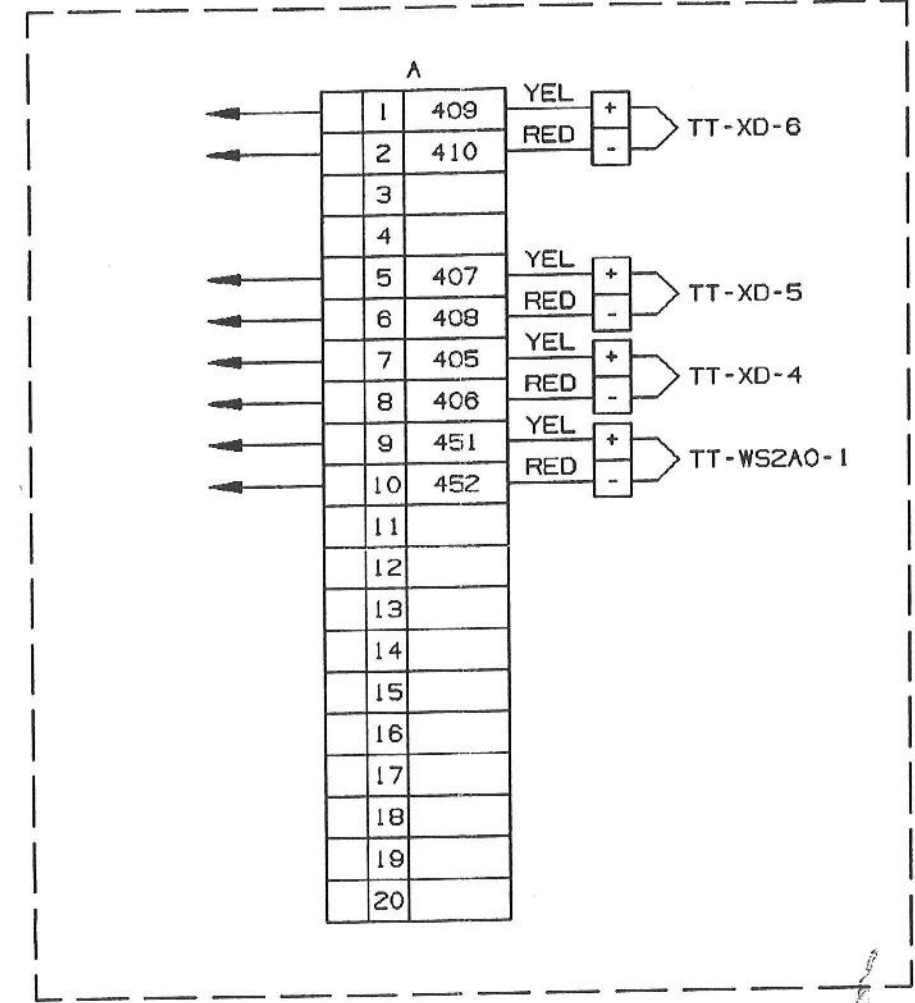
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

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UG PART: 352B932203.PRT

JUNCTION BOX #67(JB67)



JUNCTION BOX #68(JB68)



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GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY GE Power Generation	SIZE	CAGE CODE	DWG NO
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ISSUED D MARX SR 00-03-23		SCALE NONE	SHEET 22

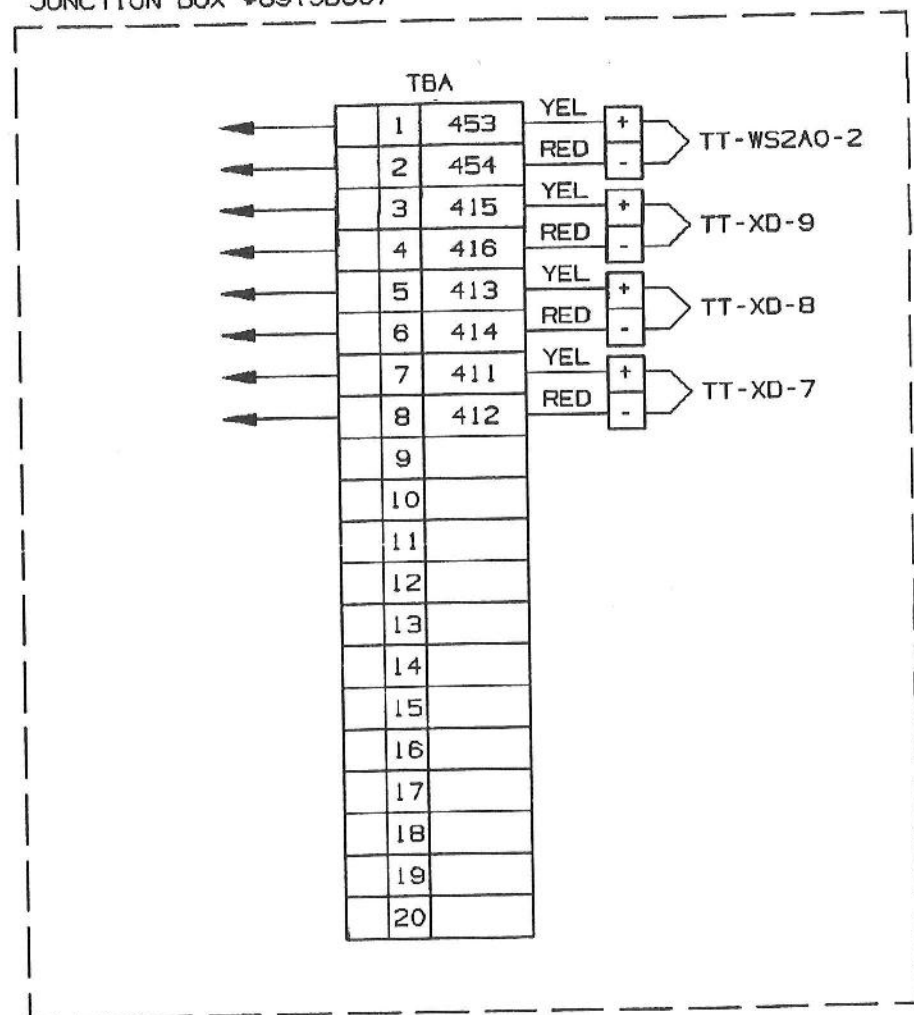
DISTR TO

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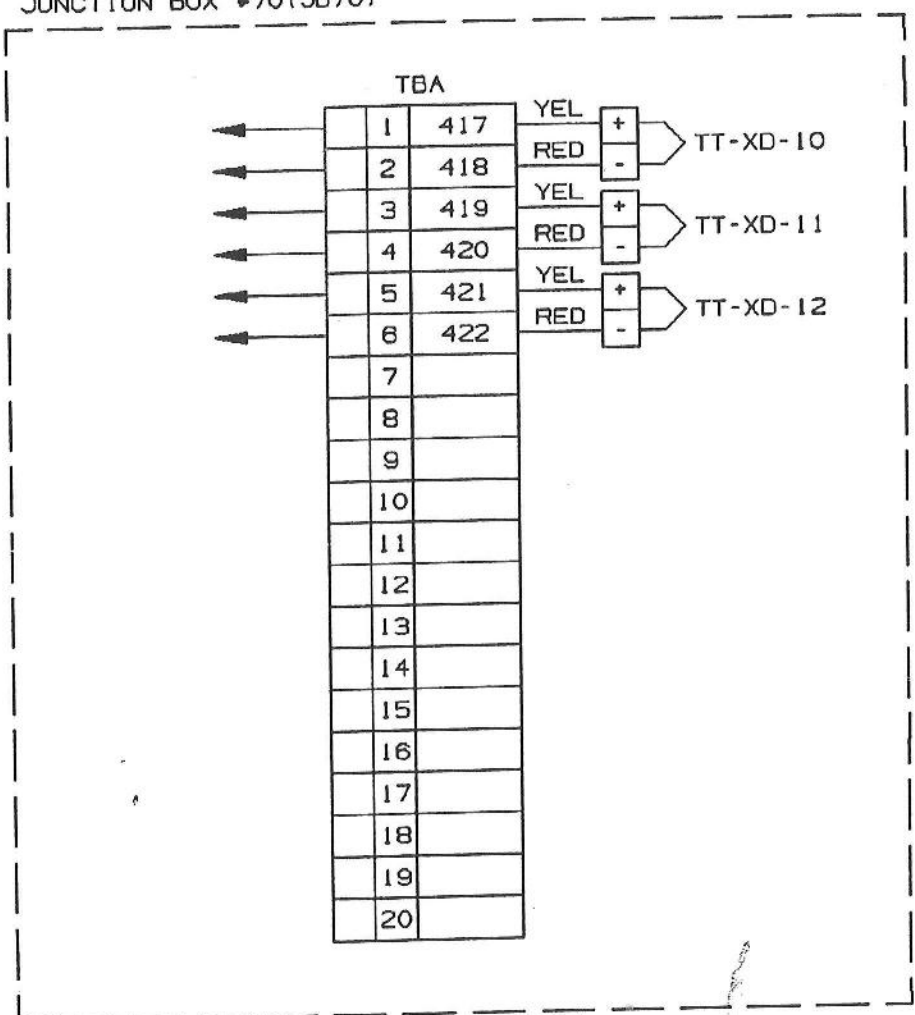
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B932203.PRT

JUNCTION BOX #69(JB69)



JUNCTION BOX #70(JB70)

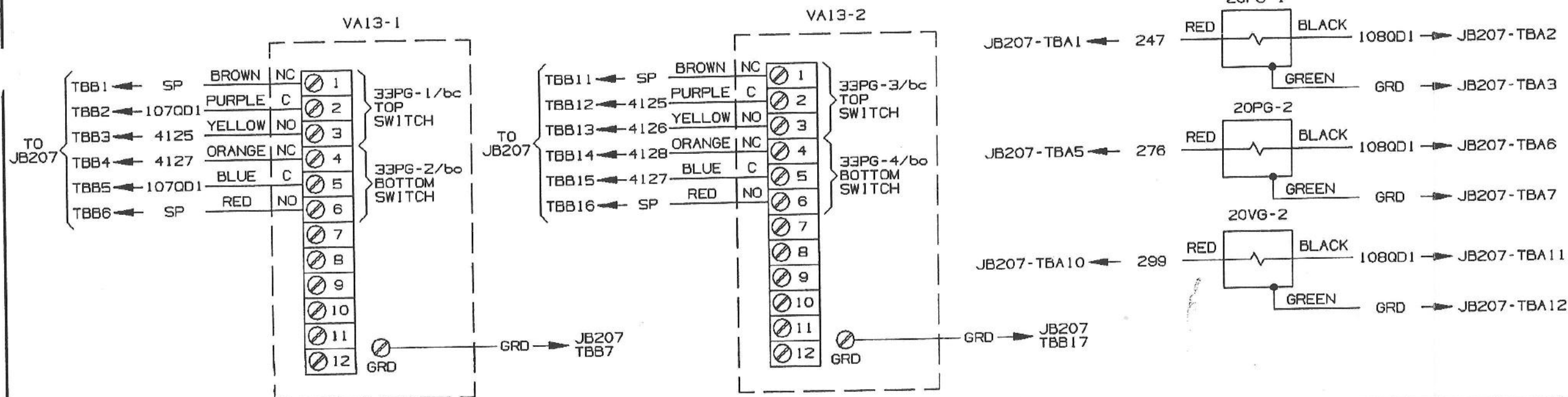
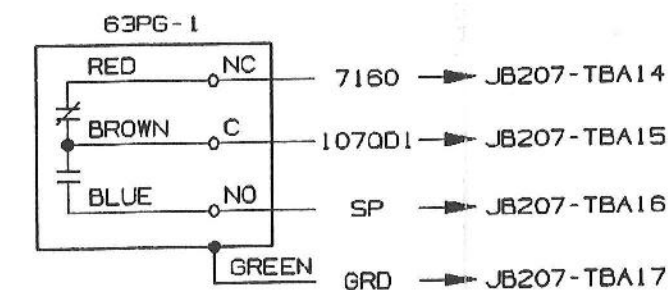
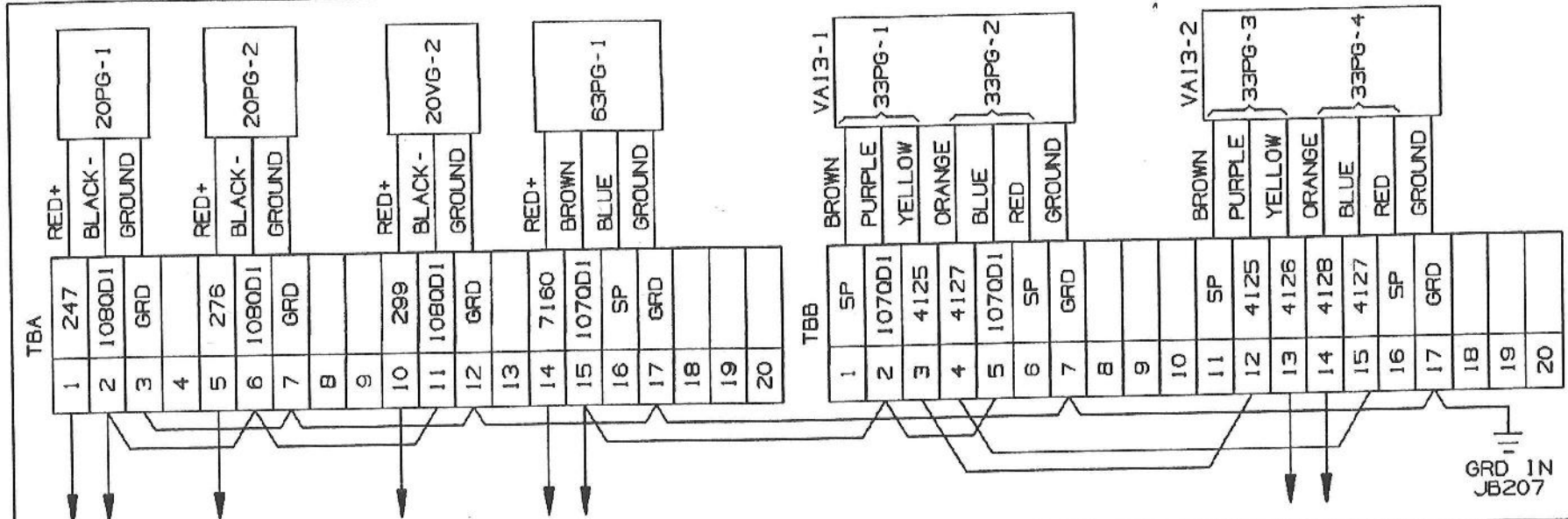


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GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY GE Power Generation		SIZE B	CAGE CODE	DWG NO 352B9322 SECT3
DRAWN D MARX SR 00-03-23		SCALE NONE		SHEET 23
ISSUED D MARX SR 00-03-23		DISTR TO		

352B932203_C_23 klikst Mon Apr 2 11:45:28 2001 gvl_tc2_oce

REVISE ON CAD ONLY
UG PART: 352B932203.PRT

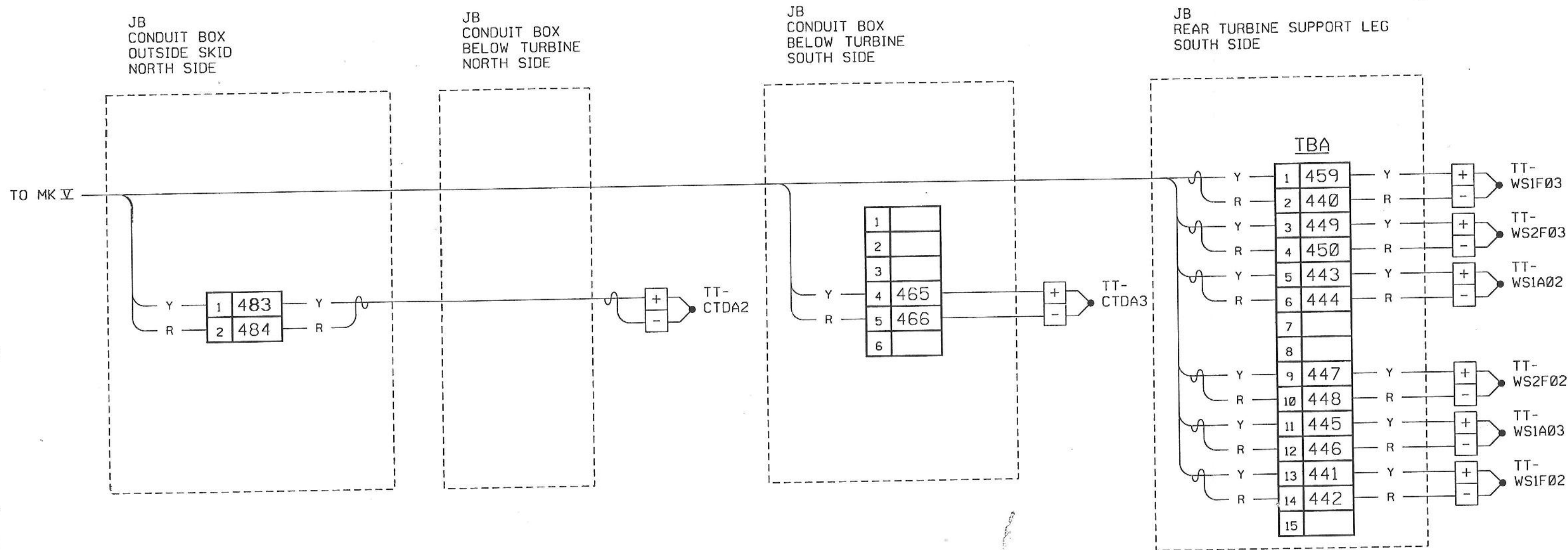


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 GE Power Generation	GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9322 SECT3	DISTR
	DRAWN D MARX SR 00-03-23		SCALE NONE		SHEET 24	

1120

352B932203_C_24 klickst Mon Apr 2 11:45:22 2001 gvl_tc2_oce



IMU TURBINE 8 - REPLACE CONTROLS - APPENDIX V

SEE - SM-11

Appendix W - Generator Connection and Wiring Diagrams

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

GENERATOR CONNECTION DIAGRAM FOR

DM#	ML	GENERATOR S/N (ALSTHOM)
F2977G1	51P	410604

REVISE ON CAD ONLY
UG PART: 352B93971.PRT

Gen Conn
i Wmwa

REFERENCE DRAWINGS:

- ALSTHOM NO 54-28230 (PLAN OF SITUATION)
- ALSTHOM NO 54-90301 (CONNECTION DIAGRAM)

-	-	-	-	-	-	-	-	-	REV	REV STATUS	SECTION
9	8	7	6	5	4	3	2	1	SH	OF SHEETS	1

-	REV	REV STATUS	INDEX
1	SH	OF SHEETS	

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UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE
DIMENSIONS ARE IN INCHES. TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± ANGLES ± FRACTIONS ±	DRAWN D MARX SR	01-02-13
	CHECKED D MARX SR	01-02-13
	ENGRG S KLINK	01-02-13
	ISSUED D MARX SR	01-02-13
APPLIED PRACTICES 348A9200		
SIM TO: NONE		

 **GE Power Generation**

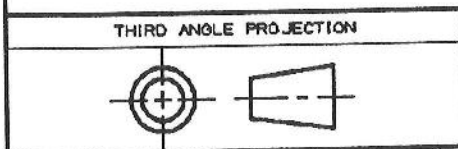
GENERAL ELECTRIC COMPANY
GAS TURBINE
Schenectady, NY

DIAGRAM, CONNECTION-GENERATOR

FMF: 324A2977G001 A013

SIZE **B** CAGE CODE DWG NO 352B9397 INDEX

SCALE SHEET 1



DT-IN

FCTD

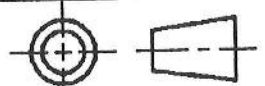
INDEX GENERATOR CONNECTION DIAGRAM

DEVICE	SHEET NO.	FUNCTION
20EF	5	GENERATOR FIELD GROUND BRUSH TEST SOLENOID
23HG-1,2	4	GENERATOR COMPARTMENT SPACE HEATER
26EH	6	TEMPERATURE SWITCH-EXCITER HOUSING-FIRE
26GH	6	TEMPERATURE SWITCH-GENERATOR COMPARTMENT-FIRE
26GL	5	MOTOR OPERATED LOUVER CONTROL-GENERATOR AIR INLET TEMPERATURE
26HG	5	TEMPERATURE SWITCH-GENERATOR SPACE HEATER
33SC	5	SSS CLUTCH (PROXIMETER SWITCH)
39V-3	9	VIBRATION DETECTOR-GENERATOR PEDASTAL BEARING
45FE	6	EXCITER COMPARTMENT-FIRE SENSOR TEMP SWITCH
45FG	6	GENERATOR COMPARTMENT-FIRE SENSOR TEMP SWITCH
63GF	6	PRESSURE SWITCH-GENERATOR AIR INLET FILTER DIFFERENTIAL
63QT	5	PRESSURE SWITCH-LOW LUBE OIL PRESSURE
77GR	9	MAGNETIC SPEED PICKUP-ZERO SPEED DETECTOR
88VG	4	VENTILATION FAN-GENERATOR LOAD GEAR COMPARTMENT
BP1,BP2, BP3,BP4	7	LIGHT SWITCH
C1,C2	8	COLD AIR (INLET) THERMOCOUPLE
C5,C6,C7,C8	8	HOT AIR (EXHAUST) THERMOCOUPLE
C21,C22,C23, C31,C32,C33	8	STATOR THERMOCOUPLE
C40	8	LOAD GEAR PEDESTAL
JB5A	3	JUNCTION BOX #5A (GENERATOR)
JB5B	2	JUNCTION BOX #5B (GENERATOR)
L1	7	AC LIGHT-ROTATING EXCITER COMPARTMENT
L2	7	AC LIGHT-LOAD GEAR COMPARTMENT
L3	7	DC LIGHT-ROTATING EXCITER COMPARTMENT
L4	7	DC LIGHT-LOAD GEAR COMPARTMENT
TCMV	5	THERMOSTAT CONTROL-MOTOR OPERATED LOUVER CONTROL
TVM	5	TRANSFORMER-GENERATOR AIR INLET SHUTTER CONTROL
---	6	ROTATING EXCITER FIELD

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

THIRD ANGLE PROJECTION.



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GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9397 SECT 1
DRAWN	D MARX SR 01-02-13			
ISSUED	D MARX SR 01-02-13	SCALE	SHEET	1

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TO

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UG PART: 352B939701.PRT

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

JUNCTION BOX #58 (JB58)

1	264	39VG-3 (1)
2	265	39VG-3 (2)
3	SHLD	39VG-3 (SHLD)
4	339	77GR (1)
5	338	77GR (2)
6	SHLD	77GR (SHLD)
7		
8		
9		
10	781	C21 (Y)
11	782	C21 (R)
12	783	C22 (Y)
13	784	C22 (R)
14	785	C23 (Y)
15	786	C23 (R)
16	787	C31 (Y)
17	788	C31 (R)
18	789	C32 (Y)
19	790	C32 (R)
20	4704	
21	4705	
22	4700	C1 (Y)
23	4701	C1 (R)
24	4702	C2 (Y)
25	4703	C2 (R)
26	4706	C5 (Y)
27	4707	C5 (R)
28	4708	C6 (Y)
29	4709	C6 (R)
30	4710	C7 (Y)
31	4711	C7 (R)
32	3906	C8 (Y)
33	3907	C8 (R)
34	4704	C33 (Y)
35	4705	C33 (R)
36	3948	C40 (Y)
37	3949	C40 (R)

1	3940	JB5A-1
2	3941	JB5A-3
3	214	JB5A-28
4	213	JB5A-29
5	3955	JB5A-35
6	3951	JB5A-40
7	10701	JB5A-43
8	934	JB5A-33
9	660	JB5A-41
10		
11	1017	33SC (C)
12	5903	33SC (NO)
13	5904	33SC (NC)
14		
15		
16		
17		
18	3536	JB5A-11
19		
20	5943	JB5A-12

1	513	JB5A-5
2	3659	JB5A-6
3		
4	906	JB5A-16
5		
6	907	JB5A-17
7		
8	3523	JB5A-30
9		
10	3524	JB5A-31
11		
12		
13	5101	20EF (1)
14	5103	20EF (2)
15	3419	20EF (BRUSH)

1	3113	JB5A-18
2	3114	JB5A-19
3	3115	JB5A-20
4		
5		
6		
7	3119	88VG (U)
8	3120	88VG (V)
9	3121	88VG (W)

1	3005	JB5A-25
2	3005	JB5A-25
3	3010	JB5A-26
4	3010	JB5A-26

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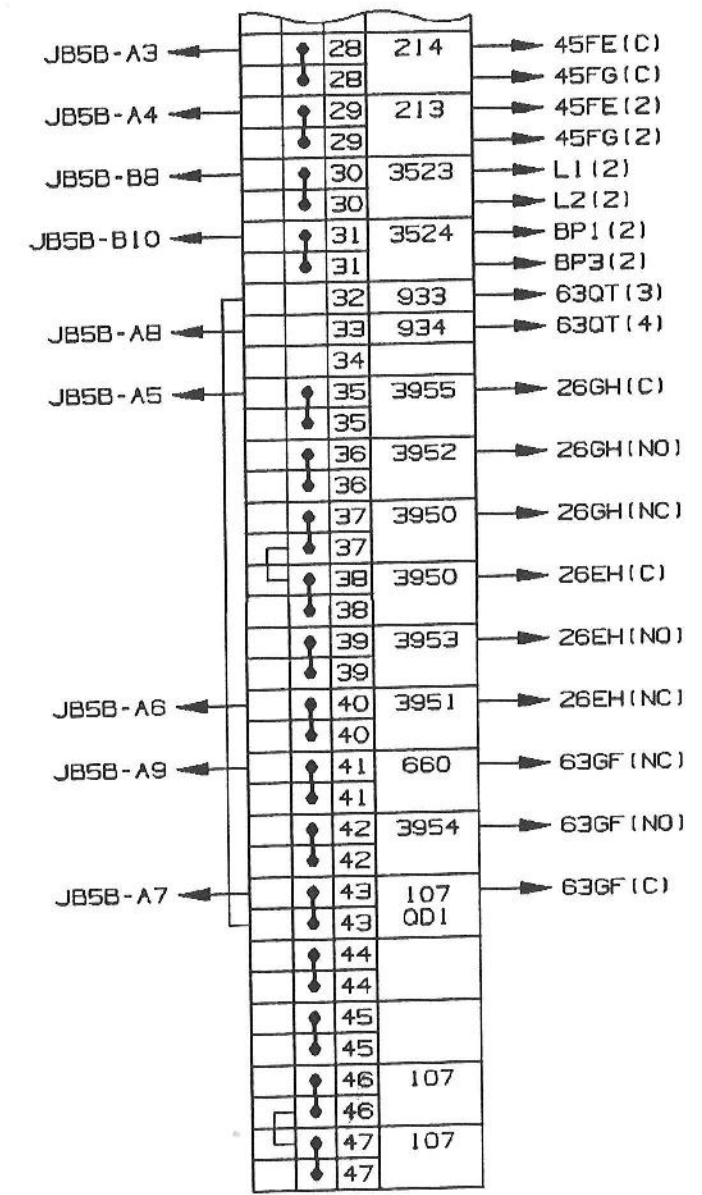
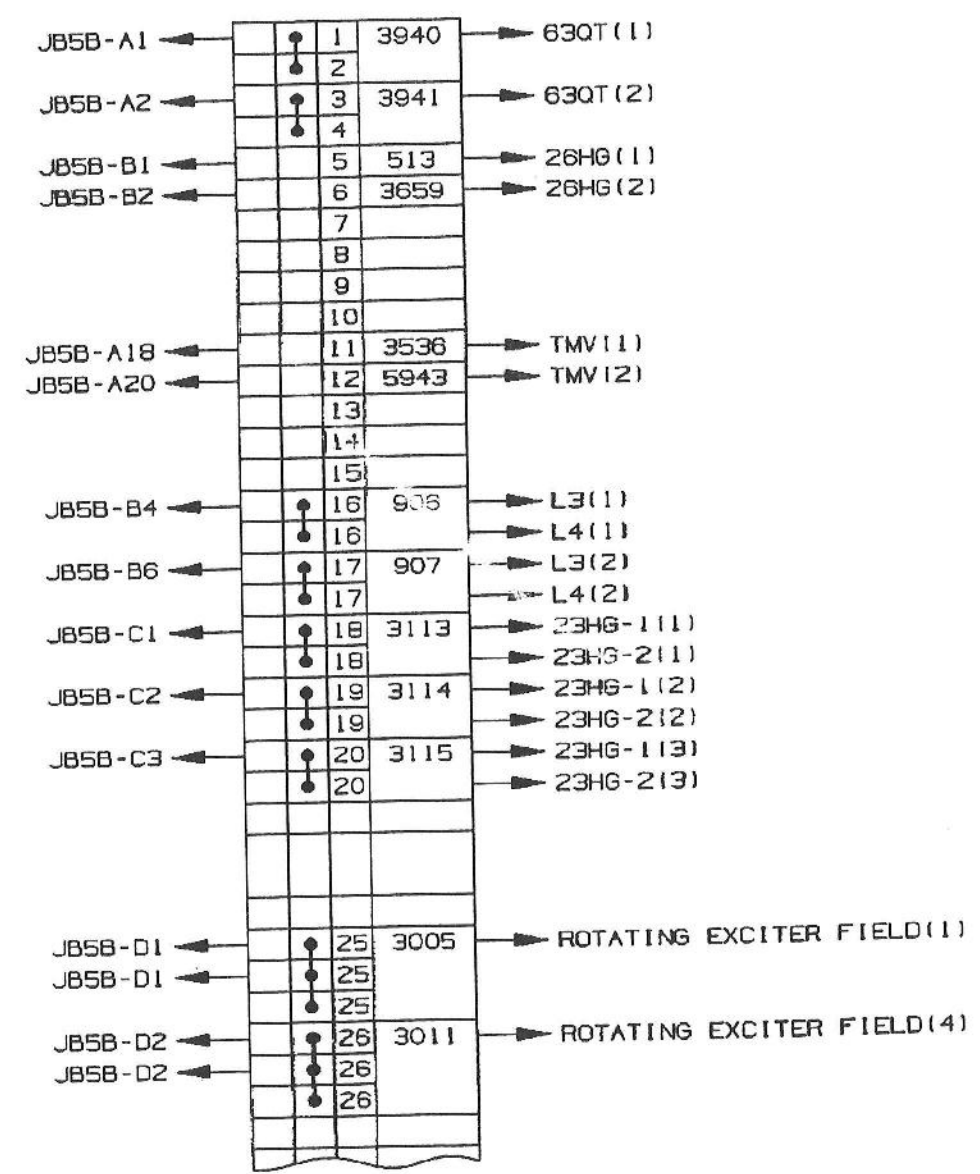
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UG PART: 352B939701.PRT

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

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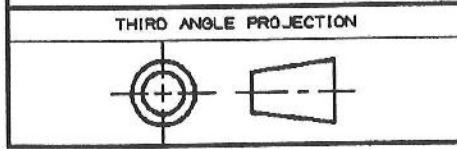
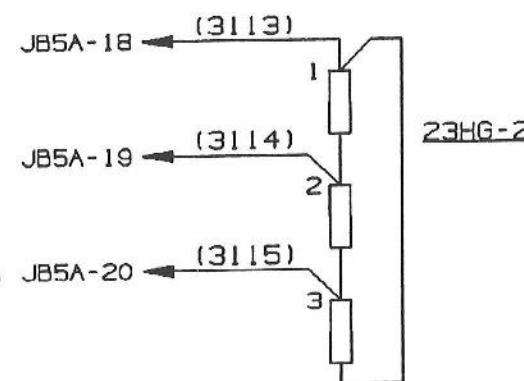
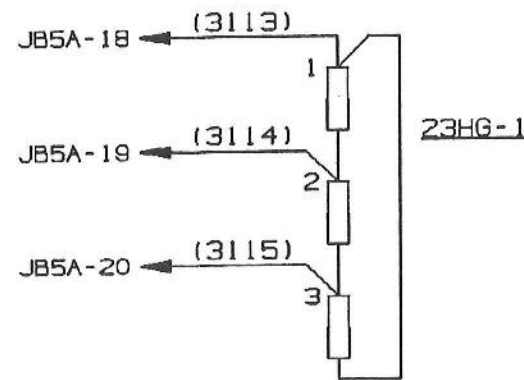
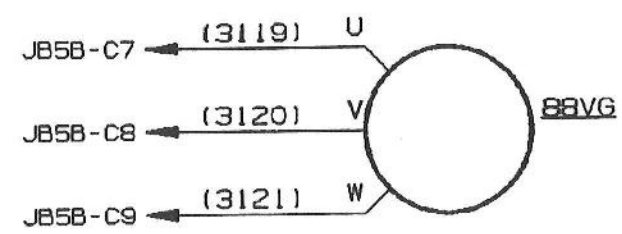
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		GENERAL ELECTRIC COMPANY GAS TURBINE Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9397 SECT 1	DISTR TO
GE Power Generation							
DRAWN	D MARX SR 01-02-			SCALE NONE		SHEET 3	
ISSUED	D MARX SR 01-02-						

352B939701_-3_klickst Mon Apr 2 14:55:37 2001 gvl_tc2_oce

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B939701.PRT



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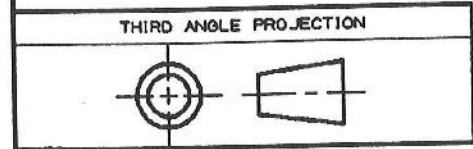
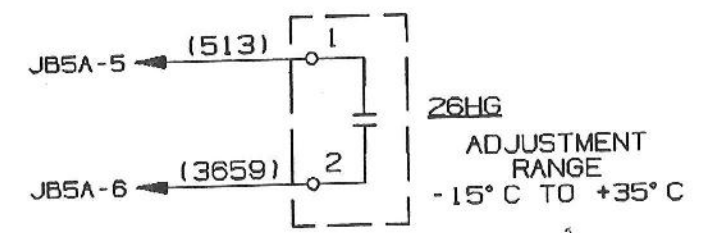
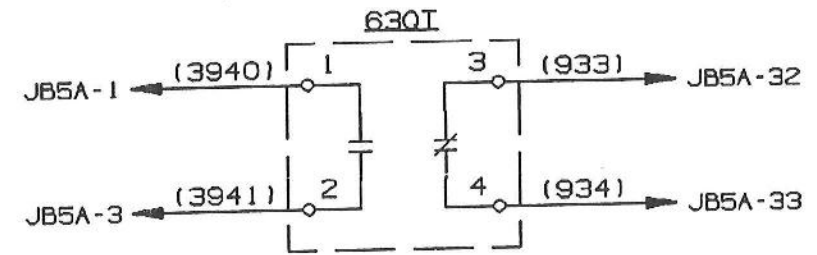
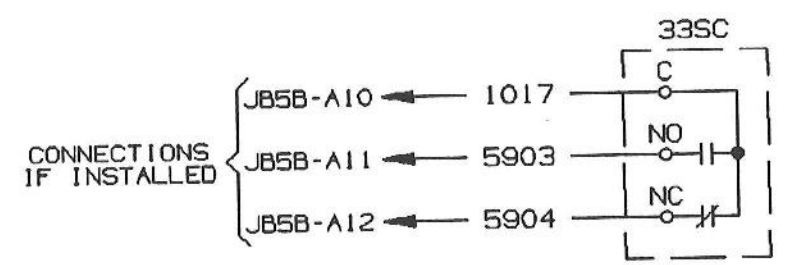
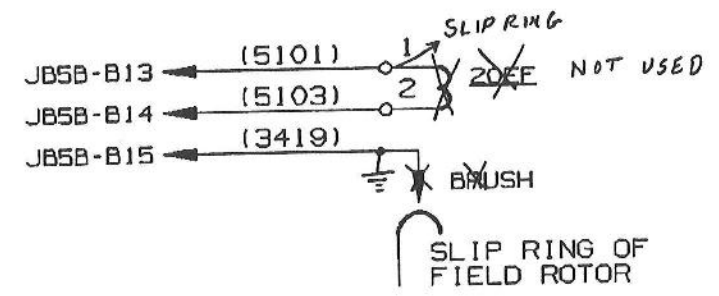
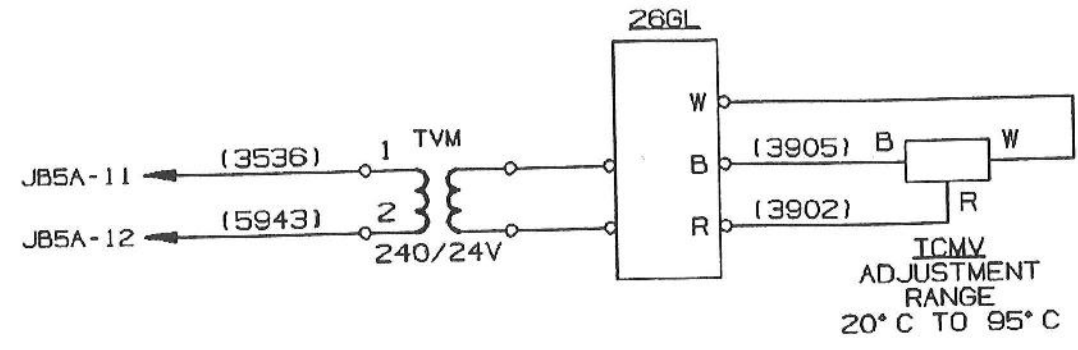
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DRAWN D MARX SR 01-02-13				SCALE		SHEET	4	
ISSUED D MARX SR 01-02-13								

DISTR
TO

352B939701 - 4 klikst Mon Apr 2 14:55:32 2001 gvl_tc2_0ce

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD
UG PART: 352B939701.PRT



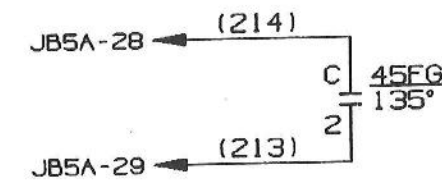
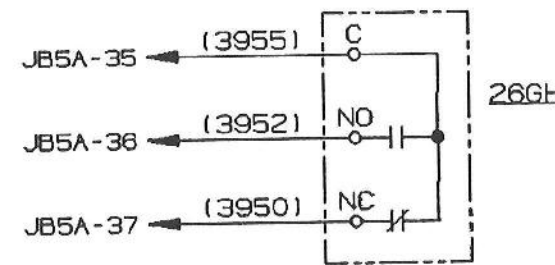
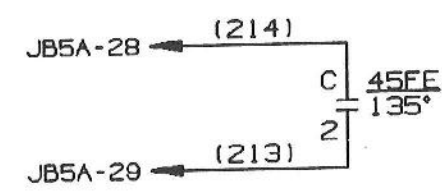
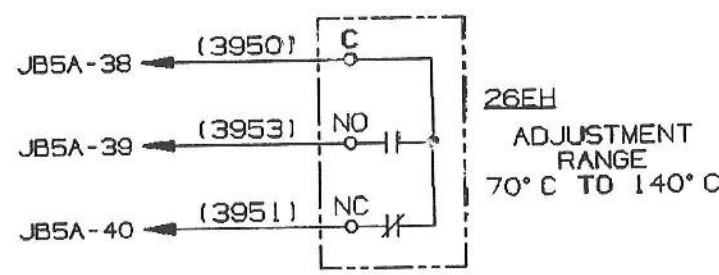
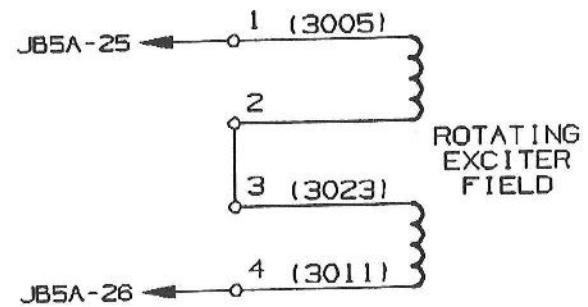
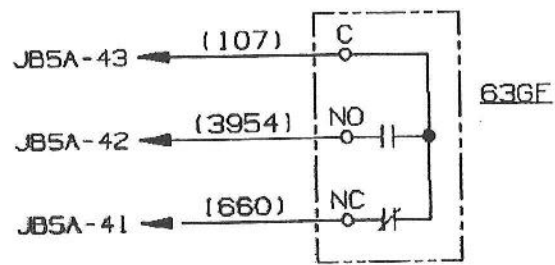
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GE Power Generation		SIZE B	CAGE CODE	DWG NO 352B9397 SECT 1	DISTR TO
DRAWN D MARX SR 01-02-13	ISSUED D MARX SR 01-02-13	SCALE		SHEET 5	

352B939701 - 5 klickst Mon Apr 2 14:55:27 2001 gvl_tc2_ocr

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

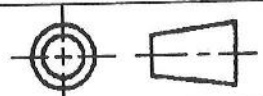
REVISE ON CAD ONLY
UG PART: 352B939701.PRT



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GENERAL ELECTRIC COMPANY GE Power Generation Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9397 SECT 1	DISTR TO
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ISSUED D MARX SR 01-02-13					

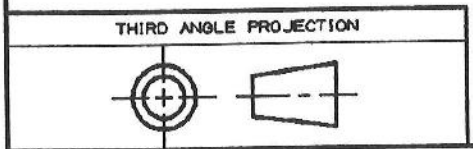
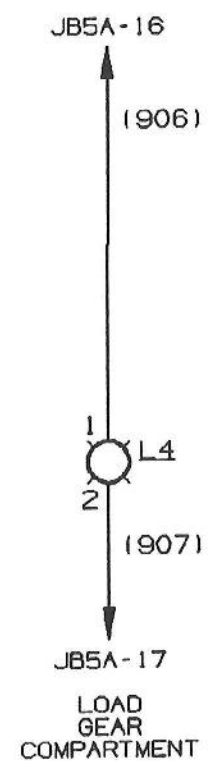
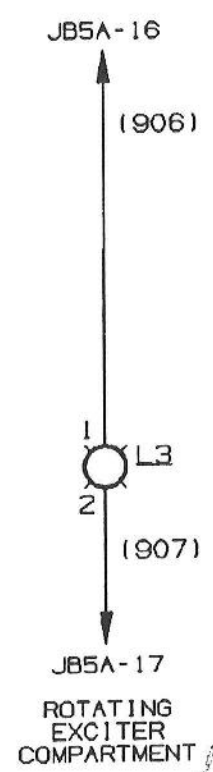
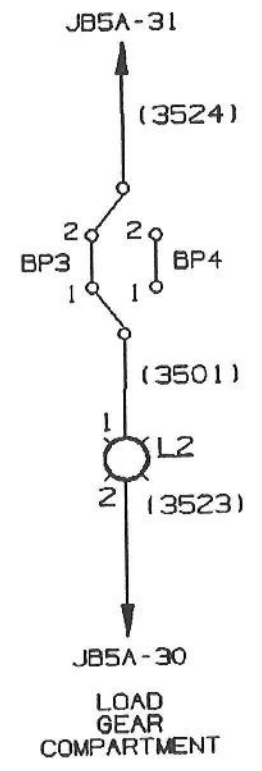
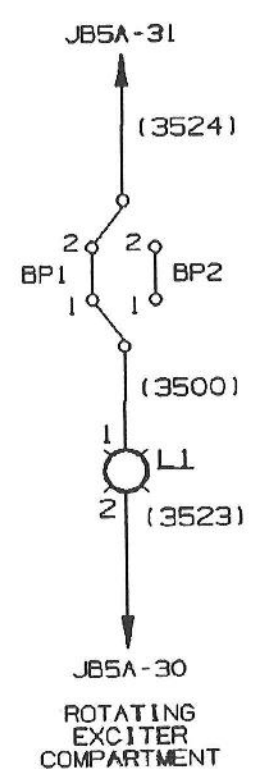
THIRD ANGLE PROJECTION



352B939701_-_6_klickst Mon Apr 2 14:55:21 2001 gvl_tc2_ocr

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B939701.PRT



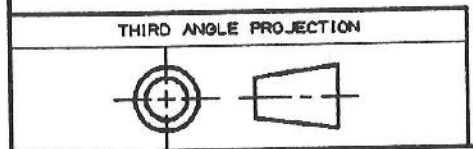
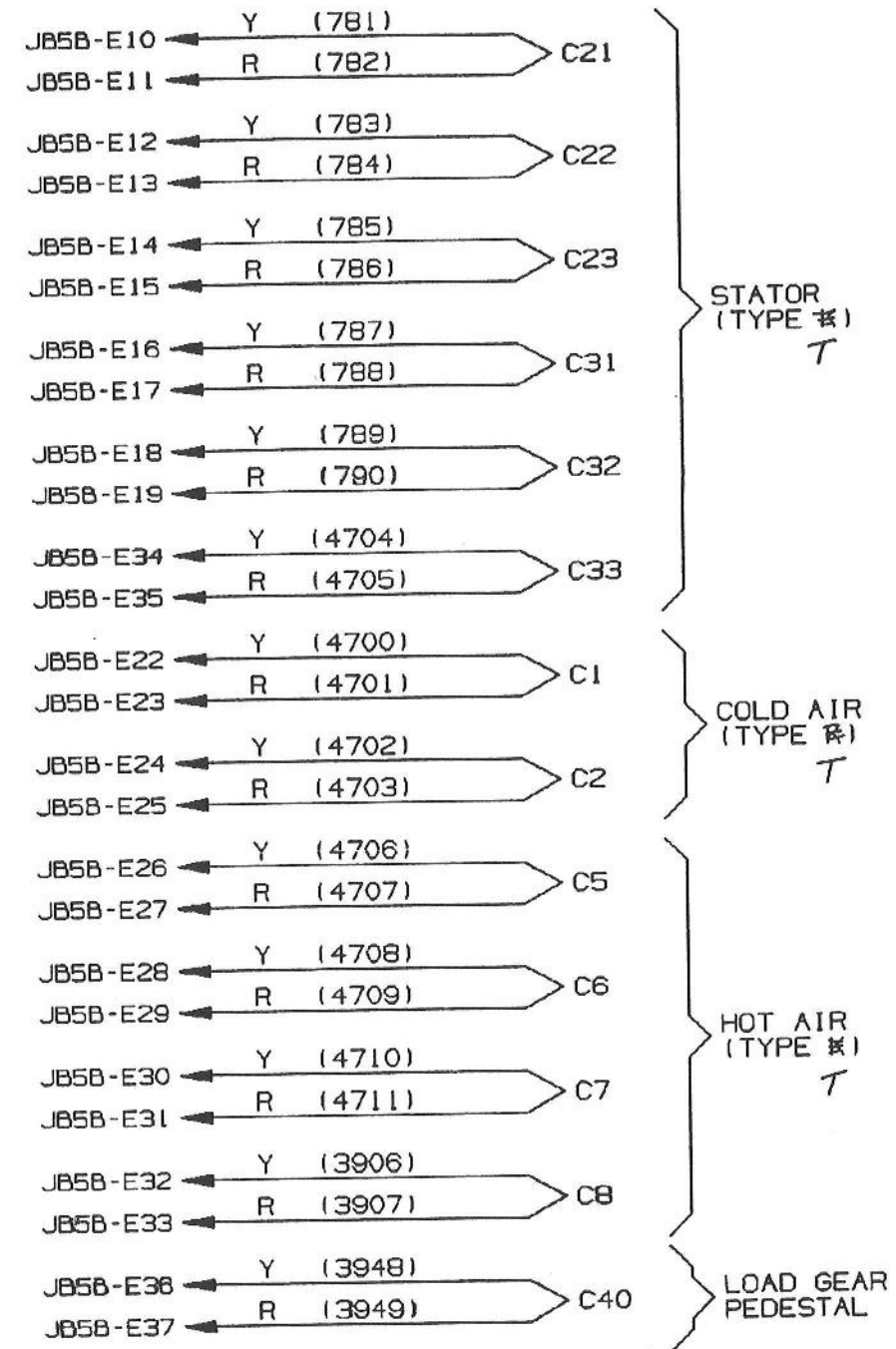
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GE Power Generation		SIZE B	CAGE CODE	DWG NO 352B9397 SECT 1
DRAWN D MARX SR 01-02-13		SCALE		SHEET 7
ISSUED D MARX SR 01-02-13		DISTR TO		

352B939701 - 7 klickst Mon Apr 2 14:55:15 2001 gvl_tc2_ocr

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

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UG PART: 352B939701.PRT



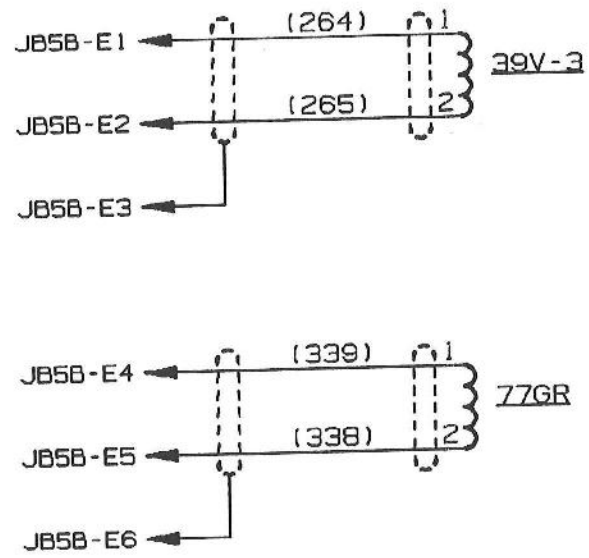
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GENERAL ELECTRIC COMPANY GE Power Generation Schenectady, NY		SIZE B	CAGE CODE	DWG NO 352B9397 SECT 1	DISTR TO
DRAWN D MARX SR 01-02-13		ISSUED D MARX SR 01-02-13	SCALE	SHEET 8	

352B939701 - 8 klickst Mon Apr 2 14:55:10 2001 gvl_tc2_ocr

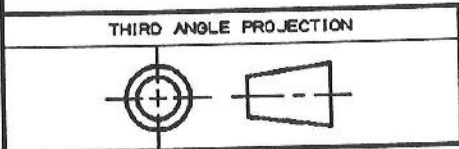
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 352B939701.PRT

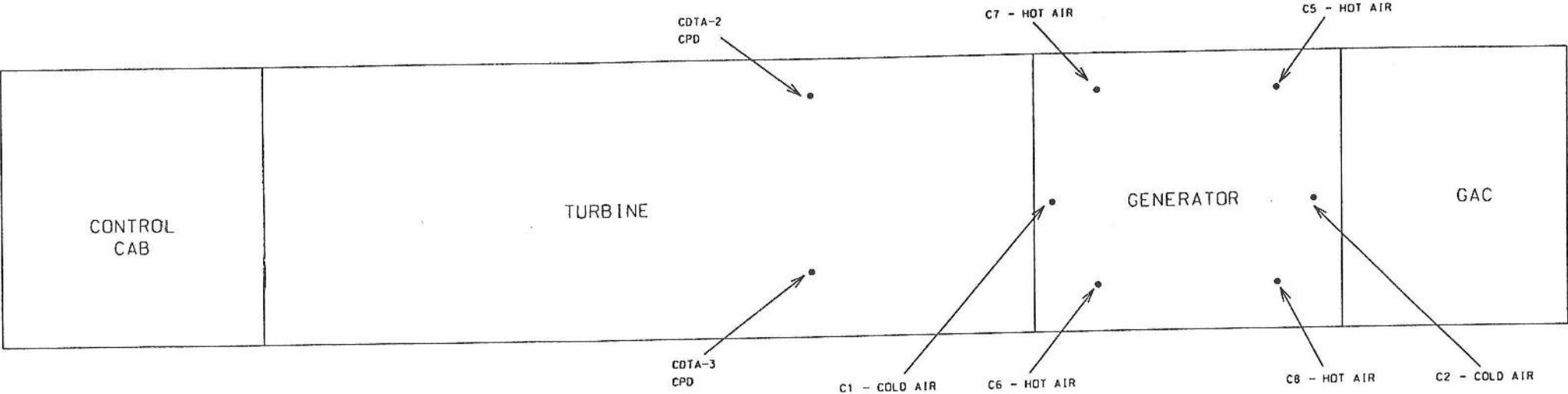


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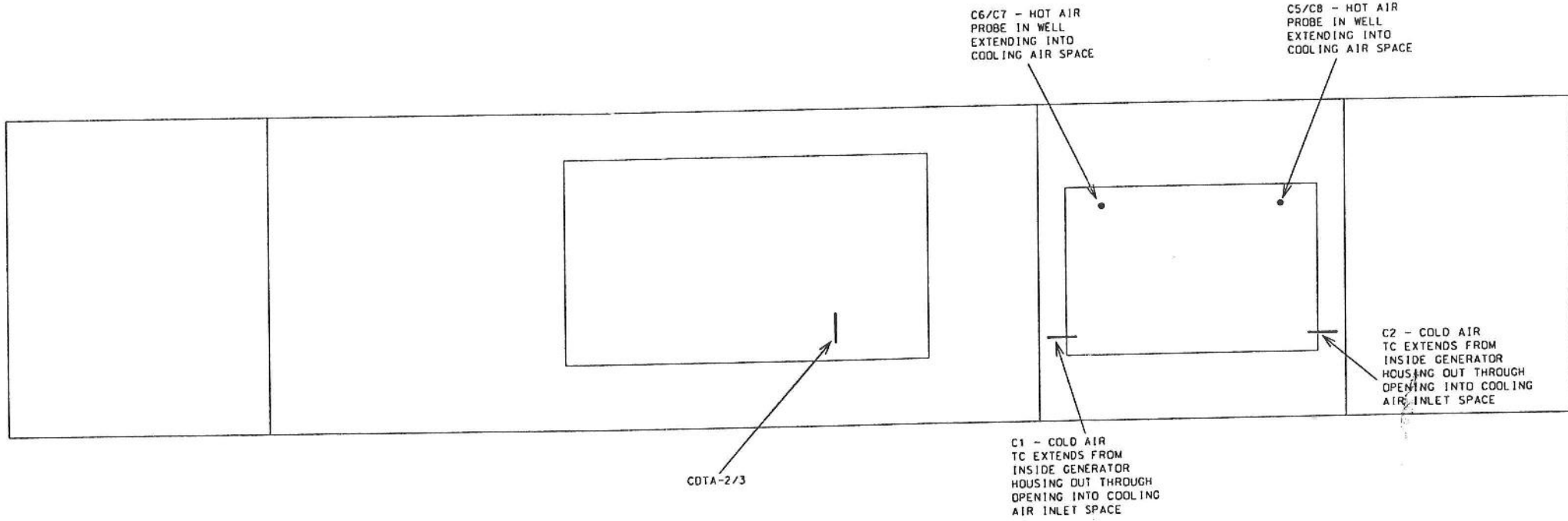
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ISSUED D MARX SR 01-02-13	SCALE		SHEET 9	



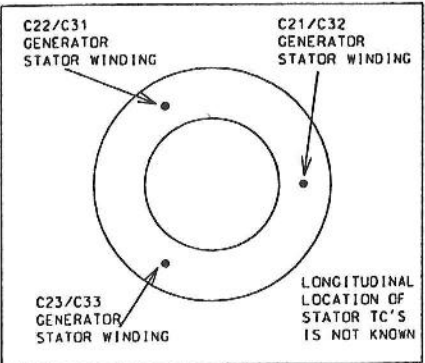
352B939701_-9_klickst Mon Apr 2 14:55:04 2001 gvl_tc2_oce



TOP VIEW OF TURBINE/GENERATOR



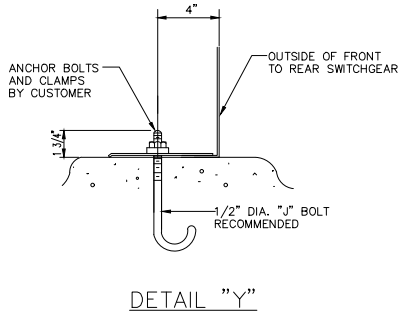
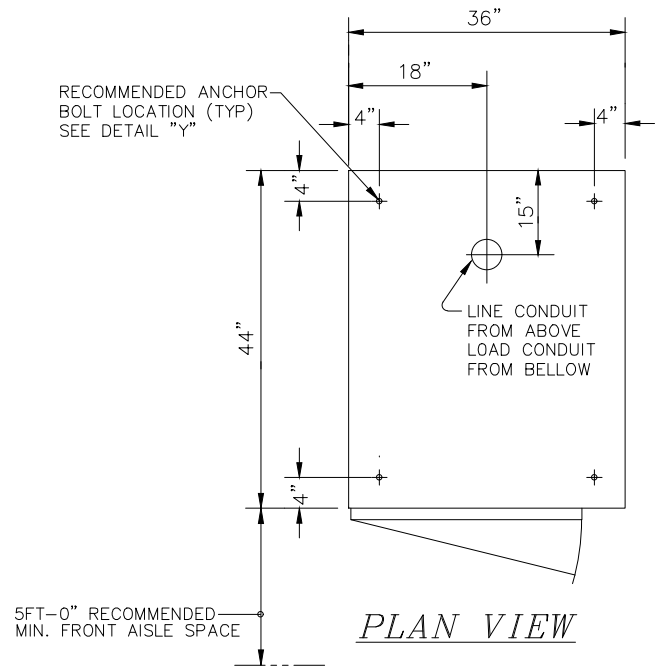
ELEVATION VIEW OF TURBINE/GENERATOR
VIEW LOOKING NORTH



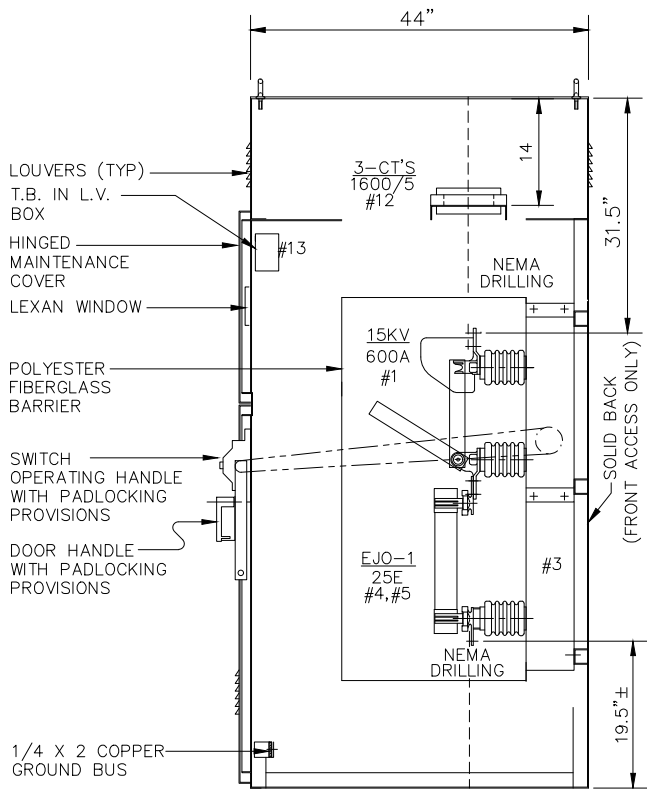
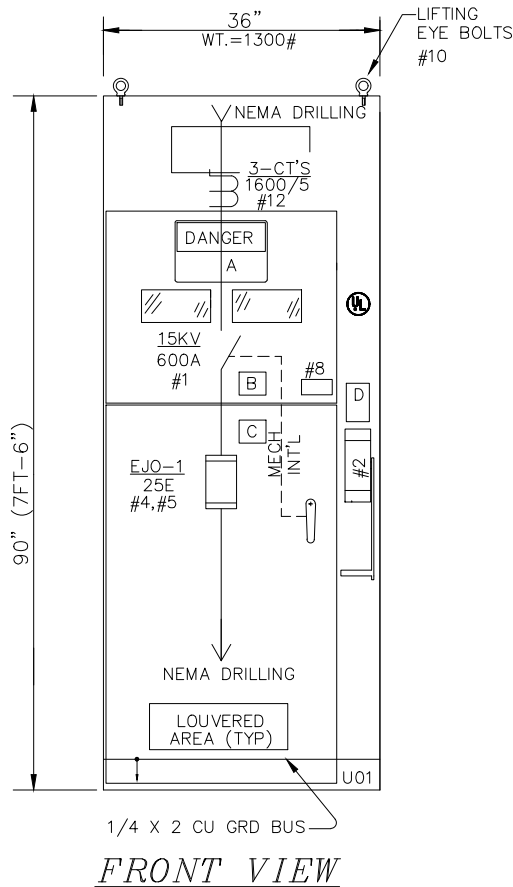
VIEW FROM REAR OF GENERATOR
LOOKING TOWARD TURBINE

REV	DATE	DESC	DFTR	APP	DESCRIPTION	REV	DATE	DESC	DFTR	APP	DESCRIPTION
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-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Appendix X - Station Power Fused Switch Drawings



SIGN DESIGNATIONS:
A. DANGER - HIGH VOLTAGE - KEEP OUT
B. WARNING - SWITCH BLADES MAY BE ENERGIZED BY BACKFEED
C. WARNING - FUSES MAY BE ENERGIZED BY BACKFEED
D. WARNING - SAFETY VIEWING OPENINGS ARE PROVIDED....



INSTALLATION NOTE:
WHEN MAKING CONNECTIONS, MAINTAIN ALL PHASE AND GROUND CLEARANCES FOR EQUIPMENT VOLTAGE CLASS AND USE CAUTION TO AVOID PLACING ANY INTENTIONAL STRAIN UPON ANY SWITCH OR FUSE TERMINAL. IT IS IMPORTANT THAT EACH CABLE-TERMINATION CONNECTOR BE FLAT AGAINST THE CORRESPONDING SWITCH OR FUSE TERMINAL PAD, WITH THE BOLT HOLES IN ALIGNMENT. DO NOT USE THE CONNECTING BOLTS TO PULL THE CABLES INTO ALIGNMENT. SECURE CABLES FIRMLY TO CABLE SUPPORT ANGLES WHERE FURNISHED.

MANUFACTURING NOTES:
1. SWITCHGEAR CONSTRUCTION IN ACCORDANCE WITH POWERCON BULLETIN PC003D & ALL APPLICABLE ANSI, IEEE, NEMA AND OSHA STANDARDS.
2. SILVER PLATED COPPER CONDUCTORS.

"MEPISE" UL

SHEET 1 OF 1

Powercon Corp
SEVERN

WEB SITE <http://www.powerconcorp.com>

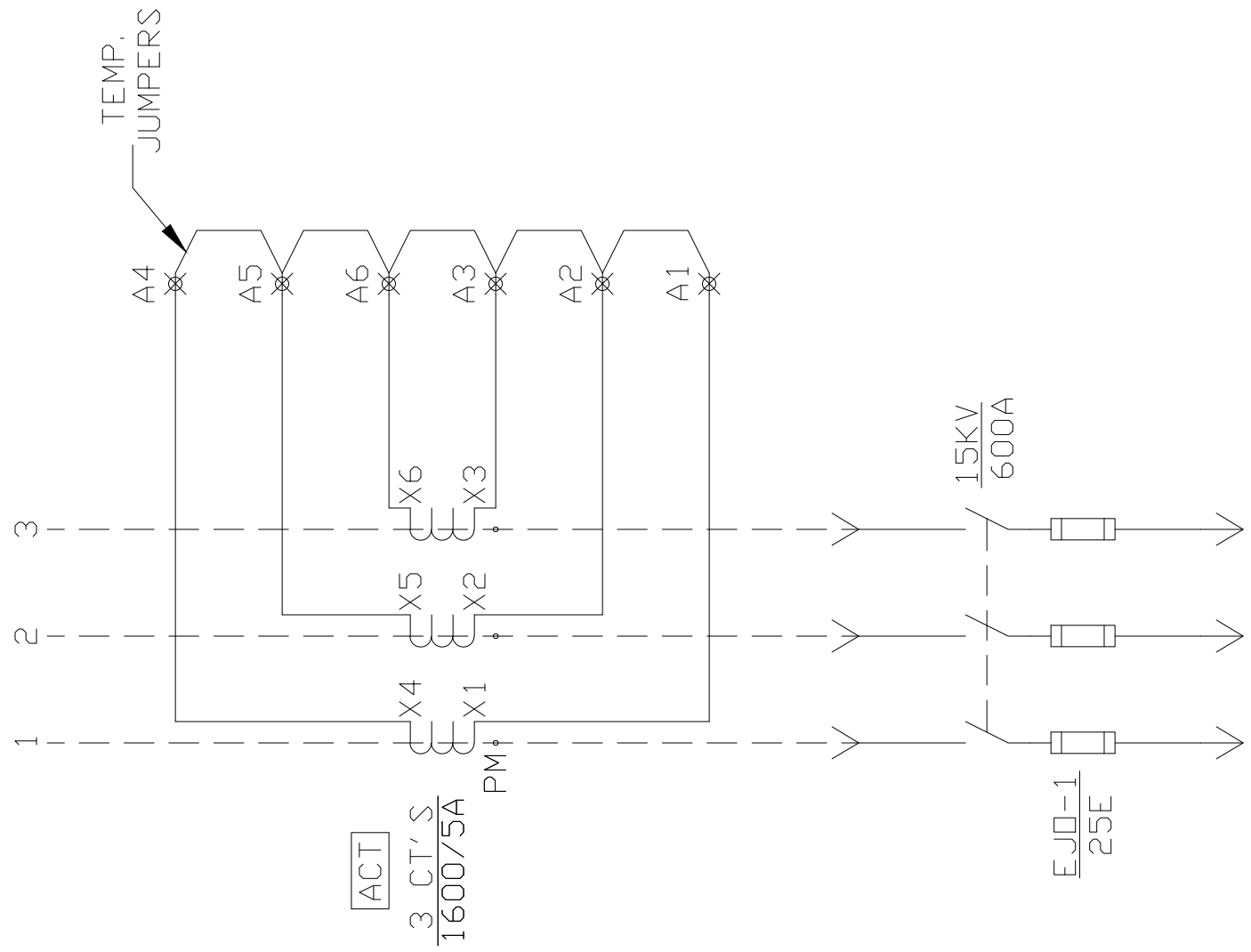
TITLE INDOOR NEMA 1 METAL ENCLOSED SWITCHGEAR,
SERVICE 13,800V, 15KV MAX. DESIGN,
600AMP, 3PH, 3W, 60HZ, 95KV BIL.

STATION
LOCATION CARROLLTON, TX

SO#00-27979 C-12526

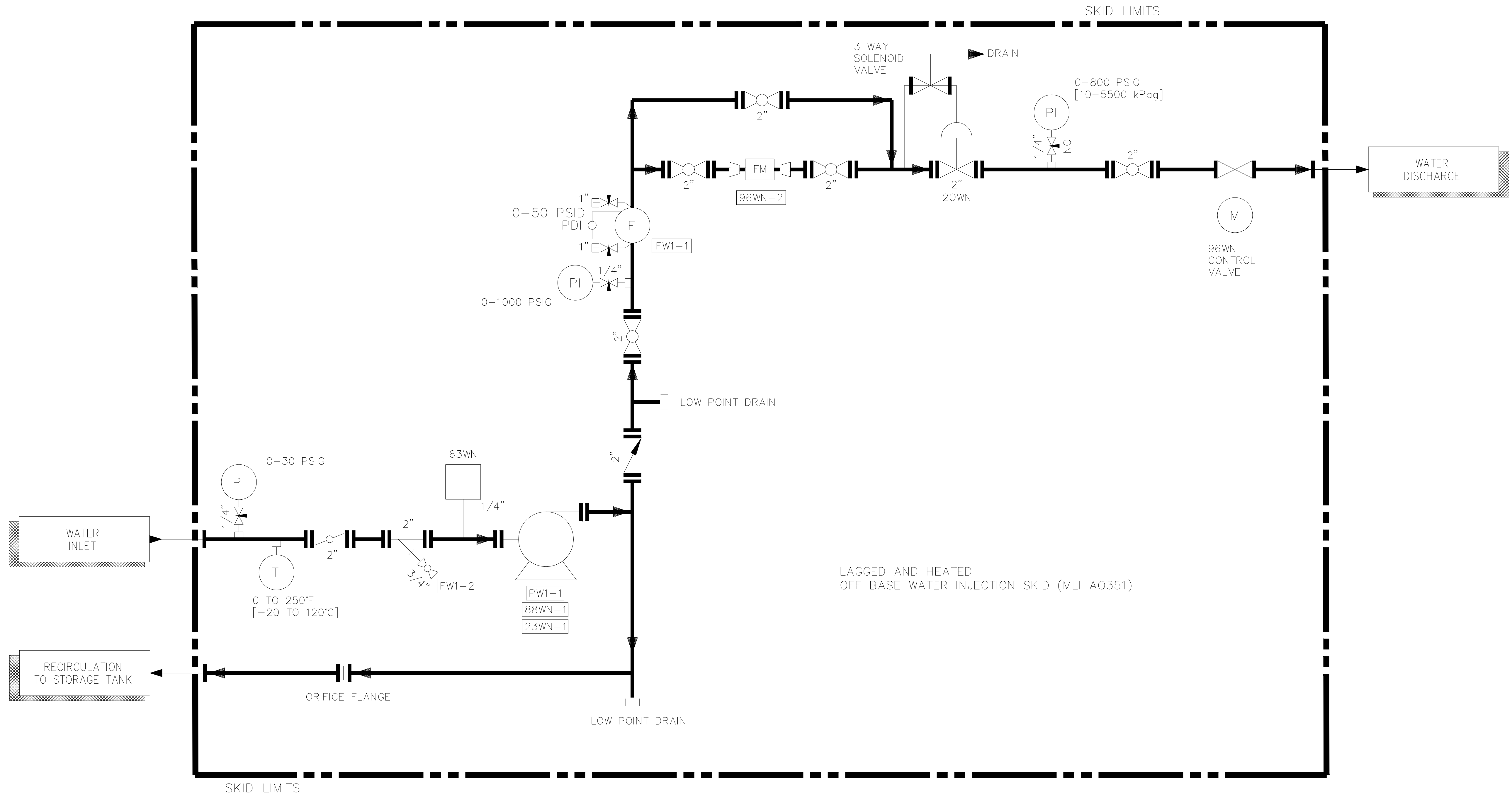
REV.
1

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			SUMMARY S-15533		P.O. NO. GY7850X019130		
			FRONT VIEW C-12526		ENGR. G. JAMES MUTH	DATE	03/02/00
			SCHEMATIC W-3352		DRWN. MIKE ELBERT	DATE	03/02/00
			WIRING DIAGRAM W-3352		CHKD. G. JAMES MUTH	DATE	03/02/00
①			APPD. G. JAMES MUTH	DATE	03/02/00		
			APPD.	DATE			
			APPD.	DATE			



REV.1 - AS BUILT AND TESTED		4/6/00 ST/AG		SHEET 1 OF 1	
DWN BY SUE TOBIN	S.O. 00-27979		POWERCON CORP.		
APP'D ALEX GELFEN	DATE 03/03/00		SEVERN, MD.		
TITLE: INDOOR NEMA 1 METAL ENCLOSED SWGR, SERVICE 13.8KV, 15KV MAX. DESIGN			WEB SITE http://www.powerconcorp.com		
			CUST: G. E. INDSYS		
			P.O. NO. GY7850X019130		
			DRAWING NO. W-3352		
			SUMMARY S-15533		
			WD/NO. N/A		

Appendix Y - Water Injection Skid Drawings



FLOWTRONEX

FLOWTRONEX INTERNATIONAL 6461 REYNOLDS RD, TYLER, TEXAS, USA 75708 +1-903-595-6511

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FOR: GENERAL ELECTRIC (REWORK)

PIPING & INSTRUMENTATION
DIAGRAM

DRAWN: *larkin*

CHKD:

DRAWING NO.

SCALE: N.T.S.

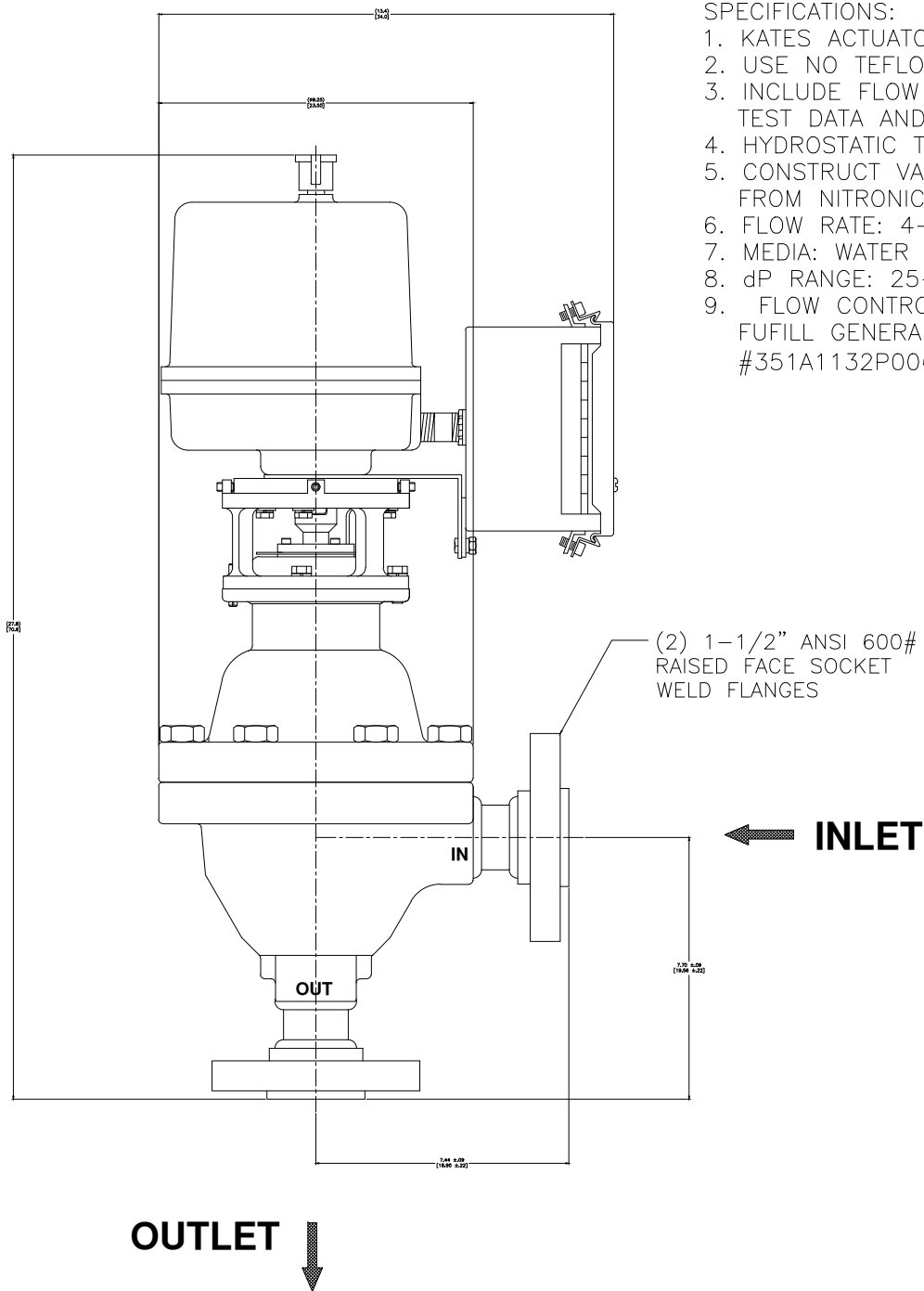
APPROVED:

P-22739-01

DATE: 01.MAY.00

SHEET: 1 of 1

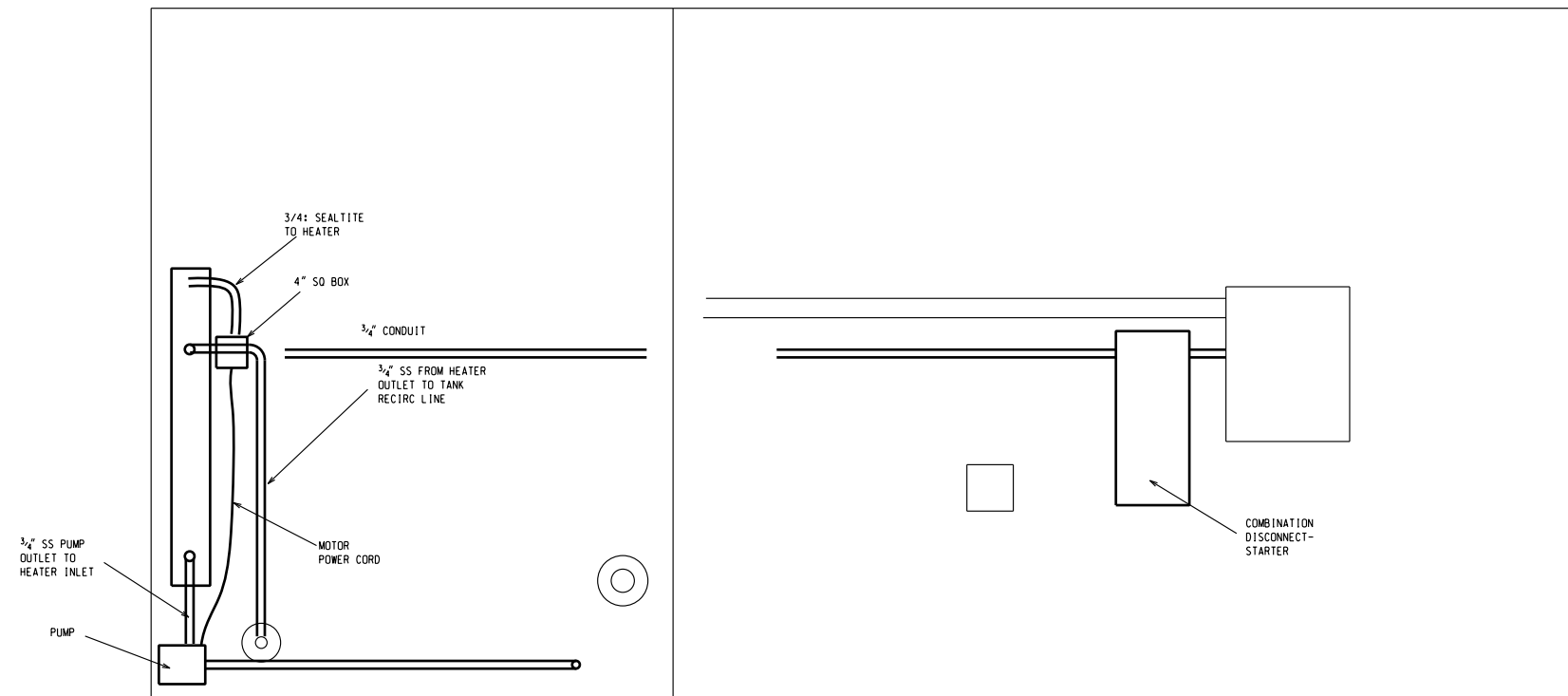
REV. 00



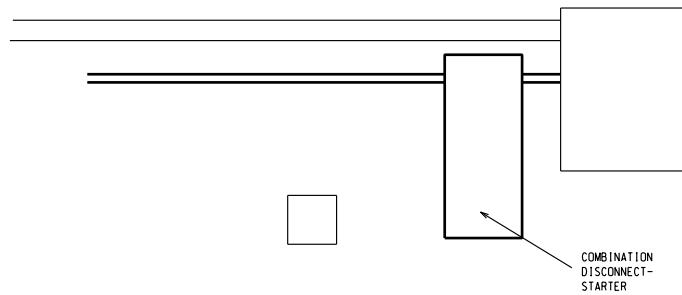
SPECIFICATIONS:

1. KATES ACTUATOR ASSEMBLY AR-01.
2. USE NO TEFLON TAPE.
3. INCLUDE FLOW TEST DATA, HYDROSTATIC TEST DATA AND CERIFICATE OF COMPLIANCE.
4. HYDROSTATIC TEST PER ANSI B16.37
5. CONSTRUCT VALVE TUBE AND VALVE SLEEVE FROM NITRONIC 60 STAINLESS STEEL.
6. FLOW RATE: 4-75 GPM
7. MEDIA: WATER
8. dP RANGE: 25-1200 psi
9. FLOW CONTROL UNIT CONSTRUCTED TO FUFILL GENERAL ELECTRIC SPECIFICATION #351A1132P006.

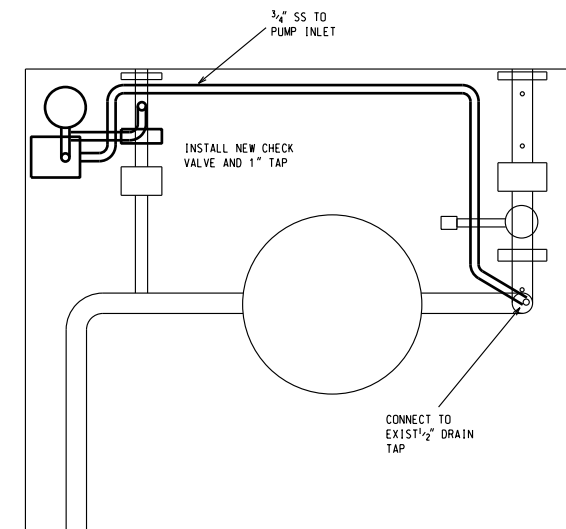
REV	DESCRIPTION	DATE	APRVD	W.A. Kates Co.	
A	RELEASED	7.10.97	EAG	1363 ANDERSON CLAWSON, MI 48067 PHONE: (248) 435-8225 FAX: (248) 435-8255	
B				MODEL:	JB64B-BHL
C				CUSTOMER:	GE POWER
UNLESS OTHERWISE SPECIFIED:				CUSTOMER P.O. #:	—
.XX ±.03 .XXX ±.005 X/XX ±1/64				ORDER #:	351A1132P006
DIMENSION UNITS: INCHES [CM]				REV:	A



ELEVATION VIEW
EAST WALL



ELEVATION VIEW
SOUTH WALL



PLAN VIEW
EAST END OF SKID

REV	DATE	DESIGNED	DRAWN	APP	DESCRIPTION	REV	DATE	DESIGNED	DRAWN	APP	DESCRIPTION
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-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

P & E ENGINEERING CO.
POWER SYSTEM ANALYSIS AND DESIGN

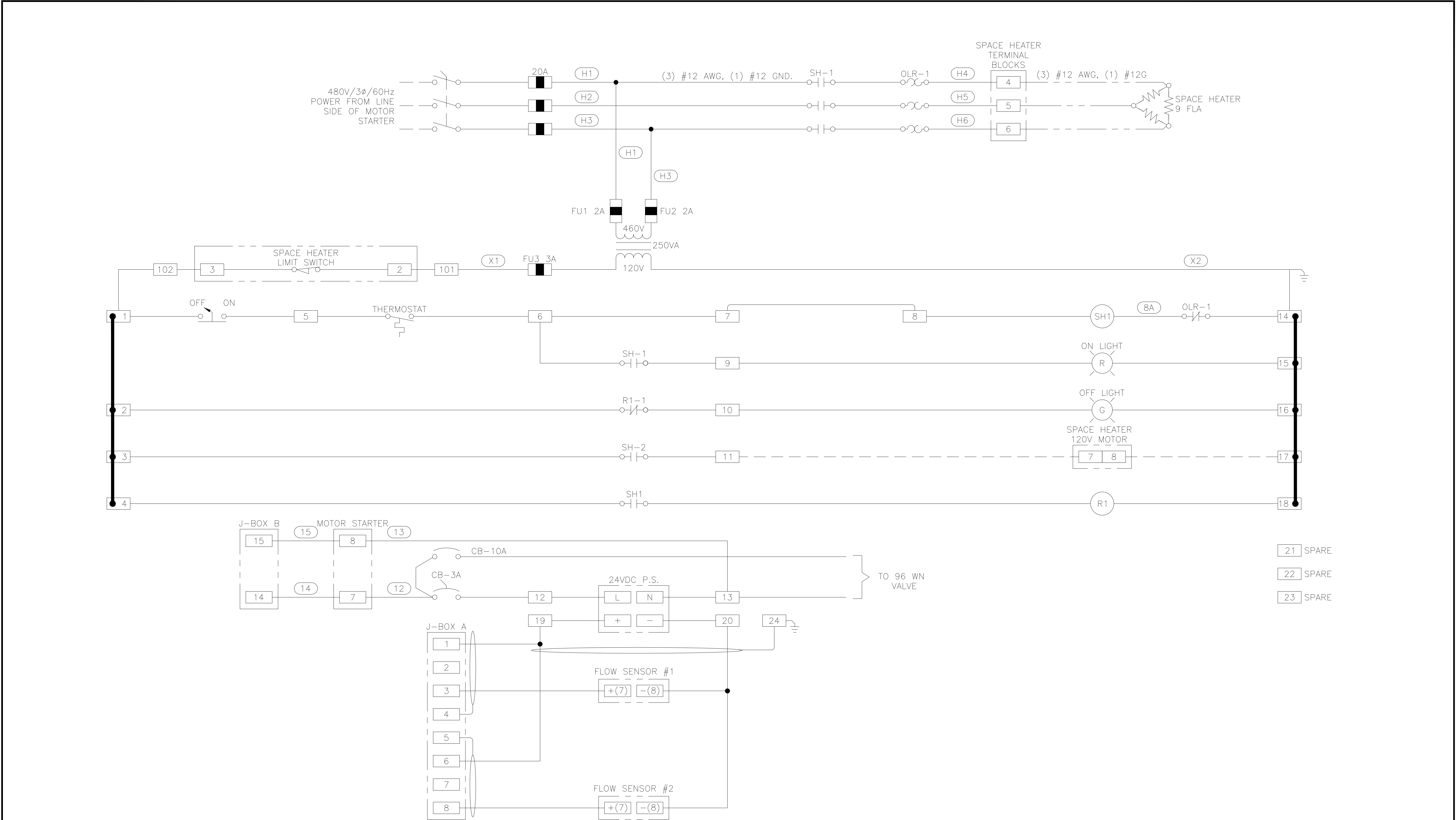
SCALE



DATE 09-01-01
DESIGNED P&E
DRAWN ARP
APPROVED ARP
APPROVED

INDIANOLA MUNICIPAL UTILITIES
WATER INJECTION SKID
TANK WATER HEATER

DWG NO
SK-10



NOTES:
1. WIRE NUMBERS TO MATCH TERMINAL NUMBERS UNLESS OTHERWISE NOTED.

LEGEND:

	JUMPER BAR (USED POINT)	RED = RED
	JUMPER BAR (UNUSED POINT)	BLU = BLUE
	WIRE NUMBER	OR = ORANGE
	TERMINALS	WHT = WHITE
	CUSTOMER SUPPLIED	BLK = BLACK
	FUTURE WIRING/EQUIPMENT	BLU = BLUE
	LOCATION GROUP/WIRING EXT. TO PANEL (IF NOT COMMON TO ALL)	YEL = YELLOW

TRANSMITTER
SHIELD

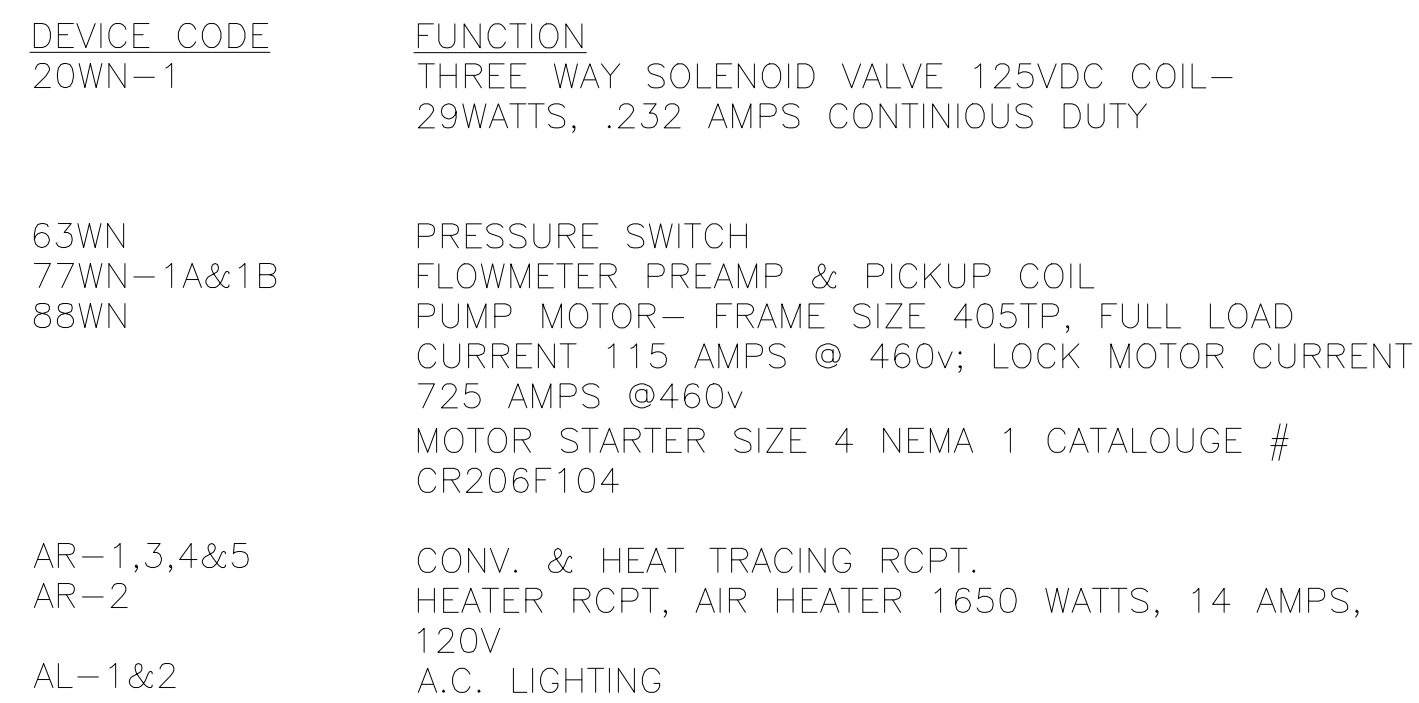
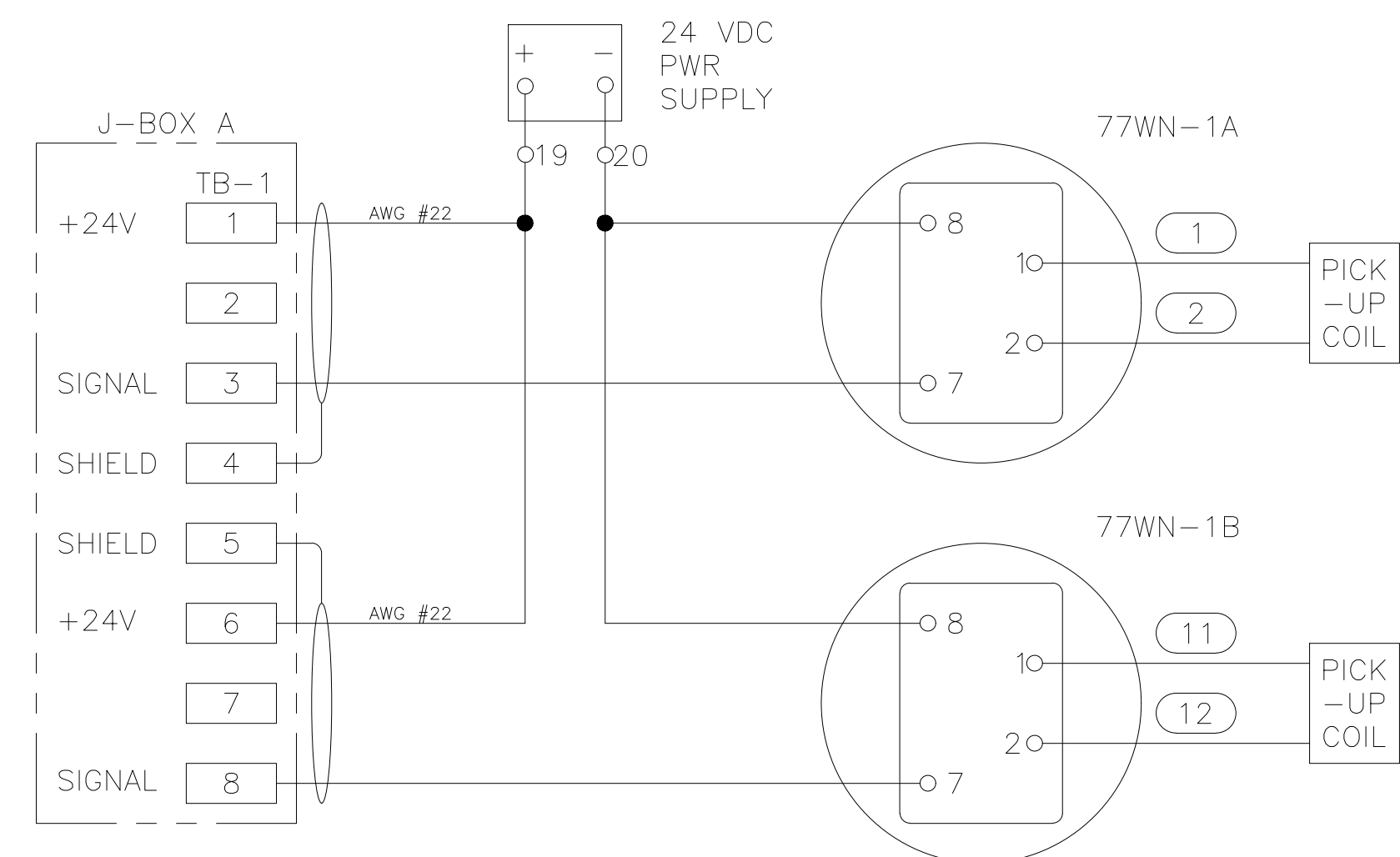
01	5/1/00	AS BUILT	AS
REV.	DATE	DESCRIPTION	BY

FLOWTRONEX

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FOR: GENERAL ELECTRIC <REWORK>		
SPACE HEATER CONTROL		
DRAWN: AMY SUE	CHKD:	DRAWING NO.
SCALE: NTS	APPROVED:	E-22739-01
DATE: MARCH 24, 2000		SHT: 1 OF 2 REV.: 01



LEGEND:

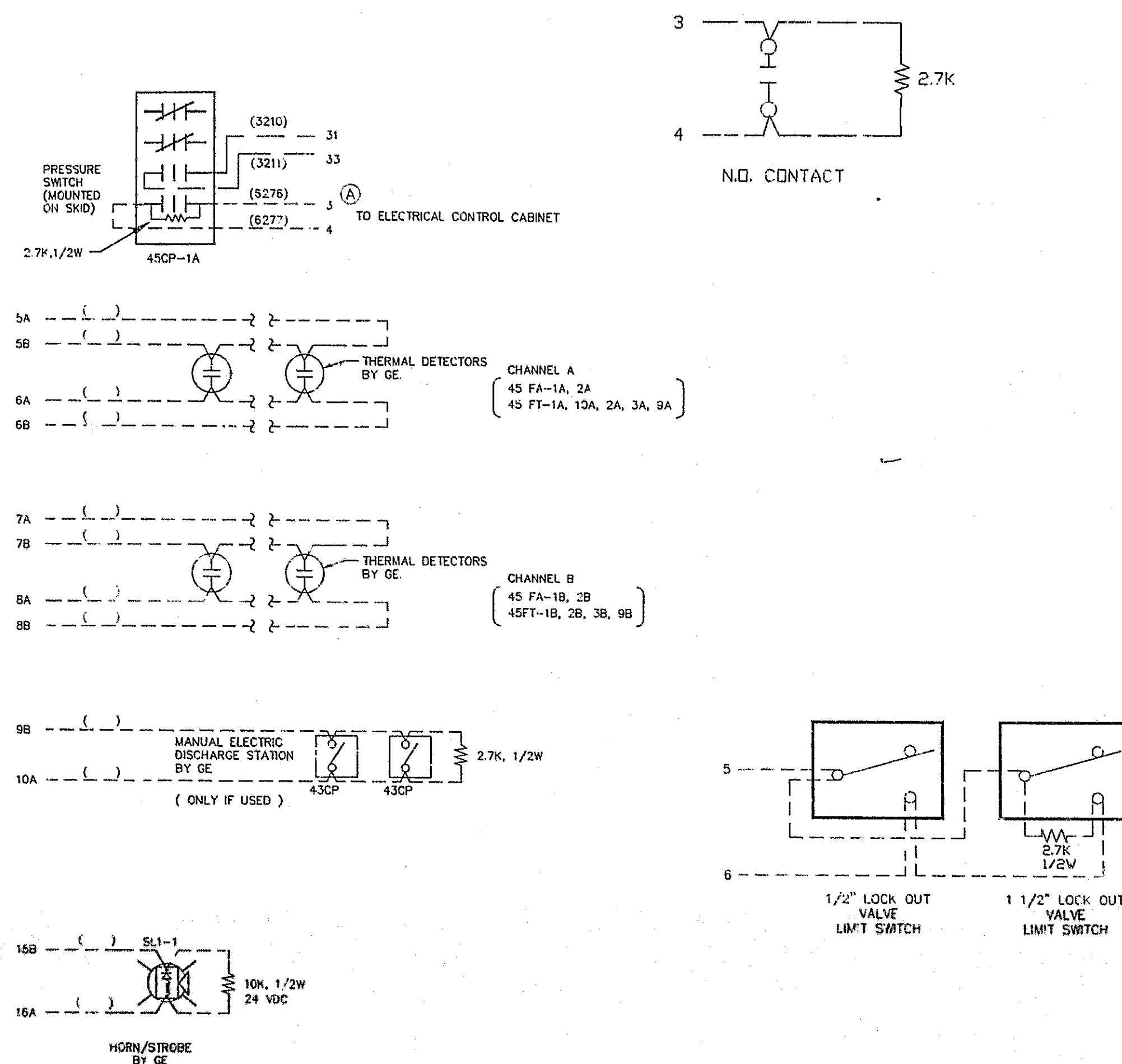
	JUMPER BAR (USED POINT)		
	JUMPER BAR (UNUSED POINT)		
	WIRE NUMBER		TRANSMITTER
	TERMINALS		
	CUSTOMER SUPPLIED		SHIELD
	FUTURE WIRING/EQUIPMENT		
	LOCATION GROUP/WIRING EXT. TO PANEL (IF NOT COMMON TO ALL)		

RED = RED
 BLU = BLUE
 OR = ORANGE
 WHT = WHITE
 BLK = BLACK
 BLU = BLUE
 YEL = YELLOW

FLOWTRONEX FLOWTRONEX INTERNATIONAL 6461 REYNOLDS RD, TYLER, TEXAS, USA 75708 +1-903-595-6511 THIS DRAWING IS THE PROPERTY OF FLOWTRONEX INTERNATIONAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, NOR USED FOR ANY PURPOSE OTHER THAN THAT WHICH IT IS FURNISHED EXCEPT BY WRITTEN PERMISSION.	FOR: GENERAL ELECTRIC <REWORK>			
	CONNECTION DIAGRAM "WATER FORWARDING UNIT"			
	DRAWN: AMY SUE	CHKD:	DRAWING NO.	
	SCALE: NTS	APPROVED:	E-22739-02	
	DATE: MAY 1. 2000		SHT: 2 OF 2	REV.: 00

Appendix Z - Fire Alarm System Drawings

REVISIONS				
SYM.	DESCRIPTION	BY	DATE	APPROVED
-	NDO CFS #12926	PJ	2/1/96	2/1/96



(A) 1) REFER TO GENERAL ELECTRIC DRAWING NO. 176D3956
2) ALL SOLID LINES REPRESENT WIRING PRE-CONNECTED BY CHEMETRON
3) () REPRESENT GENERAL ELECTRIC WIRE NO'S
4) RELAY CONTACTS ARE SHOWN IN THE NORMAL CONDITION & RATED AT:
5A @ 24VDC/120VAC
5) EXTERNAL WIRING SHOWN WITH DASHED LINES TO BE INSTALLED BY ELECTRICAL CONTRACTOR.
6) INSTALL PER NFPA 70 AND 72A AND NFPA 12, 12A AND 12B FOR INSTALLATION INSTRUCTIONS
AND ELECTRICAL RATINGS REFER TO: MICRO 1-EV CONTROL PANEL INSTALLATION & OPERATION
MANUAL (EFFECTIVE JULY 1, 1989).
7) ALL LOW VOLTAGE 24VDC CIRCUITS SHALL BE RUN IN A SEPARATE CONDUIT FROM THE HIGH
VOLTAGE 120VAC CIRCUITS.
8) ALL RESISTORS ARE 2.7K, 1/2W EXCEPT AS NOTED.

ALARM NUMBER	CONDITION
A-04	ZONE 1 INPUT LOOP ALARM
A-06	ZONE 2 INPUT LOOP ALARM
A-08	AUXILIARY INPUT LOOP 1 ACTIVATED
A-12	MANUAL DISCHARGE LOOP ACTIVATED
A-44	ZONE 1 INPUT LOOP ALARM (OVER 65mA)
A-46	ZONE 2 INPUT LOOP ALARM (OVER 65mA)

<u>FAULT NUMBER</u>	<u>CONDITION</u>
F-01	NO BATTERY VOLTAGE (BATTERY FAILURE)
F-02	BATTERY CHARGER CIRCUIT FAILURE - BATTERY LOW
F-03	AUXILIARY INPUT LOOP 1 OPEN
F-05	AUXILIARY INPUT LOOP 1 OPEN
F-07	ZONE 1 INPUT LOOP OPEN
F-09	ZONE 2 INPUT LOOP OPEN
F-10	AUXILIARY INPUT LOOP 2 ACTIVATED
F-11	MANUAL DISCHARGE LOOP OPEN
F-13	ABORT SWITCH LOOP OPEN
F-14	ABORT SWITCH LOOP ACTIVATED
F-15	SOLENOID 1 OUTPUT TROUBLE
F-16	SOLENOID 2 OUTPUT TROUBLE
F-17	SOLENOID 2 OUTPUT TROUBLE
F-18	ALARM 1 OUTPUT TROUBLE
F-19	ALARM 2 OUTPUT TROUBLE
F-20	ALARM RELAY COIL TROUBLE
F-21	TROUBLE RELAY COIL TROUBLE
F-22	AUXILIARY OUTPUT 1 TROUBLE
F-23	AUXILIARY 2 OUTPUT TROUBLE
F-24	AC POWER FAILURE
F-25	SOLENOID 1 OUTPUT SHORTED
F-26	SOLENOID 2 OUTPUT SHORTED
F-27	SOLENOID 3 OUTPUT SHORTED
F-28	GROUND FAULT TROUBLE
F-39	ALARM 1 OUTPUT SHORTED
F-40	ALARM 2 OUTPUT SHORTED
F-48	AUXILIARY POWER OUTPUT FAILURE
F-49	REMOTE DISPLAY COMMANDS FAILURE
✱	IN THE EVENT OF AC POWER LOSS, THIS CONDITION MAY EXIST UNTIL THE BATTERIES ARE FULLY CHARGED.

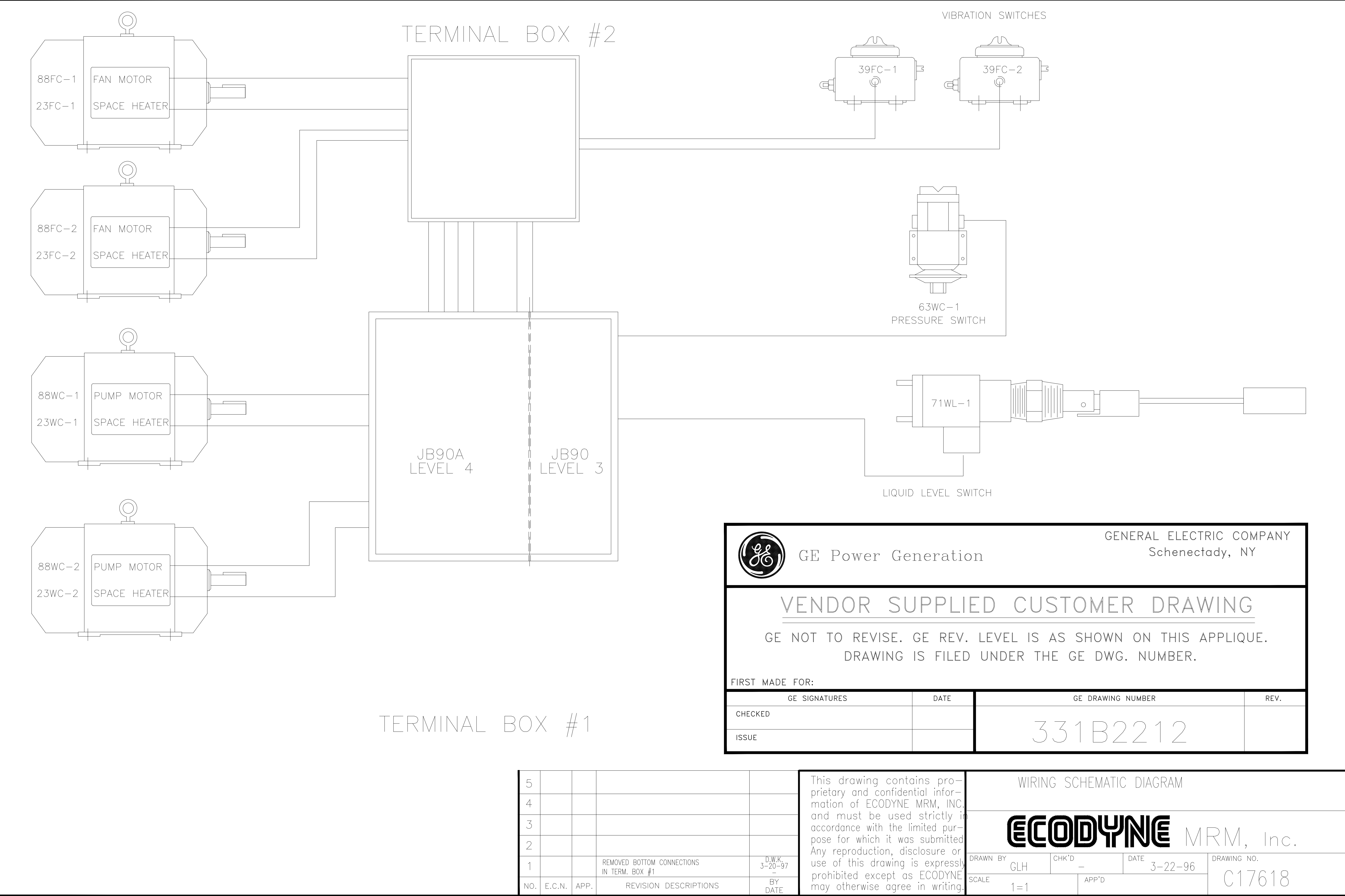
PROGRAMMING LIST	
PROGRAM	OPTION
01	2
02	2
03	1
04	3
05	1
06	2
07	1
08	1
09	2

- FIELD SET THE PREDISCHARGE TIME FOR SOLENOID A & 2 FOR SITE CONDITIONS
- FIELD SET THE DISCHARGE TIME FOR SOLENOID 1 & 2 TO 10 MINUTE
- FIELD SET THE PREDISCHARGE AND DISCHARGE TIME FOR SOLENOID 3 TO 0

SHT 1 OF 1

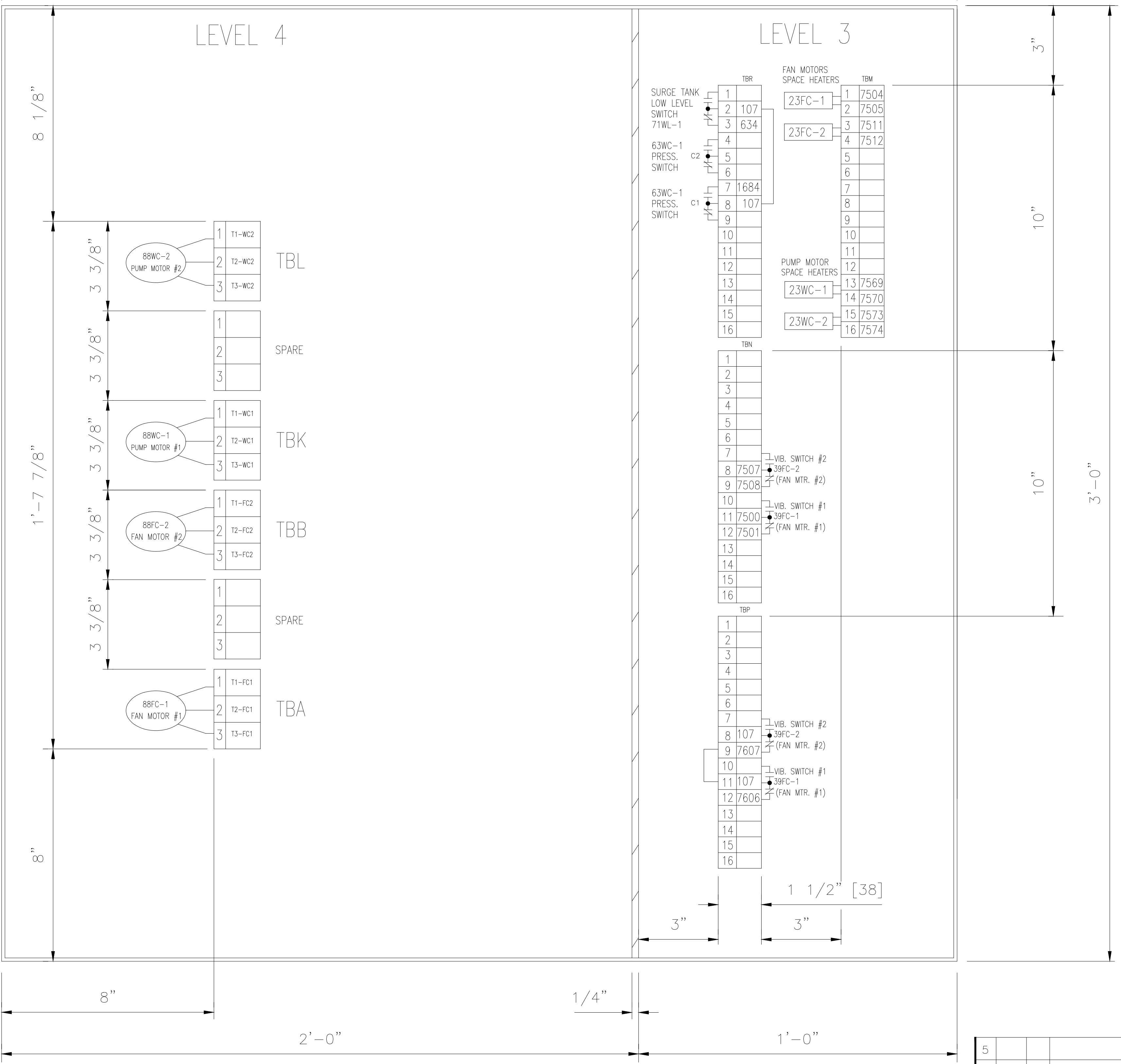
GE Power Generation		GENERAL ELECTRIC COMPANY Schenectady, NY	
GE NOT TO REVISE. GE REV. LEVEL IS AS SHOWN ON THIS APPLIC. JE. DRAWING IS FILED UNDER THE GE DWG. NUMBER.		VENDOR SUPPLIED DRAWING	
FIRST MADE FOR: <u>M/L-SAPPI-3766181-24</u>			
GE SIGNATURES	DATE	GE DRAWING NUMBER	REV
CHECKED <u>J. J. [Signature]</u>	9/6/3/68	194D1057	—
ISSUED <u>J. J. [Signature]</u>	9/6-24/68		
DATE 2/1/96	NAME EXTERNAL CONNECTION DIAGRAM GENERAL ELECTRIC HIGH PRESSURE CO2 FIRE SYSTEM 12 - 100 LB CYLINDERS 15 - 100 LB CYLINDERS SINGLE ZONE CLASS "A" (INITIAL & EXTENDED)		 CHEMETRON Fire Systems™ A Division of <u>BADGER FIRE PROTECTION, INC.</u>
STOCK NUMBER SCALE NONE WT.	N/A		DWG. NO. D53576
SHEET	1	OF	1

Appendix ZZ - Water Cooling Skid Drawings



COOLING WATER MODULE
MAIN JUNCTION BOX 90A/90 (BOX #1)

3'-0"



- NOTES:
- 1. SEE UNIT INFORMATION DRAWING FOR MOTOR SPECIFICATIONS.
 - 2. BOXES ARE TO BE NEMA 4.
 - 3. ALL LEVEL 3 WIRING TO BE 12 GA. WIRE MINIMUM W/ 1/2" DIA. CONDUIT.



GE Power Generation

GENERAL ELECTRIC COMPANY
Schenectady, NY

VENDOR SUPPLIED CUSTOMER DRAWING

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DRAWING IS FILED UNDER THE GE DWG. NUMBER.

FIRST MADE FOR:

GE SIGNATURES	DATE	GE DRAWING NUMBER	REV.
CHECKED		233C3643	
ISSUE			

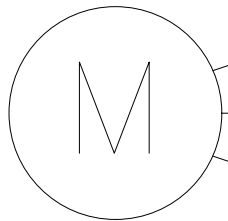
5					This drawing contains proprietary and confidential information of ECODYNE MRM, INC. and must be used strictly in accordance with the limited purpose for which it was submitted. Any reproduction, disclosure or use of this drawing is expressly prohibited except as ECODYNE may otherwise agree in writing.	PUMP SKID TERMINAL STRIP DETAILS		
4								
3								
2								
1								
NO.	E.C.N.	APP.	REVISION DESCRIPTIONS	BY DATE	DRAWN BY GLH	CHK'D -	DATE 3-22-96	DRAWING NO. D16012
					SCALE 4"=1'	APP'D DRW		

HEAT EXCHANGER BOX #2

INTERCONNECTION WIRING

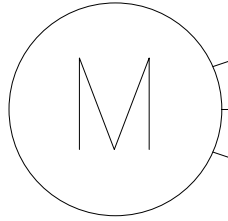
LEVEL 4

88FC-1
FAN MOTOR #1



1	T1-FC1
2	T2-FC1
3	T3-FC1
4	

88FC-2
FAN MOTOR #2



1	T1-FC2
2	T2-FC2
3	T3-FC2
4	

TBA

TBB

LEVEL 3

FAN MOTORS
SPACE HEATERS

23FC-1
23FC-2

TBM	
1	7504
2	7505
3	7511
4	7512
5	
6	
7	
8	
9	
10	
11	
12	

TBN

1	
2	7507
3	7508
4	
5	
6	7500
7	7501
8	
9	
10	
11	
12	

VIBRATION SWITCH #2
39FC-2 39FC-2
(FAN MTR. #2)

VIBRATION SWITCH #1
39FC-1 39FC-1
(FAN MTR. #1)

TBP

1	
2	107
3	7607
4	
5	
6	107
7	7606
8	
9	
10	
11	
12	

HEAT EXCHANGER TERMINAL BOX TO MAIN JUNCTION BOX
TERMINAL TO TERMINAL

TBA1	TBA1
TBA2	TBA2
TBA3	TBA3
TBB1	TBB1
TBB2	TBB2
TBB3	TBB3
TBM1	TBM1
TBM2	TBM2
TBM3	TBM3
TBM4	TBM4
TBN1	TBN7
TBN2	TBN8
TBN3	TBN9
TBN5	TBN10
TBN6	TBN11
TBN7	TBN12
TBP1	TBP7
TBP2	TBP8
TBP3	TBP9
TBP5	TBP10
TBP6	TBP11
TBP7	TBP12

ALL LEVEL 3 WIRING TO BE 12 GA. WIRE MINIMUM W/ 1/2" DIA. CONDUIT

- NOTES:
- 1. SEE PURCHASER INFORMATION DRAWING FOR MOTOR SPECIFICATIONS.
 - 2. BOXES ARE TO BE NEMA 4

GE Power Generation

GENERAL ELECTRIC COMPANY
Schenectady, NY

VENDOR SUPPLIED CUSTOMER DRAWING

GE NOT TO REVISE. GE REV. LEVEL IS AS SHOWN ON THIS APPLIQUE.
DRAWING IS FILED UNDER THE GE DWG. NUMBER.

FIRST MADE FOR:

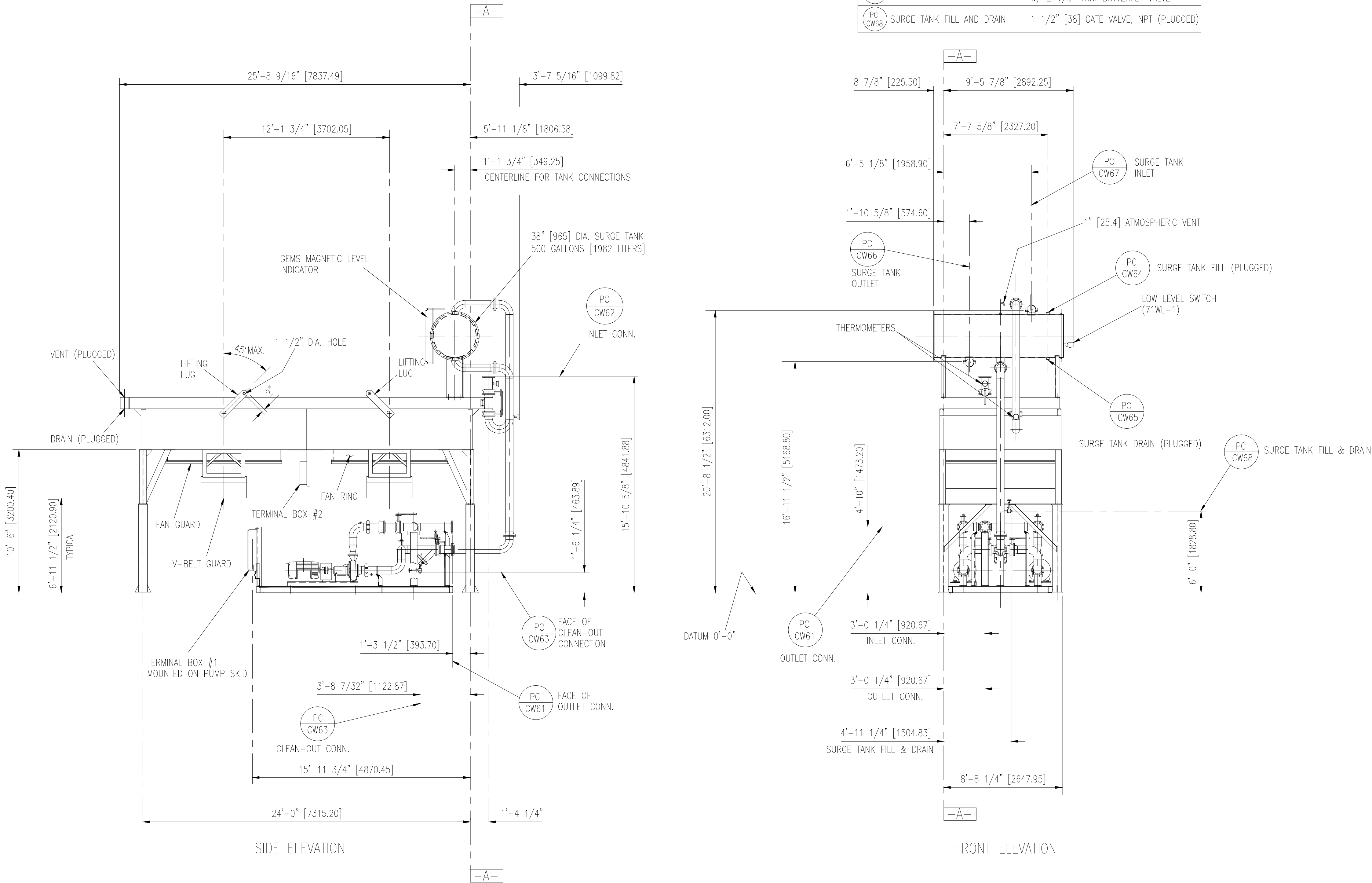
GE SIGNATURES	DATE	GE DRAWING NUMBER	REV.
CHECKED		233C3611	
ISSUE			

5					This drawing contains pro- prietary and confidential infor- mation of ECODYNE MRM, INC. and must be used strictly in accordance with the limited pur- pose for which it was submitted. Any reproduction, disclosure or use of this drawing is expressly prohibited except as ECODYNE may otherwise agree in writing.	HEAT EXCHANGER TERMINAL STRIP DETAILS			
4									
3									
2									
			CORRECTED MAIN JUNCTION BOX NO'S REMOVED TBM NO'S	GLH 5-15-96		DRAWN BY GLH	CHK'D -	DATE 3-22-96	DRAWING NO. D16013
	NO.	E.C.N.	APP.	REVISION DESCRIPTIONS	BY DATE	SCALE 1=1	APP'D		

Page 5 of 7

PURCHASER CONNECTIONS		
 PC CW61	OUTLET CONNECTION	6" [152]–150# RF FLANGE ASME SA–105
 PC CW62	INLET CONNECTION	6" [152]–150# RF FLANGE ASME SA–105
 PC CW63	CLEAN–OUT CONNECTION	1" [25] GATE VALVE, NPT (PLUGGED)
 PC CW64	SURGE TANK FILL, ON TANK	2" [51] HALF COUPLING, NPT (PLUGGED)
 PC CW65	SURGE TANK DRAIN, ON TANK	1" [25] HALF COUPLING, NPT (PLUGGED)
 PC CW66	SURGE TANK OUTLET, DIESEL CONN.	6" [152]–150# FF FLANGE W/ 2 1/8" THK. BUTTERFLY VALVE
 PC CW67	SURGE TANK INLET, DIESEL CONN.	6" [152]–150# FF FLANGE W/ 2 1/8" THK. BUTTERFLY VALVE
 PC CW68	SURGE TANK FILL AND DRAIN	1 1/2" [38] GATE VALVE, NPT (PLUGGED)

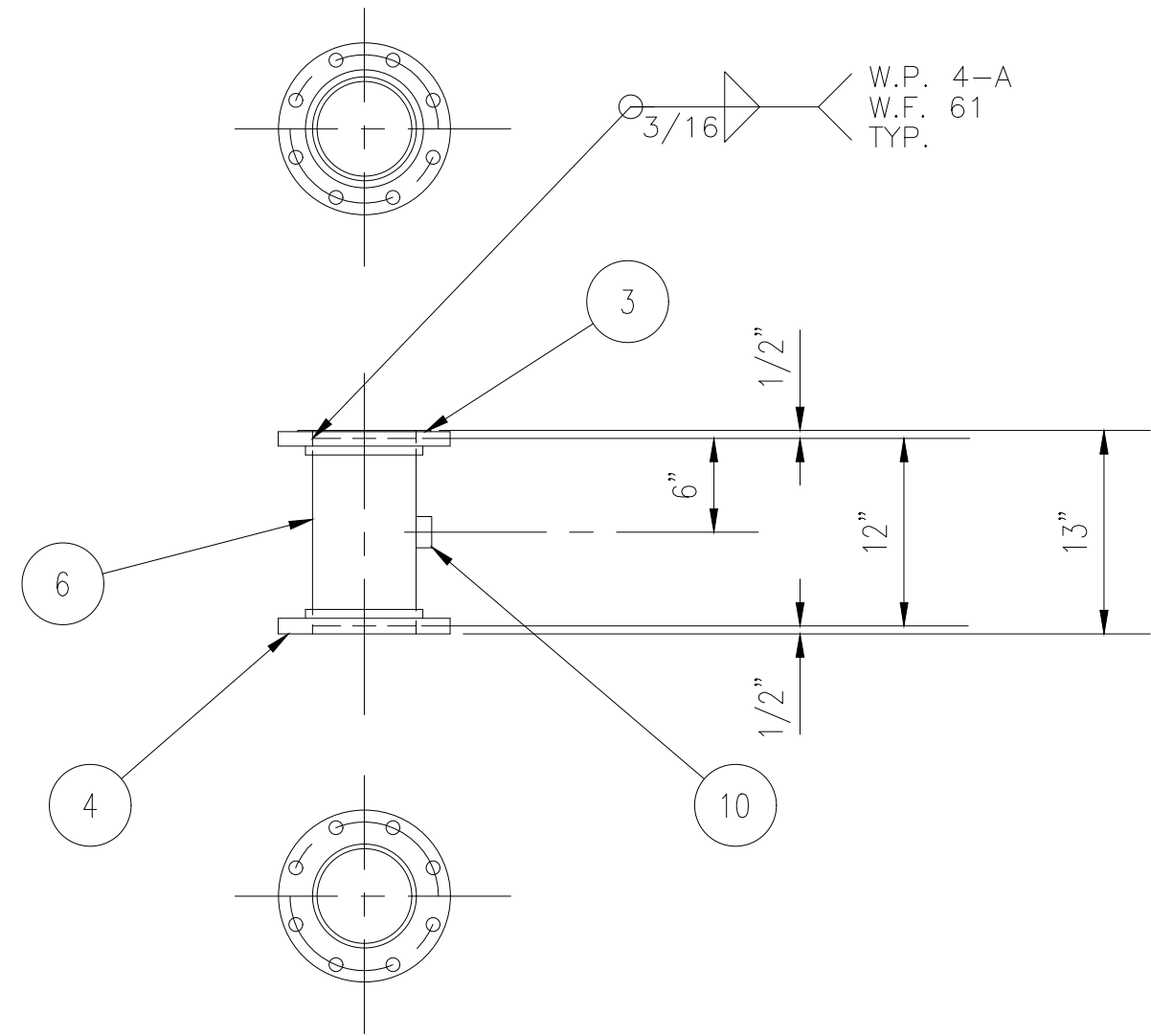
- NOTES:
- PURCHASER TO LIFT HEAT EXCHANGER BAY FROM THE LIFTING LUGS USING A SPREADER BEAM PERPENDICULAR TO THE LENGTH OF THE UNIT TO MAINTAIN A VERTICAL LIFT. DO NOT LIFT FROM A SINGLE POINT DIRECTLY ABOVE THE UNIT. REMOVE RETAINING BOLTS PRIOR TO LIFTING.
 - TERMINAL BOXES #1& #2 (NEMA 4 HINGED ENCLOSURE) WITH TERMINAL BLOCKS SUPPLIED BY ECODYNE MRM, INC. ALL WIRING AND CONDUIT RUNS FROM PUMP MOTORS AND INSTRUMENTS TO TERMINAL BOX #1 (JB90/JB90A) MOUNTED ON PUMP SKID, SUPPLIED AND INSTALLED BY ECODYNE MRM, INC. ALL WIRING AND CONDUIT RUNS FROM FAN MOTORS AND VIBRATION SWITCHES TO TERMINAL BOX #2 MOUNTED ON FACTORY-ASSEMBLED UNIT, SUPPLIED AND INSTALLED BY ECODYNE MRM, INC. WIRING AND CONDUIT RUNS CONNECTING TERMINAL BOXES #1 WITH #2 AND LIQUID LEVEL INDICATOR W/SWITCH (71WL-1) TO TERMINAL BOX #1 SUPPLIED BY ECODYNE MRM, INC. AND SHIPPED LOOSE FOR FIELD INSTALLATION.
 - PARTS SHIPPED FOR FIELD INSTALLATION CONSIST OF: ONE (1) AIR COOLED HEAT EXCHANGER BAY, PUMP SKID WITH PUMPS, PUMP MOTORS AND PIPING, PIPING TO CONNECT BAY TO PUMP SKID, SURGE TANK TO PUMP SKID PIPING, (2) THERMOMETERS, LOWER COLUMNS, KNEE BRACES, WIRING AND CONDUIT RUNS FROM HEAT EXCHANGER TERMINAL BOXES TO MAIN TERMINAL BOX ON PUMP SKID, LIQUID LEVEL INDICATOR W/SWITCH (71WL-1) TO MAIN TERMINAL BOX, FOUR (4) 6"-150# F.F. BUTTERFLY VALVES FOR TUBE BUNDLE INLET & OUTLET CONNECTIONS TO HEAT EXCHANGER AND DIESEL INLET AND OUTLET CONNECTIONS ON TANK AND ALL REQUIRED HARDWARE.



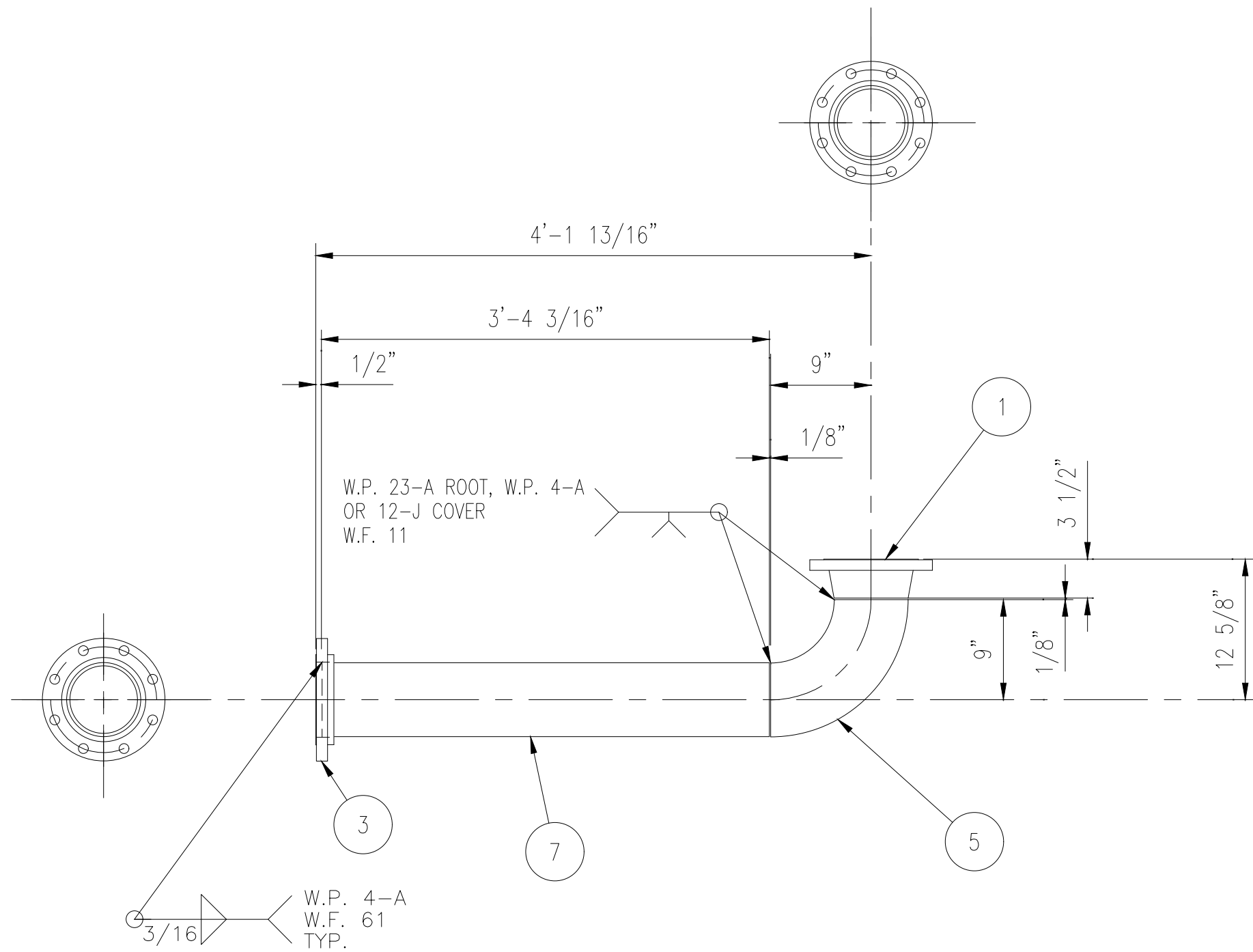
GE Power Generation		GENERAL ELECTRIC COMPANY Schenectady, NY	
DT - VENDOR SUPPLIED DRAWING			
GE NOT TO REVISE. GE REV. LEVEL IS AS SHOWN ON THIS APPLIQUE. THIS DOCUMENT IS FILED UNDER THE GE DRAWING NUMBER.			
THIS DOCUMENT SHALL BE REVISED IN ITS ENTIRETY. ALL SHEETS OF THIS DOCUMENTS ARE THE SAME REVISION LEVEL AS INDICATED IN THIS VENDOR SUPPLIED DRWING APPLIQUE.			
FIRST MADE FOR:		OF	
GE SIGNATURES	DATE	GE DRAWING NUMBER	REV.
CHECKED		199D4943	
ISSUE			

PURCHASER INFORMATION	
ECODYNE MRM, INC. PROPOSAL NO.	M99-564
NUMBER REQUIRED	
PURCHASER	GENERAL ELECTRIC / INDIANOLA PROJECT
PURCHASE ORDER NO.	
SERVICE	WATER COOLER MODULE
LOCATION	
CERTIFIED CORRECT	

5						This drawing contains proprietary and confidential information of ECODYNE MRM, INC. and must be used strictly in accordance with the limited purpose for which it was submitted. Any reproduction, disclosure or use of this drawing is expressly prohibited except as ECODYNE may otherwise agree in writing.	#9W-26L-2F8 FORCED DRAFT OUTLINE DRAWING							
4							ECODYNE MRM, Inc.	DRAWN BY	GLH	CHK'D		DATE	03-10-00	DRAWING NO.
3								SCALE	1/4" = 1'-0"	APP'D				E5893
2														
1														
NO.	E.C.N.	APP.	REVISION DESCRIPTIONS	BY	DATE									



P-9
ONE (1) REQ'D

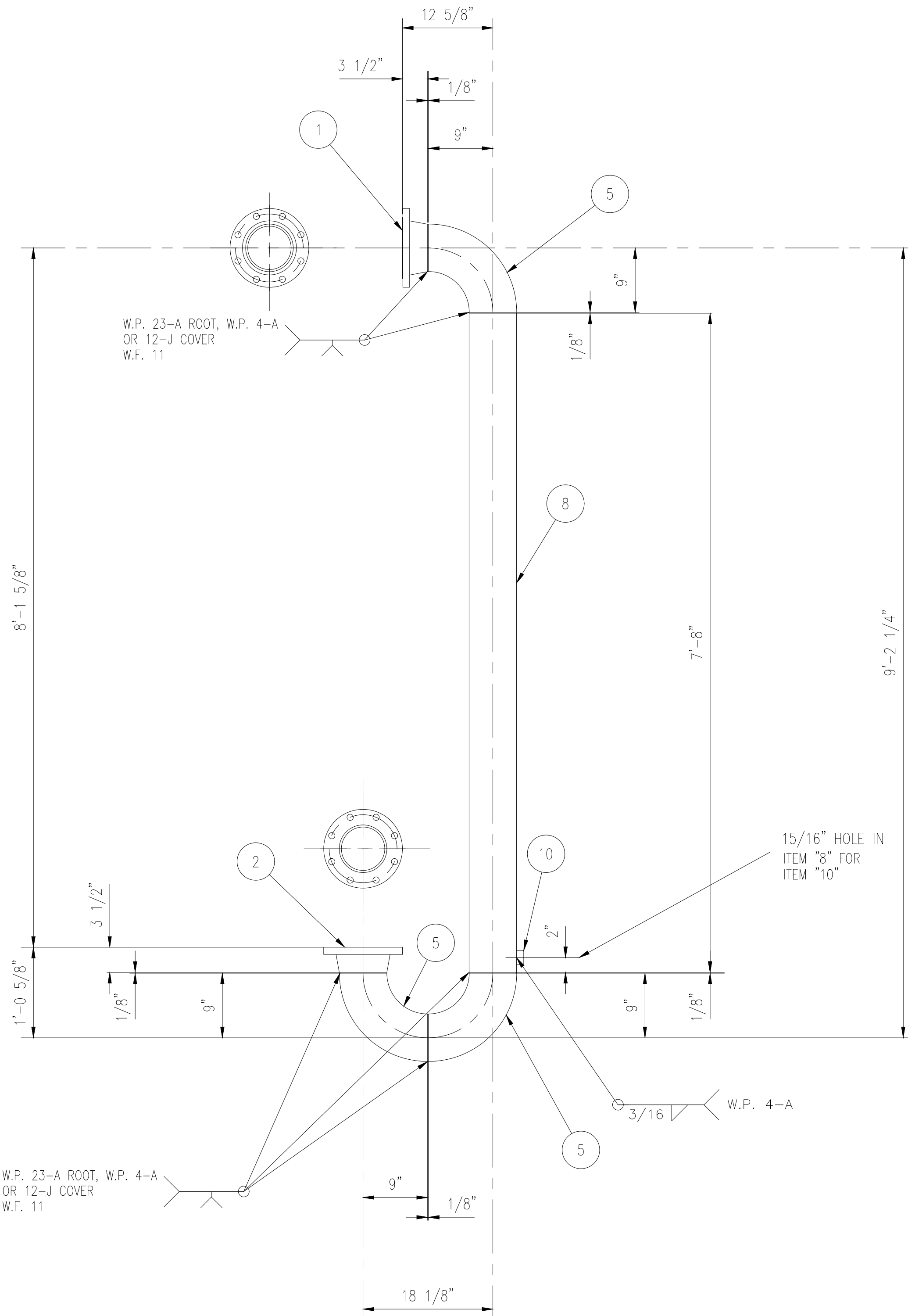


P-10
ONE (1) REQ'D

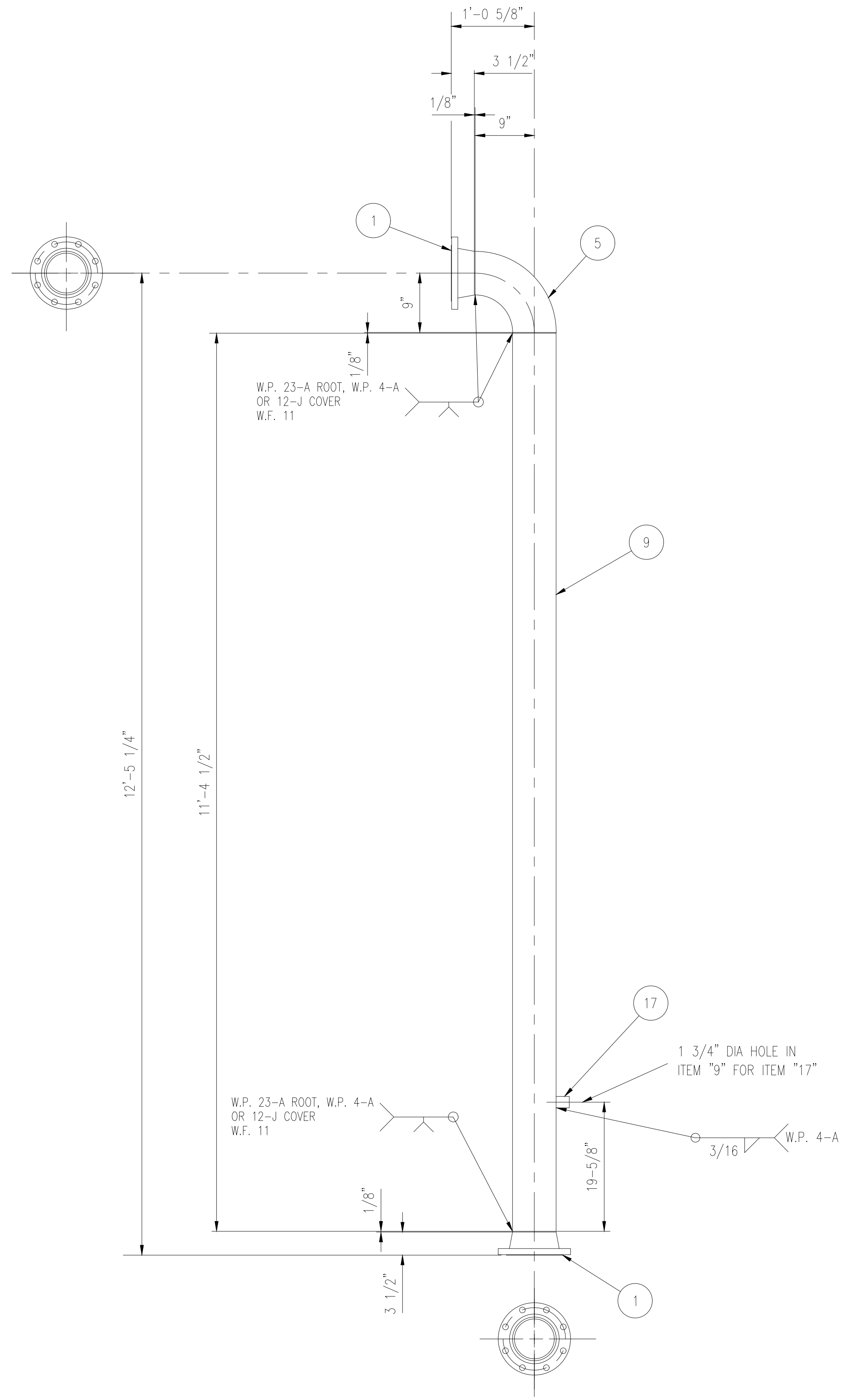
PIPING BOM C19925

NOTES:

1. ALL FLANGE BOLTING TO STRADDLE CENTERLINES.
2. MARK EACH PIPING SUB-ASSEMBLY WITH MARK NO.
3. ALL PIECES OF PIPE TO HAVE A TOLERANCE OF $+0" -1/16"$
4. OVERALL DIMENSIONS ON A SERIES OF PIPING TO BE HELD WITHIN $+0" -1/8"$
5. REFERENCED WELDING PROCEDURES AND FIGURES ARE FOR ECODYNE MRM USE ONLY.
6. WELDING PROCEDURES 12-J AND 4-A MAY BE USED INTERCHANGEABLE.



P-11
ONE (1) REQ'D



P-12
ONE (1) REQ'D

5						This print, including all information thereon, is the property of Ecodyne MRM, Inc. and is loaned in confidence subject to the return upon request and with the understanding that no copies of this print or of the information contained shall be made without the prior written consent of Ecodyne MRM, Inc. All rights to design and invention are reserved.	CUSTOMER PIPING DETAILS					
4							DRAWN BY JRP					ECODYNE MRM, Inc. DRAWING NO. E5907
3							CHK'D GLH					
2							DATE 03-22-00					
1							APP'D					
NO.	E.C.N.	APP.	REVISION	DESCRIPTIONS	BY DATE		SCALE	1" = 1'-0"				

This being the time and place fixed for a public hearing on the matter of the adoption of plans, specifications, form of contract and estimate of cost relative to the Turbine 8 Control Replacement Project for Indianola Municipal Utilities, Indianola, Iowa, the Chair called for any oral objections to the adoption of the plans, specifications, form of contract and estimate the cost. ____ oral objections were offered, and the Trustee Clerk reported that ____ written objections had been filed.

Board Member _____ introduced the following Resolution entitled "RESOLUTION ADOPTING PLANS, SPECIFICATIONS, FORM OF CONTRACT AND ESTIMATE OF COST FOR TURBINE 8 CONTROL REPLACEMENT PROJECT" and moved that it be adopted. Board Member _____ seconded the motion to adopt.

The roll was called, and the vote was:

AYES:

NAYS:

ABSENT:

Whereupon the Chair declared the following resolution duly adopted:

**RESOLUTION ADOPTING PLANS, SPECIFICATIONS, FORM OF CONTRACT AND
ESTIMATE OF COST FOR TURBINE 8 CONTROL REPLACEMENT PROJECT**

WHEREAS, on the 19th day of October 2022, the plans, specifications, form of contract and estimate of cost were filed with the City Clerk for the Indianola Municipal Utilities, for certain public improvements described in general as the Turbine 8 Control Replacement Project for the Indianola Municipal Utilities, Indianola, Iowa; and

WHEREAS, the notice of hearing on plans, specifications, form of contract and estimate of costs of the public improvements was published as required by law.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE INDIANOLA MUNICIPAL UTILITIES:

Section 1. The plans, specifications, form of contract and estimate of cost are approved as the plans, specifications, form of contract and estimate of cost for the public improvements described in the preamble of this Resolution.

PASSED AND APPROVED this 12TH day of December 2022.

Lori Smith, Chairperson

ATTEST:

Jackie Raffety, City Clerk

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities

From:

Date: December 12, 2022

Subject: Public hearing regarding the Turbine 8 Control Replacement Project.

Recommendation: The Chair will open and close the Public Hearing.

Attachments: None

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities

From:

Date: December 12, 2022

Subject: Resolution adopting the plans, specifications, form of contract and estimate of costs for the Turbine 8 Control Replacement Project.

Recommendation: Roll call is in order.

Attachments: None

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities

From:

Date: December 12, 2022

Subject: Resolution making award of construction contract for the Turbine 8 Control Replacement Project.

Recommendation: Roll call is in order.

Attachments:

1. Turbine 8 Contract Award Recommendation 2022-12-07
2. HPI 1 of 2
3. HPI 2 of 2
4. Petrotech bid
5. Resolution Awarding contract Turbine 8 Control Replacement

December 7, 2022

Mr. Mike Metcalf
Indianola Municipal Utilities
210 West 2nd Ave
Indianola, Iowa 50125

Re: Bids for Turbine 8 Controls Replacement

Dear Mike,

Bids were received on December 1st, 2022, for replacing and upgrading the existing Turbine 8 control system. Two bids were received as follows. Both bidders provided the required bid security and acknowledged the two addendums.

Bidder	Base Bid	Bid Alternate 1 (Flame Sensors)	Bid Alternate 2 (NOx Control Algorithm)	Bid Alternate 3 (Stack Testing)
HPI	\$580,506.76	\$0.00	\$0.00	No Bid
Petrotech	\$581,757.00	\$0.00	\$13,140.00	\$18,157.00

My estimate of the probable contract price was \$625,000 for the base bid. The base bids were within 0.2% of each other and were approximately 7% less than my estimate.

Summary

Both bidders are experienced with combustion turbine control work and have experience with the GE Frame 5, and the proposals address the requirements and specifications that were included in the RFP. Both bidders have confirmed that they can complete the project within the contemplated schedule and do not anticipate problems with material deliveries. Both bidders included the impact of sales tax in their bid. I believe that both bidders are qualified and capable of completing the project.

After a thorough review of both bids and discussions with the bidders, and recognizing the very small cost difference between the two bids, I believe the selection decision must weigh the value of the following aspects of the project:

1. Petrotech's proposed system is very similar to the system that they provided for Turbine 7 in 2018.
2. Petrotech provides 24/7 technical support for the life of the control system at no cost.
3. Petrotech's base bid includes their standard NOx control algorithm and supporting documentation. This should be sufficient and their proposal for Bid Alternate 2 is not required.
4. Petrotech's proposal for Bid Alternate 3 is attractive as it eliminates the need for IMU to coordinate the scheduling of stack testing with the end of the commissioning process.

I believe that it is in IMU's best interests to award the contract to Petrotech due to the similarity of the proposed system to the Turbine 7 controls and the availability of 24/7 technical support at no cost for the life of the system.

Existing Control System

The existing control system is a GE Mark V control system that was installed when Turbine 8 was installed in Indianola in 2000. Replacement is needed due to the age and obsolescence of the existing system.

Terms and Conditions

Both HPI and Petrotech requested changes in the contract language. HPI initially requested that the terms and conditions be replaced with their standard terms and conditions but have since only asked that the requirement to carry builder's risk insurance coverage be eliminated.

The changes requested by Petrotech are relatively minor. They initially requested that liquidated damages be capped at 5% of the contract price but have since stated that they will accept the 10% cap that was included in the bid documents. The Petrotech bid referenced Petrotech's standard warranty terms. Petrotech has stated that the limitation of remedy and liability terms included on the same sheet are not applicable to this project.

Bid Alternate 1

Bid Alternate 1 covers replacing the flame sensors. Both HPI and Petrotech included a software algorithm to determine flame status from thermocouple data.

This matches the approach taken with the Turbine 7 control replacement project in 2018. Additionally, Petrotech submitted an alternate proposal to replace the existing flame sensors at a cost of \$42,524 and recommends use of separate flame sensors. Their primary concern with flame detection algorithms based on the temperature of the exhaust gas is that latent heat may prevent the unit from restarting for a period of time after the unit is shutdown. IMU has not experienced this with Turbine 7. Petrotech included sufficient I/O capability to reconnect the existing flame sensors and can reuse them at no additional cost. At this time, I do not recommend accepting Petrotech's proposal to replace the existing flame detectors. The decision on whether to use the existing flame detectors or rely on software can be made during the engineering phase.

Bid Alternate 2

Bid Alternate 2 includes development of a new NOx control algorithm using the existing water injection equipment. HPI included this alternate at no cost. Petrotech included their standard water injection algorithm in their base bid and can provide supporting documentation. Their price for bid alternate 2 includes a detailed review of the existing algorithm, recent operating data from Turbine 8, and test data from past projects. They will provide a detailed report on the differences. Petrotech does not believe that this is necessary and I agree. Per discussions with the DNR, stack testing at the end of the control replacement project will allow IMU to establish a new minimum water/fuel injection ratio for ongoing compliance monitoring so minor differences between the existing algorithm and either vendor's standard algorithm should be acceptable. I recommend using the standard algorithm from HPI or Petrotech.

Bid Alternate 3

Bid Alternate 3 covers stack testing to confirm that the turbine and new control system remain in compliance with the existing DNR permit. HPI did not submit a bid for this work but have since agreed that they can provide commissioning personnel to assist a stack testing contractor hired by IMU as a part of their base bid. They would prefer that IMU schedule the stack testing to start immediately after commissioning has been completed. If that is not possible, HPI can remobilize at no additional cost if necessary. Petrotech provided a bid of \$18,157 to include stack testing in their contract. This includes one day of setup, three one hour tests on one working day, and a Petrotech employee to assist the testing contractor. While the DNR has not provided their requirements in writing, I understand from verbal discussions with them that they will likely require stack testing to provide that the turbine remains in compliance with the existing permit. Incorporating the stack testing into the controls contract means that IMU will not be responsible for scheduling the work.

Similarity to Turbine 7

The specifications require hardware that is very similar to the existing Turbine 7 control system. Petrotech has stated that they intend to use the existing Turbine 7 user interface as the starting point for the Turbine 8 user interface and make modifications as necessary to accommodate the differences between the two turbines.

HPI will provide their standard software and we expect that there will be differences between the two. Awarding the contract to HPI means that IMU personnel will need to be trained on a second turbine control system and any new hires will need to be trained on both systems. Having a second vendor increases complexity for IMU personnel and increases training costs.

Technical Support

HPI included free 24/7 support during the 1 year warranty period. Support after the warranty period requires a service contract or will be billed at the prevailing field service labor rates. Petrotech provides 24/7 telephone support for the life of the installation at no cost. Both bids include a remote support gateway. Petrotech does not charge if this is used to troubleshoot the original installation but does charge for changes in functionality.

Spare Parts

Neither bidder included a quotation for spare parts as a part of their bid. Most of the components in the new control system are readily available through local suppliers, and I do not recommend keeping spares on site. However, there may be some parts identified later that will be recommended for purchase.

References

Petrotech completed a very similar project for IMU in 2017. IMU is satisfied with Petrotech as a contractor and with Petrotech's control system.

I received a positive reference from Brett Kyllonen with the Marquette Board of Light and Power, Marquette, Michigan for Petrotech that mirrors IMU's past experience with Petrotech. Petrotech upgraded the controls on a GE Frame 5 turbine owned by Marquette. They have had not needed to make any modifications to the PLC or wiring and Petrotech has responded quickly to technical support queries. They are currently in the middle of another project with Petrotech.

I have contacted a reference provided by HPI but have not received a response.

Both bidders have extensive experience with control replacements on Frame 5 turbines. Petrotech does have more experience with Frame 5 turbines with control replacements involving water injection (more than 20 projects vs. 1). HPI does have experience with water injection on turbines from other manufacturers. I do not believe that this is a significant difference.

Schedule

The Contract requires substantial completion of the work within 35 calendar days of the start of the construction outage which shall start no earlier than October 1, 2023 and not later than February 15, 2024. If substantial completion is not achieved by May 30th, 2024, liquidated damages will accrue at a rate of \$1200 per day. Liquidated damages are capped at 10 percent of the contract price.

HPI intendeds to work seven 12 hour days per week during the construction outage. Their schedule includes 15 days of installation with a three person crew and 15 days of commissioning with a one person crew. There is overlap between the two periods and, from our telephone conversation, it appears likely that they will work on three weekends.

Petrotech intends to work six 10 hour days per week for 34 calendar days during the construction outage. They intend to provide a 4 person installation crew and a two person commissioning crew. They intend to work on 5 weekends, but only plan to work one day per weekend. Comparing the two planned schedules, Petrotech intends to work five weekend days and HPI six. Based on experience with the Turbine 7 control replacement project in 2018, it is likely that Indianola personnel will need to be present for a short period of time on each of those weekend days. The Petrotech schedule may result in less overtime cost for IMU.

Related Work

The following work related to the control upgrade is not included in the Contract and will be the responsibility of IMU to complete.

1. Install underground conduits between the control building and turbine skid.
2. Develop settings for the new protective relays (P&E plans to provide relay settings)
3. Apply and test the protective relays (using an independent testing contractor)
3. Develop and apply new settings for the Turbine 8 RTU.

December 7, 2022
Mr. Mike Metcalf
Page 6 of 6

4. Revise existing SCADA master station programming to incorporate the new Turbine 8 control system.

Please let me know if you have any questions or would like to discuss any aspects of this project.

Sincerely,

A handwritten signature in blue ink that reads "Jared Kline". The signature is written in a cursive, flowing style.

Jared Kline, P.E.



Proposal Table of Content

For the

TURBINE 8 CONTROL REPLACEMENT PROJECT

For

**INDIANOLA MUNICIPAL UTILITIES
INDIANOLA, IOWA - USA**

HPI Proposal No. P_22_6434



December 1st, 2022

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First Point Assessment Registration No: #10049487



Certificate No. EN 1301

Certificate No. 6783

Certificate No. OH 1352

HPI Energy Services, LLC USA ISO-9001, ISO-14001, ISO-18001 Certificates

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- HPI's Executive Summary
- HPI's Technical Proposal P_22_6434
- HPI's Bid Form (provided by IMU and filled out by HPI).
- HPI Field Service Rates Schedule 2022.
- HPI Terms & Conditions 2022 (Terms and Conditions are expected to be negotiated/agreed between HPI and IMU, before a Purchase Order is placed).
- HPI's Frame 5 Selected Control System Retrofit Projects with Reference Contacts.
- HPI's Controls Experience List.



EXECUTIVE SUMMARY

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4 BENEFITS OF HPI'S TURBINE CONTROL SYSTEM PROPOSED SOLUTION

1. HPI offers the implementation of **Alternative 1** and **Alternative 2** at no extra charge to IMU.
2. The Remote HMI will include all software licenses to enable IMU to access the HMI application, control system, AVR and Generator Relays for monitoring, editing, and troubleshooting, locally and remotely.
3. Allen Bradley Control Platform is used successfully in 1000's of Gas Turbine applications worldwide on a wide range of gas turbine manufacturers including GE, Rolls Royce, Solar Turbines, Pratt & Whitney, Westinghouse.
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Proposal

For the

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For

**INDIANOLA MUNICIPAL UTILITIES
INDIANOLA, IOWA - USA**

HPI Proposal No. P_22_6434

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5 HEALTH, SAFETY & ENVIRONMENT

HPI is fully committed to the health, safety and wellbeing of all people with whom it interacts. Assessment of HSE hazards, risks and mitigations are always at the forefront of the company's activities being given equal priority to other business critical activities. The company successfully achieving OHSAS 18001 accreditation confirms this commitment but perhaps one of the most significant indicators is its industry leading TRIR metrics.

HPI is equally committed to its environmental responsibilities, in recognition of which its demonstrated conformance with its environmental management system has been independently audited to comply with ISO Standard 14001.

6 QUALITY

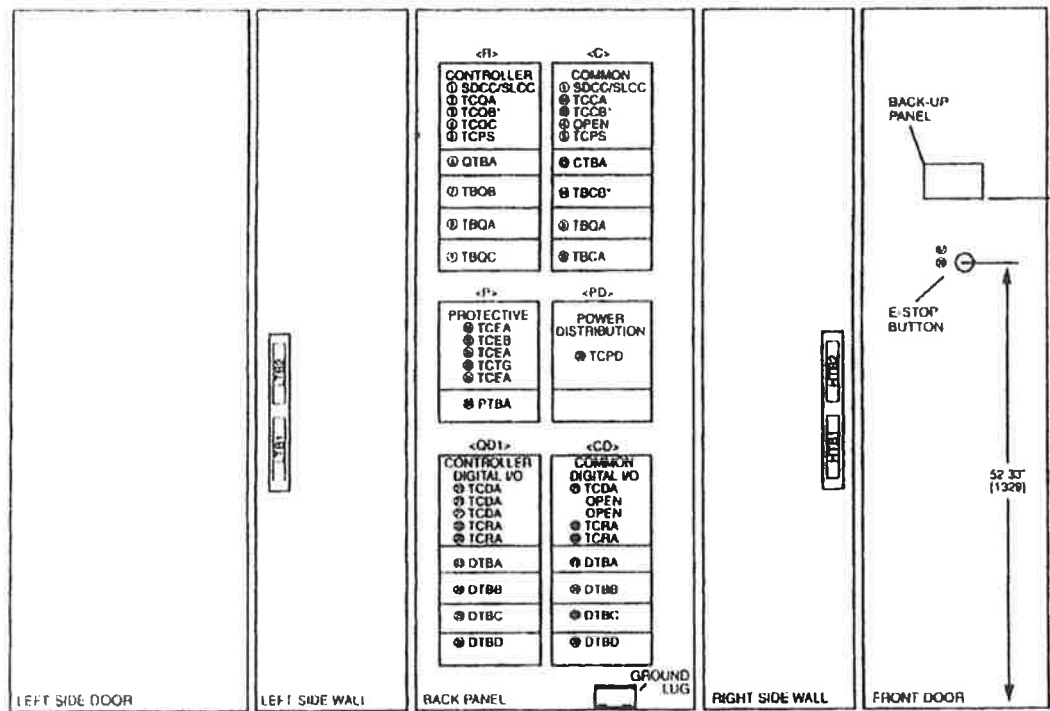
An effective quality management system with demonstrated quality delivery has been pivotal to HPI's success. In addition to the company's ISO 9001 accreditation, it is a registered Achilles FPAL and UVDB Verify supplier. The company has also been audited to other stringent quality requirements such as those of the nuclear industry in Canada.

7 PROPOSED SOLUTION

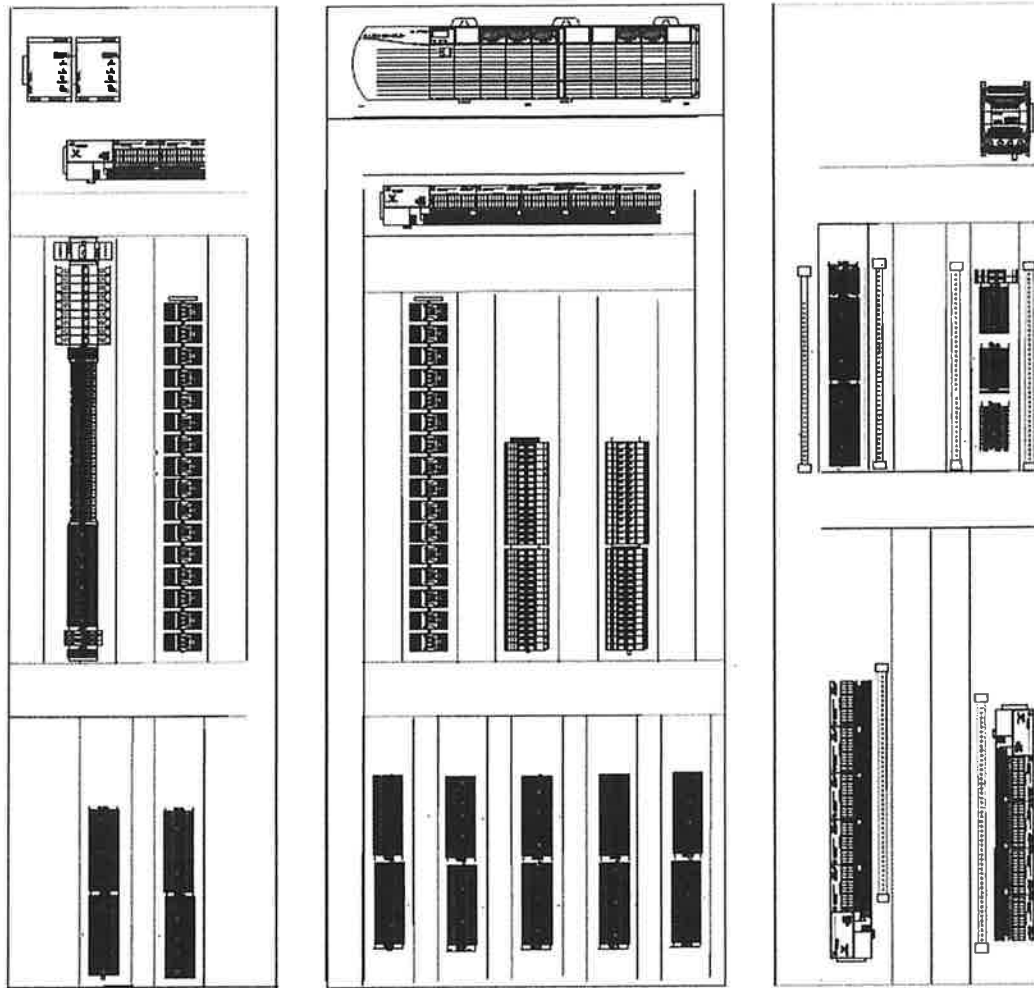
7.1 System Overview

The replacement controller for the Turbine Control System is based upon the Allen Bradley ControlLogix Simplex Controller and I/O modules for the field signals. The existing Excitation will be replaced by the Basler DECS-250 Excitation/AVR, while the Protective Relays will be provided using SEL equipment, as requested in IMU's bid specs. The new Controller will contain the software for the Gas Turbine governor control, Start, Stop and Auxiliary System sequencing.

The new control system will be designed to be installed in existing cabinets (when bid specs ask for it); however the existing control system hardware within it will be completely removed. New sub-panels will be provided for the rear and sides of the existing cabinet to mount the new controls equipment and a new door / door plate will be fitted. Disconnect terminal blocks will be used to interface the field cables with the new control system. The disconnect terminal blocks reduce maintenance time by allowing individual channels to be isolated when replacing equipment or troubleshooting issues. Below is an overview of a typical system layout compared to the existing Mk V layout to show the open layout and architecture of the control system.

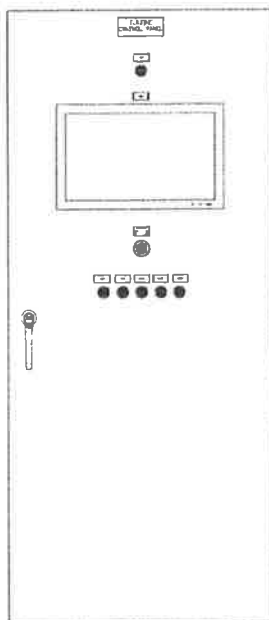


Existing Mk V Controller



Typical Replacement Control System Layout

The control system will be equipped with a local door mounted Panelview HMI display (as requested in IMU's bid specs) through which the gas turbine will be monitored and operated.



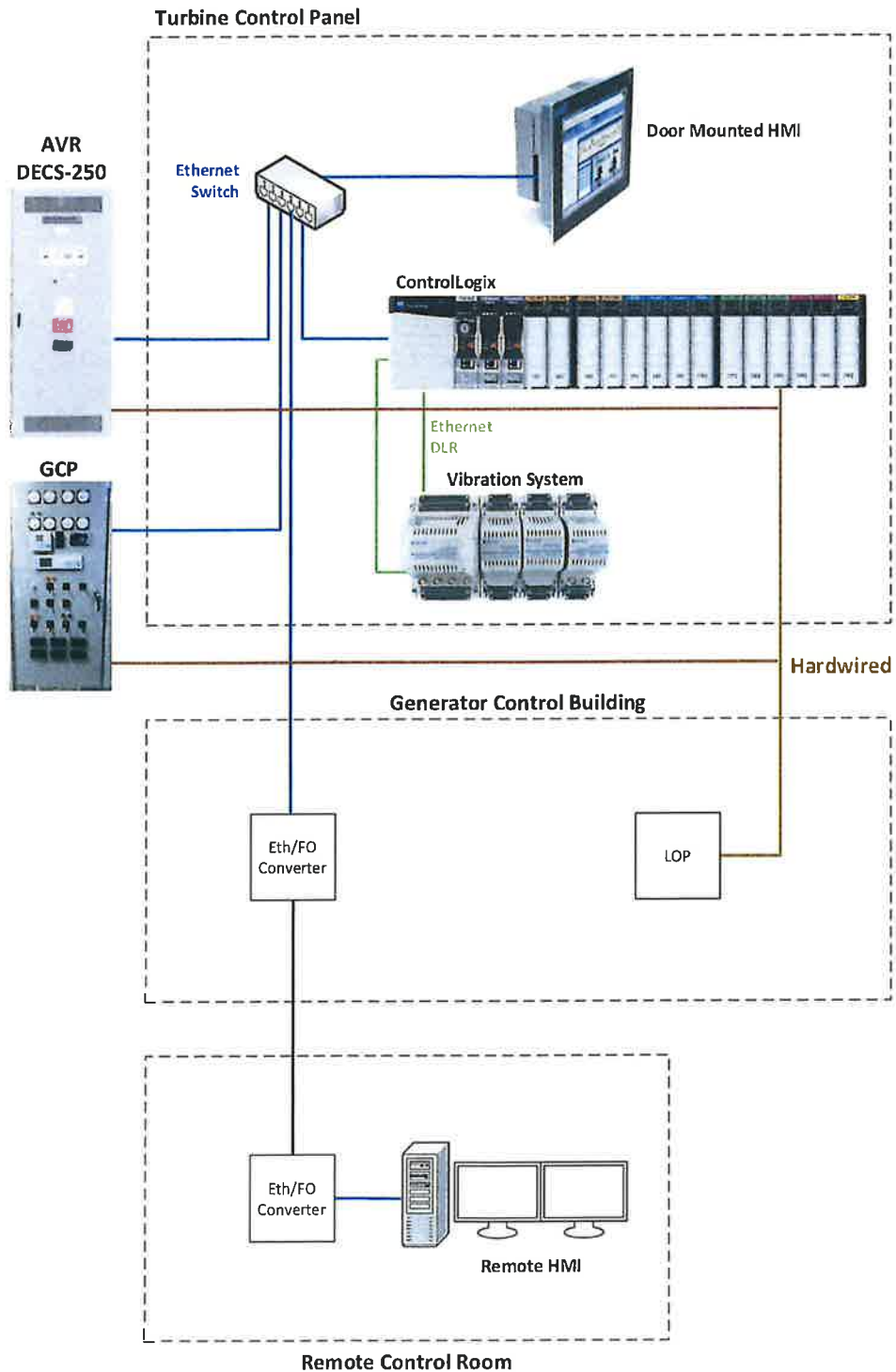
Typical Replacement Door Layout

Additionally, the scope of work for this project will include Automatic Voltage Regulator (AVR); Generator Redundant Protection Relays which will be described separately in the following sections of this proposal.

7.2 System Architecture - Communication Network Overview

The following proposed architecture drawing shows a complete system network design with the new AB PLC system and optional equipment incorporated. Three separate networks/media will be provided with the latest software revision/version available for each case:

- Ethernet: Copper and Fiber for monitoring and supervisory data acquisition.
- Hardwired: direct connection between physical equipment and PLC I/O modules



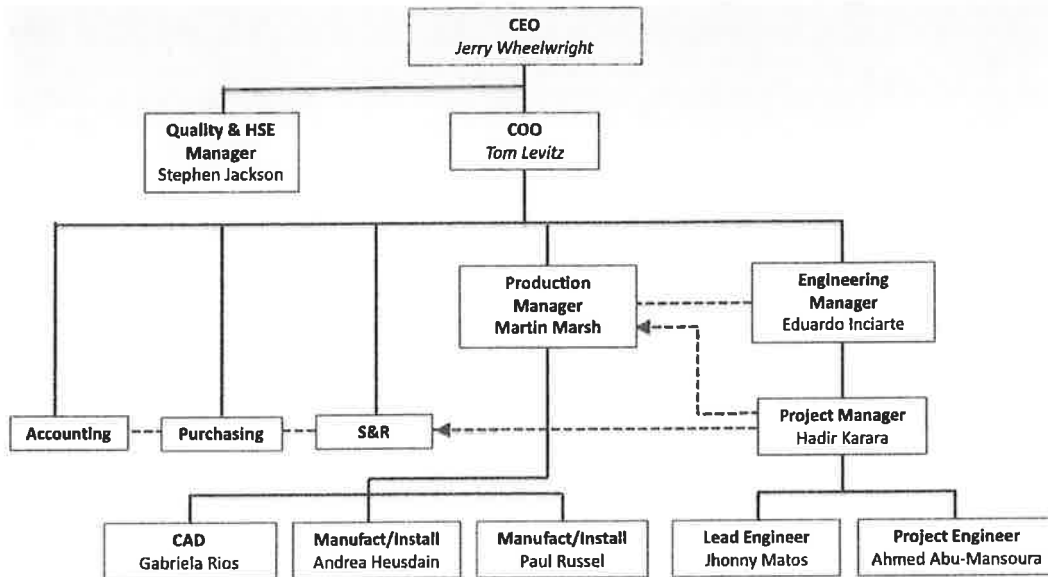
8 BASE SCOPE OVERVIEW

HPI will supply a turnkey controls system upgrade which will include the following main areas.

The following items address the main overview of the base scope of work:-

- Upgrade the existing MarkV control system with a new Allen Bradley ControlLogix based PLC system in a Simplex processor configuration.
- HPI will design, manufacture, program, test and deliver the replacement system for the Turbine Control Panel (TCP), Automatic Voltage Regulator (AVR), and Generator Redundant Protective Relays, as requested in IMU's bid specs.
- The existing control field cables will be re-used, plus any new cabling included as part of the upgrade.
- HPI will supply two Operation Stations: one panel/door mounted Rockwell Panelview HMI system and one stand-alone PC with Dual 24" monitors.
- HPI will supply the HMI application programs for the two Operation Stations.
- The new equipment will be supplied on sub-panels which will be mounted inside the existing control cabinets.
- New Basler designed and manufactured DECS-250 AVR to replace the current automatic voltage regulation/excitation system for the generator, installed in a new NEMA 1 cabinet.
- The existing Motor Control Center (MCC) will be re-used.
- Existing Fuel Control Valves will be re-used.
- New vibration sensors, integrated to the new PLC based control system.
- New Generator Protection Devices, as requested in IMU's bid specs.
- HPI Engineering Services will be provide for:
 - In-House design and implementation of the new system
 - HPI manufactured control panels / sub-panels.
 - Customer witnessed Factor Acceptance Test (FAT)
 - Installation and Commissioning (I&C)
 - Supply all Project Documentation, consisting of:
 - Functional Design Specifications(FDS), including Alarm/Trip Cause Effect Matrix
 - Factory Acceptance Test (FAT)
 - PDF Markups for new delivered/replaced systems, on the existing customer's PDF drawings where the new system interfaces with the old one
 - Installation and Commissioning Manual (I&C)
 - Project Management
 - Quality Assurance

8.1 HPI Project Structure for Frame 5 Retrofit



9 CONTROL PANEL UPGRADE DESIGN AND MANUFACTURE

All design and manufacturing for the new control panels and control systems will be executed at HPI's Houston facility. The control panels / sub-panels upgrades will be custom built in-house to meet project specifications and requirements according to best knowledge of the equipment currently installed. All panel / sub-panels fabrication are built in accordance to UL508 and UL689 quality programs.

The new equipment for the gas turbine will be housed in the existing enclosure, with new back and side panels and a new door cover plate for the control enclosure. Those will be supplied with the following major equipment.

9.1 Allen Bradley ControlLogix

The existing control system and their associated equipment in the existing control panel will be removed. HPI will install a replacement control system with a ControlLogix controller and I/O modules.

ControlLogix brings together the benefits of the Logix platform — common programming environment, common networks, common control engine — to provide the performance required in an easy-to-use environment. The ControlLogix controller features a modular control platform with virtually infinite expansion of controllers, networks and I/O.

There are a number of key advantages to using ControlLogix: -

- Proven platform for propulsion controls
- Allen Bradley offers worldwide technical support and spare parts.
- The advance diagnostics provided by the PLC allows faults to be diagnosed quickly.
- The easy access to the PLC and I/O modules allows easy on-site replacement of parts.
- All configurations are resident within the software; therefore, no in-depth knowledge of ControlLogix is required to carry out repairs.
- Simple inclusion of upgrades and system changes.

All of the control, monitor, protection and sequence functions are built into the PLC controller. The functionality will be based on the existing system, with the addition of the advanced diagnostic and fault monitoring capabilities that are inherent to a latest technology PLC installation.

9.1.1 Vibration Monitoring & Protection

HPI will supply a new Rockwell Dynamix 1444 vibration monitoring system for the Unit. The vibration sensors wired back the control panel and will be connected to the Dynamix 1444 vibration module. The 1444 is connected to the PLC using Ethernet/IP and allows detailed data to be displayed on the HMI. HPI might consider other previously proven alternatives for the vibration monitoring modules (in case of potential long lead delivery time as recently experienced derived from post-COVID supply chain issues), which might represent other brands like Metrix or similar.



9.1.2 Overspeed Detection System

This is the same GE part 329A3529P029 shipped with their new turbines. The friction-free moving elements in CEC's 4-138 Velocity Transducers assure long life and reliability. Designed for industrial applications on fixed turbines, you can use this instrument in turbine hot sections where high temperatures cause problems with other sensors.



The system is simplified due to the low impedance, high level output that can drive AC meters, recorders, and control electronics without using special amplifiers.

The friction-less design also allows measurement of extremely low vibration levels, critical when monitoring precision balanced turbine systems. The low level is limited only by system noise. The 4-138 is a seismic mass type velocity transducer designed for measuring vertical vibrations at low frequencies and high temperatures up to +700°F (+371°C).

The output signal results from relative movement between the internal coil and magnet when the case vibrates. This magnetic damped system operates above its natural frequency. The self-generated sensor output is proportional to velocity.

9.1.3 Overspeed Detection System

To monitor the turbine overspeed protection HPI will use the Jaquet T401 Single Channel Tachometer Speed Switch. The Speed Probes will wire directly to this new module which converts absolute speed into a 4-20mA signal that can be brought directly back to the PLC. HPI will incorporate terminal points in the GT Panels to allow easy access to connect a frequency simulator which will allow Overspeed Testing of the units. T401 Module includes the following features:

- 10-30 DCV Power Supply
- Includes 2 limits (A/B) with programmable hysteresis
- Isolated signal input with automatic trigger level adjustment
- Built-in isolated sensor supply with sensor monitoring
- Open collector output of sensor frequency
- Pluggable terminals
- Configuration and status via included Windows software
- Accuracy class 0.05% for limits & 0.5% for analog signals



9.1.4 Watchdog Relay

The watchdog circuit consists of an independent hardwired timer, which is continually pulsed by the control system. The timer is pulsed every PLC scan and it will time-out after 200 milliseconds. If the timer times-out, the ESD circuit is interrupted, resulting in a turbine shutdown.

9.1.5 Hardwired Independent Shutdown Loop

The emergency shutdown system is used to shutoff fuel flow to the turbine by immediately closing all fuel shutoff valves, de-energizing the 20HD solenoid, and ensuring the lubrication system is activated.

A hardwired, daisy chain (series) of relays is used to supply power to the fuel shutoff valve solenoids. If any relay opens, power to the fuel shutoff valve solenoids will be interrupted. The most critical trip signals are wired to this daisy chain of relays to assure safe operations.

A summary trip signal is used to control one of the ESD relays connected in series. The ladder logic software controls the state of the summary trip signal. The ladder logic summary trip rung consists of a number of critical signals (including controller faults) connected in series. If any fault indication is present in the summary trip software, the summary trip signal will be set to logic zero causing the ESD daisy chain to be broken.

When an emergency shutdown occurs, the selected fuel control valve will be instructed to close at the maximum rate, and the fuel shutoff valves will close immediately.

9.1.6 Power Supply (Brand to be defined later)

Redundant Power supplies providing a clean to 24VDC supply will be mounted within the Panel. The power supplies will be sized such that one power supply is capable of supplying the complete load of the system. The 24VDC supply will be monitored for faults. Any such fault will be alarmed on the HMI. Circuit Breakers shall be fitted to all incoming feeders, and in addition all outputs shall be individually fused.



9.1.7 Ground Fault Relays

Two SEL-2664 will be provided, according to IMU request in bid specs documents. One each for the brushless exciter field winding and one for the generator field winding.



9.1.8 Interposing Relays

Due to the inductive nature and current requirements of some field devices interposing relays are provided as final drivers. These interposing relays will be mounted and pre-wired on the sub-plate in order to provide a complete pre-tested assembly.



9.1.9 Ethernet Switch

An Ethernet switch will be mounted on the sub-panels and will provide a connection point for the HMIs and ControlLogix system:

- Offers a low-cost, compact solution
- Includes ability to automatically negotiate speed and duplex settings
- Operates on 24V DC power
- Includes automatic cable cross-over detection



9.1.10 Door Mounted Panelview HMI

A panel mounted Panelview HMI will be provided, to be installed on the existing turbine control panel. The HMI will use Rockwell's FactoryTalk Programming/Configuration software. Details of the HMI typical mimics are described later in this document.



All software licenses will be registered to IMU.

9.1.11 Desktop HMI

HPI will supply a Desktop HMI Computer with Dual 24" Monitors, at least 2TB SSD, 125 VDC Power Input and fiber optic connectivity, to be installed in the SCADA Room. In addition to serve as an Operation Station, this computer will be installed with the following software to allow maintenance of the control system:

- Rockwell Studio5000
- Rockwell FactoryTalk Development software
- DECS-250 Configuration Software

9.1.12 Data Archive

The System will provide a user-executable function to create an annual archive of historical data. Data from the current calendar year and the prior calendar year will reside on the System. At the end of each calendar year, data from the year prior to the year coming to an end will be archived. A storage medium with sufficient capacity will be provided to store five archive files with full data from 12 months including 240 hours of run time in each file. The system will provide the capability to vary the rate at which data is saved. It shall be possible to save some parameters at a more frequent intervals while the unit is running

9.1.13 Remote Support Capabilities for PLC & HMI

HPI will provide the licenses/hardware required for Remote Support of the PLC and HMI, as required in bid specs document.

HPI's ARMADA is a remote support and monitoring service which can be quoted to IMU, if interested.

9.2 Excitation/Automated Voltage Regulator (AVR)

HPI will provide a Basler DECS-250 Static Exciter to replace the existing GE-EX2000 excitation, in a NEMA 1 enclosure as requested in bid specs documents.

Basler Electric DECS-250 based digital automatic voltage regulator system – with local and remote control provisions - consisting of the devices itemized below, mounted, wired and tested in a NEMA 1 enclosure - for use with a brushless type synchronous generator. Excitation power to be provided from a station power source through an included power stepdown transformer. The DECS-250 power output is rated to 15 Amperes continuous at up to 125 Volts. System is suitable for operation at temperatures to 40°C at altitudes to 1000 meters; 95% humidity, non-condensing.

The equipment consists of:

NEMA 1 enclosure measuring approximately 36"W x 20"D x 90"H, weighing approximately 900 lbs. with the following features:

DECS-250 CN1CN1N digital excitation controller, cabinet door mounted, with the following features:

- Power Bridge-15 Ampere Capacity
- Voltage Regulation 0.25%, true RMS sensing
- Generator voltage softstart
- Generator to bus voltage matching
- Underfrequency limiting
- Under excitation limiting
- Over excitation limiting
 - On-Line and off-line modes
- Five (5) point plotted limiter curve
 - Takeover Style
- Stator Current Limiter
- Field Current Regulator (includes soft-start also)
- Field Voltage Regulator
- Var and Power Factor Regulator
- Var Limiter
- Stator Voltage Limiter
- Metering, real time at local LCD or at personal computer
- Preposition setpoints (maintain or release)
- Setpoint position indication
- IRIG-B time synchronization
- Dual Setting Groups
- Communication
 - RS-485 port (ModBus™) USB Port
 - Modbus™ RTU
 - CANBUS
 - Ethernet (ModBus™ TCP 100 base T)
- Protection
 - Synchronizing Check (25)
 - Generator over/under voltage (27/59)
 - Generator Reverse Power (32R)
 - Generator Reverse Vars (40Q)
 - Generator over/under frequency (81 O/U)
 - Field over current (51F)
 - Field over voltage (59F)

Rotating Diode Fault Detector (ripple detector)
Failure to build voltage
Loss of voltage sensing
Configurable Protection Elements
(eight) via BESTCOMSPlus software
Control
Front panel keypad switches
Provisions for external hardwired contacts and switches
BESTCOMSPlus Software – compatible with MS Windows™
with features including:
Oscillography (COMTRADE compatible)
Sequence of Events Recording
Real-Time Metering Analysis
Trending (up to six parameters)
Integrated Programmable Logic Screens
Self-Tuning for AVR Gain Parameters
Local/remote interface
AC/DC power module
Control Power Isolation Transformer
Dual Operating Power Sources:
AC Power Input from Station Power Stepdown Transformer
(see description below)
DC Power Input from 125 Vdc Station Battery
Dual Operating Power Auctioneering Circuit Rectifiers
ICRM-15 Inrush Current Reduction Module for AC Operating Power
DC Shunt, 100 mv
Independent extended field overcurrent relay
ES-74S - 7NB0A4N0
Remote Interface
Excitation Start/Stop
Automatic/Manual Mode Select
Setpoint Raise/Lower
Contact annunciation
Ring Tongue Lugs where appropriate
PT/CT Test Switches; ABB Type FT-1
Operating Power Circuit Breakers: CB1 and CB2
Operating Power Contactors: K1 and K2
DECS-Operating Power Circuit Breaker: K3
Control Power Circuit Breakers: CB3 and CB4
Power Potential Transformer, BE33456-001 with primary fuses
3 Phase, 6.8 kVA, 480:120 (480 V from station power source)
Safety guards to protect workers from live 480 V circuits.
Cubicle light and convenience outlet
Strip Heater with thermostat
Standard Documentation Package (outline, interconnection dwg. etc.)
Standard Factory Tests with reports
Three (3) Sets Instruction Books with "As-Built" Drawings
One Set DECS-250 BESTCOMSPlus Software –Windows™ Compatible

9.3 Field Instrumentation

As a minimum HPI will provide the following instrumentation, as requested in bid specs document:

- Water Flow Meter Amplifiers (77WN-1A & 77WN-1B)
- New Vibration Sensors (39v-1, 39v-2, 39v-3)
- Diesel Starting Engine Tachometer (65DE)
- CDP Transmitter (96CD)
- Diesel Engine water temperature, oil pressure and accumulated hour gages (New Enclosure on top of turbine gage panel)
- Liquid Fuel Flow Meter with analog output for instant flow and totalizer in the PLC/HMI

9.4 Generator Protection and Communication Devices

A new generator control panel will be supplied that will exceed the existing GCP capabilities and functionality of the existing one.

The existing control cabinet will be reused with all the new components mounted within the panel in new subpanel.

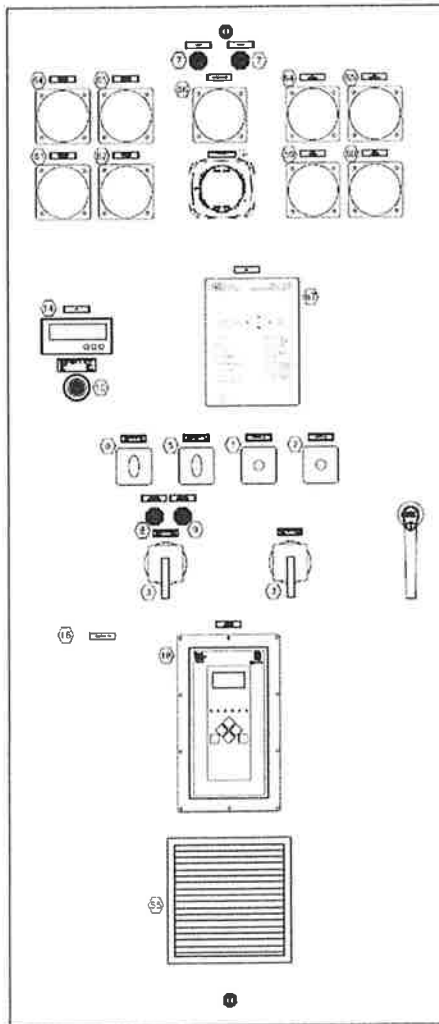
The GCP door will be dismantled and a new cover plate with new equipment will be installed. The Generator Control Panel equipment will be feed by the 125VDC available from the turbine control panel 125VDC distribution circuit.

As a minimum the new GCP door will contain the following devices for monitoring and execution of operator commands, as requested in bid specs document:

- Two SEL-700G1+ (11GP & 11GS)
- Two Electros witch series 24 manual reset LOR with lighted name plates Lockout Relays
- SCADA Gateway SEL-3620
- SCADA I/O SEL-2440 (DPAC)
- SEL-735
- SEL-751 Generator Breaker Failure Relay
- SEL-2243 Power Couple Module (with 2 100BASE-FX MULTIMODE FIBER PORTS)
- SEL-2664 Field Ground Modules (brushless exciter / generator field winding)
- ABB FT-1 Test Switches
- Electrical Gauge for synchroscope and synchronization lights.

- Voltage regulator raise/lower, voltage regulator Man/Auto selector, synchronizer Off/Man/Auto selector, Generator Breaker manual trip and close lever, Generator breaker status lamps, Isoc/Droop, turbine speed raise/lower, deadbus enable.

Note: depending of the available space part of the above equipment can be relocated to the turbine control panel door.



Typical GCP Door

9.5 Fuel System

The existing Liquid and Gas Fuel Control Valve/System will be re-used and integrated to the new PLC based turbine control system.

9.6 Fire Suppression Equipment

According to bid specs document, the existing one will be re-used.

9.7 Water Injection Emissions Control Equipment

According to bid specs document, existing control strategy (demin water injection system for Nox control) will be included in the PLC application program.

9.8 Water Cooling Skid Junction Box

According to bid specs document, HPI will provide and install a replacement Water Cooling Skid Main Junction Box (NEMA 4X, 42" tall, 36" wide, and 8" deep).

9.9 Control Building – Control Cab Fiber Optic

According to bid specs document, HPI will provide and install a multimode fiber cable between the control building and the turbine control panel in the control cab in IMU's supplied conduits. HPI will supply two fiber patch panels, one each in the control building and the turbine control panel in the control cab. Fiber cable will have minimum of 6 spare fibers beyond what is required for the relay, control, and SCADA systems. HPI will terminate fiber cable and provide necessary patch cables and splicing materials.

9.10 Control Building Equipment

According to bid specs document, HPI will provide a new wall or floor mounted control panel and installed in the control building adjacent to the turbine skid including the following equipment and functions. Control cables will be installed in IMU's provided conduits between the skid and the control building to implement all required functions on the control panel, including potential, current, and control circuits. In so far as practical, layout, functionality, and devices used shall follow the existing Turbine 7 control panel.

Devices will include:

- New Breaker Control Switch for Generator Breaker (Electroswitch series 74 with lighted nameplate)
- Turbine Manual Start/Stop
- Turbine Operation Selector: off/crank/fire/panel/rem
- Load Raise/Lower (90GL/90GR)
- Voltage Raise/Lower (90LR/90RR)
- Voltage Regulator Mode: Volt/Droop/React)
- Governor Mode: ISO/DROOP/POWER
- Synchronizing: MAN, OFF/REM, AUTO
- TURBINE EMERGENCY STOP switch
- 2 Bitronics M350 Digital Voltmeters

- Bitronics M350 Digital Ampmeter
- Bitronics Digital 2 1/2 or 3 element MW/MVAR meter
- Sync scope
- Frequency meter
- Synch Indicating Lamps

9.11 Bid Alternative 1: UV Flame Sensors Upgrade

HPI will provide turbine ignition and flame detection algorithm in the PLC utilizing the exhaust thermocouple data and other available monitored data.

9.12 Bid Alternative 2: NOX Control Algorithm

The scope covers the provision of a new NOx control algorithm built in the PLC at no extra cost to IMU utilizing the existing water injection equipment and providing Owner with data required to file the required Iowa Department of Natural Resources permits. Algorithm will be compliant with Iowa DNR and EPA regulations and applicable industry standards.

9.13 Bid Alternative 3: Retain third party testing contractor to perform stack testing in accordance with Section 13310 Part 7

HPI has decided not to bid this alternative.

9.14 GE Frame Unit Fast Start Capabilities

HPI have performed the following fast start/loading functionality on the Frame 7EA at Sacramento Municipal Utility District (SMUD) and the Frame 5's at Silicon Valley Power (SVP) and WEB ARUBA amongst others. All GE Frame engine control systems we provide have this functionality built in, however many of the customers do not utilize it. The most common use of a faster start sequence is for customers to be on-line within 10 minutes.

Figure 1 below is a typical startup curve for GE Frame Gas Turbines. GE allows for a Fast Start option that eliminates the purge sequence due to a purge credit.

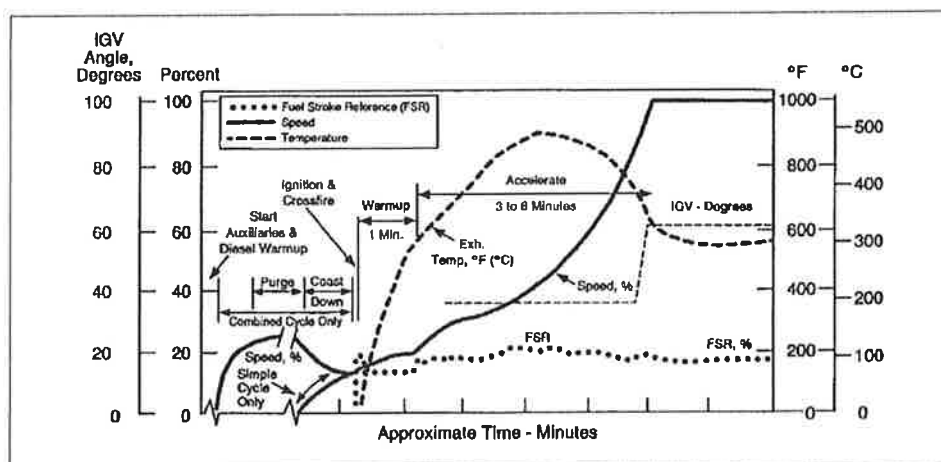


Figure 1 – Typical Startup Characteristics

Table 3
SIMPLE CYCLE PACKAGE POWER PLANT STARTING TIMES

Model Series	Type of Start	Starting Device	Minutes				Total Time to Base Load
			Diesel Warmup Time	+	Turbine Starting Time	=	Time to Full Speed No Load
LM6000	Normal	Hydraulic	NA		7.0		7.0
MS5001P	Normal	Diesel	2		7.17		8.17
	Fast Load	Diesel	1/2		7.17		7.67
	Emergency	Big Diesel	1/2		4.0		4.5
MS6001B	Normal	Diesel	2		10.0		12.0
	Fast Load	Diesel	1/2		6.67		7.17
MS7001EA	Normal	Motor	NA		7.5		7.5
	Fast Load	Motor	NA		7.5		7.5
MS7001FA	Normal	Motor/LCI	NA		9.0		9.0
MS9001E	Normal	Motor	NA		8.17		8.17
	Fast Load	Motor	NA		8.17		8.17
MS9001FA	Normal	Motor/LCI	NA		9.0		9.0

LCI = Load Commutating Inverter (Static Starter)

Figure 2 – Simple Cycle Startup Times

The decrease in startup time is achieved by a combination of reduced warm up times for the Diesel and the gas turbine, more rapid acceleration rates to FSNL, faster loading rates to FSFL, and reduced or eliminated purge rates.

It may be possible to more accurately calculate the actual purge requirements for the existing installation, and reduce the purge time. It should be noted that the exact loading rates will need to be determined by inspection of the generator data.

10 NEW FIELD WIRING

According to bid specs document, HPI will provide and Install a copper cable between the control building and the turbine control panel in the control cab in IMU's supplied conduits. HPI will supply the necessary cables to interconnect the New Local Operator Panel with the Turbine Control System.

Additionally HPI, will provide the new cables for the new provided fuel flow meter in IMU's supplied conduits.

11 SOFTWARE DEVELOPMENT

HPI develops in house software programming that is in an open architecture format which is logical and easy to follow. HPI can develop and program software in multiple logic programming languages such as ladder, script and block diagrams. Upon installation of any software programming both an SDS (software design specification) and Operators Manual is produced to aid the end user in working with the new system. All software is created for a project is extensively tested in-house using the HPI designed and fabricated test simulators. The test simulators increase the speed in which a control panel and corresponding software programs can be tested and are used during the customer witnessed FAT's to simplify simulating the processes of the system.

All software and licenses used for the configuration of the new provided equipment will be handed over to IMU at the end of the project.

11.1 HMI (Human Machine Interface)

HPI can supply a range of different HMI options depending on customer requirements. These can range from panel or remote mounted touchscreen (or mouse/trackball) controls graphics displays providing the operator interface through to the traditional annunciator and hardwired switches.

HPI has designed and developed a high-performance HMI to greatly improve HMI functionality, operations, alarm identification, navigation, and operator focus; which is quickly becoming an industry standard. A high-performance HMI primarily uses grey-scale across all its screen and only uses colors on alarms/shutdowns and highly important information or if otherwise specified by a customer. The layout of each screen is also arranged with the most information displayed on the primary screen and less crucial information available in a pop-up like function. This reduces the clutter and confusion on a HMI and greatly increases the focus of the operator so their immediate attention is only drawn to critical information.

HPI can supply a typical HPI custom designed HMI layout and functionality or can upgrade/replicate existing HMI's to a newer version with the upgraded system incorporated. HPI has extensive experience with HMI applications and are flexible to be able meet the customers' desired requirements.

The following are examples of screens created in Rockwell FactoryTalk View for a GE Frame 5 Turbo-Generator Control System-

11.1.1 Header

The header is viewable from all HMI screens, it is used to detail important information so that it can be read by the operator regardless of what screen they have open.

Operator: Regardless of what screen they have open:											
On Line	Speed	99.0 % 5055 rpm	EGT EGT SP	563.7 °F 300.0 °F	Power Setpoint:	00 MW 00 MW	Volts	140 KV	Droop Mode	Speed Setpoint	Voltage Setpoint
										BASE:	106.8 %
Disabled	GCV	00 %			Reactive Power	00 MVar	50.00 KV	Auto Mode		LOWER	1450 rpm
											UPPER

11.1.2 Footer

The footer is used to detail all current alarms and trips. The footer is set to display the latest 4 alarm or trip events. The footer is also viewable from all HMI screens.



Alarm Name	Alarm Time	Alarm Name	Message
EGT SYSTEM FAULT (PERMIT ALARM)	5/25/2022 3:12:25 PM	EGT SYSTEM FAULT (PERMIT ALARM)	EGT SYSTEM FAULT (PERMIT ALARM)
PERMISSIVE TO START FROM FG SYSTEM WHEN REPTED DETECTED ALARM	5/25/2022 3:12:25 PM	PERMISSIVE TO START FROM FG SYSTEM WHEN REPTED DETECTED ALARM	PERMISSIVE TO START FROM FG SYSTEM WHEN REPTED DETECTED ALARM
PERMISSIVE TO START FROM FG SYSTEM WHEN REPTED DETECTED ALARM	5/25/2022 3:12:25 PM	PERMISSIVE TO START FROM FG SYSTEM WHEN REPTED DETECTED ALARM	PERMISSIVE TO START FROM FG SYSTEM WHEN REPTED DETECTED ALARM
PERMISSIVE TO START FROM FG SYSTEM WHEN REPTED DETECTED ALARM	5/25/2022 3:12:25 PM	PERMISSIVE TO START FROM FG SYSTEM WHEN REPTED DETECTED ALARM	PERMISSIVE TO START FROM FG SYSTEM WHEN REPTED DETECTED ALARM

11.1.3 Menu

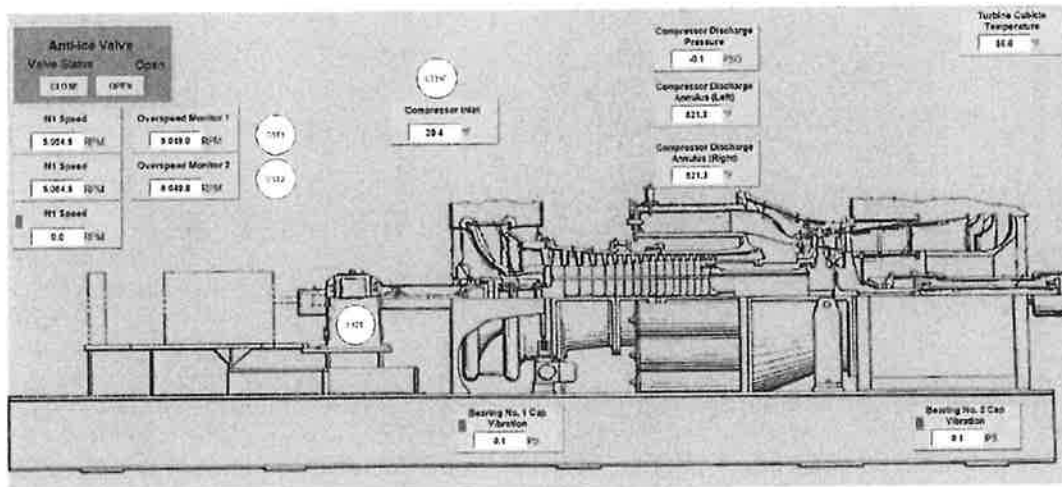
The navigation menu is located on the right hand side of the screen.



11.1.4 Overview

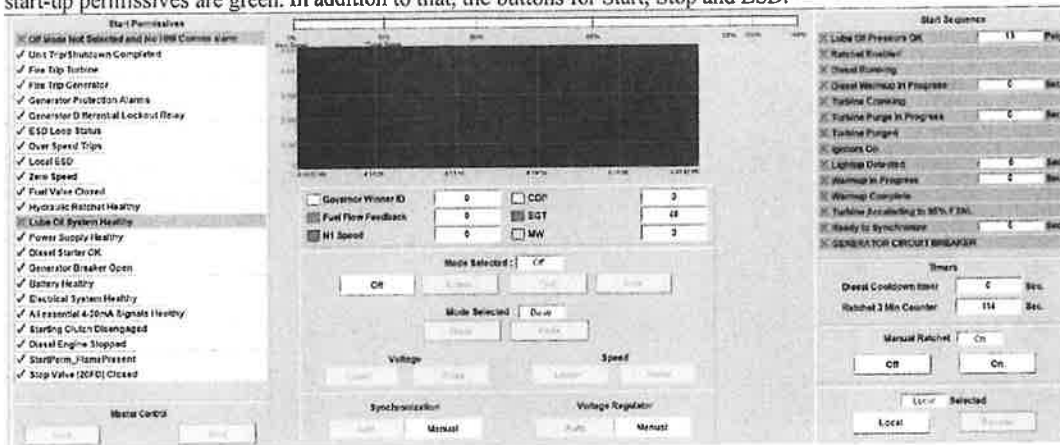
The Overview screen provides the most relevant information of the system operating conditions at a glance. Includes the following information:

- Fired Hours
- Start Counter
- Differential Pressures in Inlet Filter
- GG and PT Speeds
- CDP
- Engine temperatures



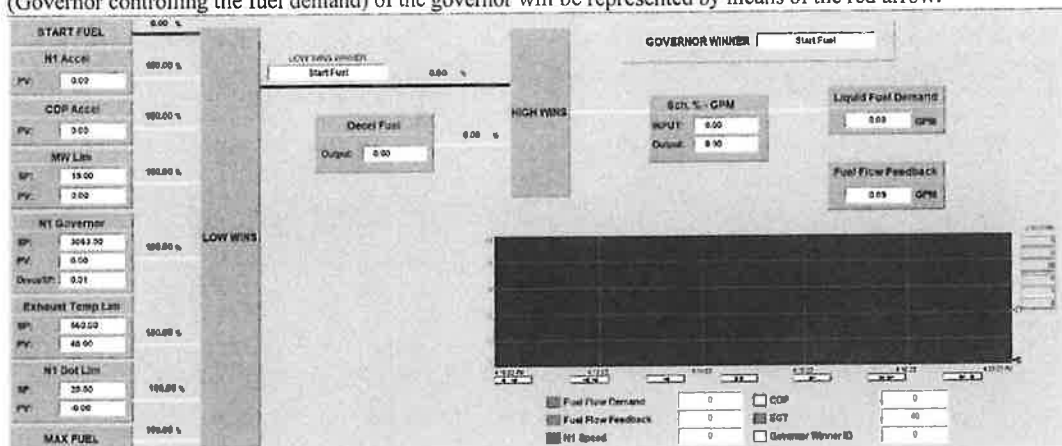
11.1.5 Startup Sequence Screen

The Startup Sequence screen is the operator's main diagnostic tool before and during start up. On the right hand side start permissives are shown indicating if the turbine is ready to start or which parameters still need to be satisfied. During a start the list on the left side will indicate which states of the startup have been completed. The center of the screen holds a trend that will show important starting information such as speed temperature and valve position. Below the Start-up trend the operator can identify the "Ready to Start" indication, which will become green if all the start-up permissives are green. In addition to that, the buttons for Start, Stop and ESD.



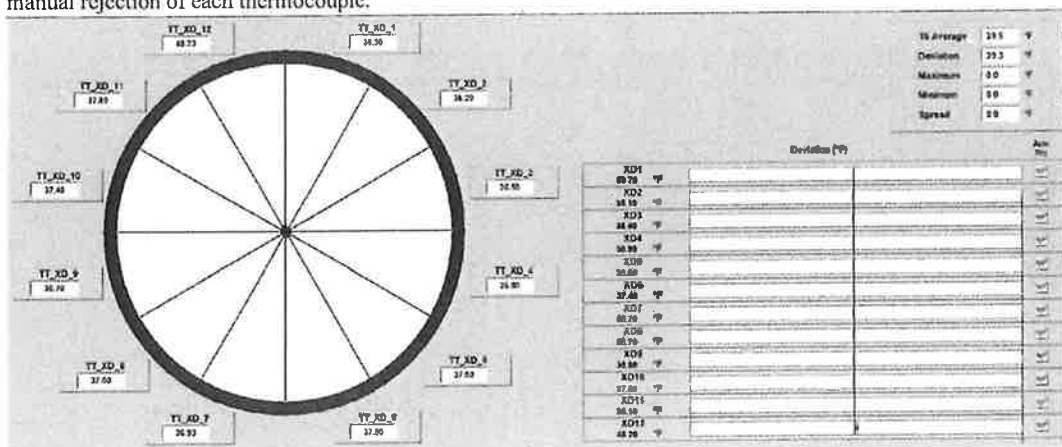
11.1.6 Governor Status Screen

The Governor Status screen shows the logic behind the fuel control. Each governor elements output and parameters required by the element is shown. Also the final fuel demand and the valve position are shown. From the governor page there is a link to the trend page that will bring up trending of governor related information. The winning loop (Governor controlling the fuel demand) of the governor will be represented by means of the red arrow.



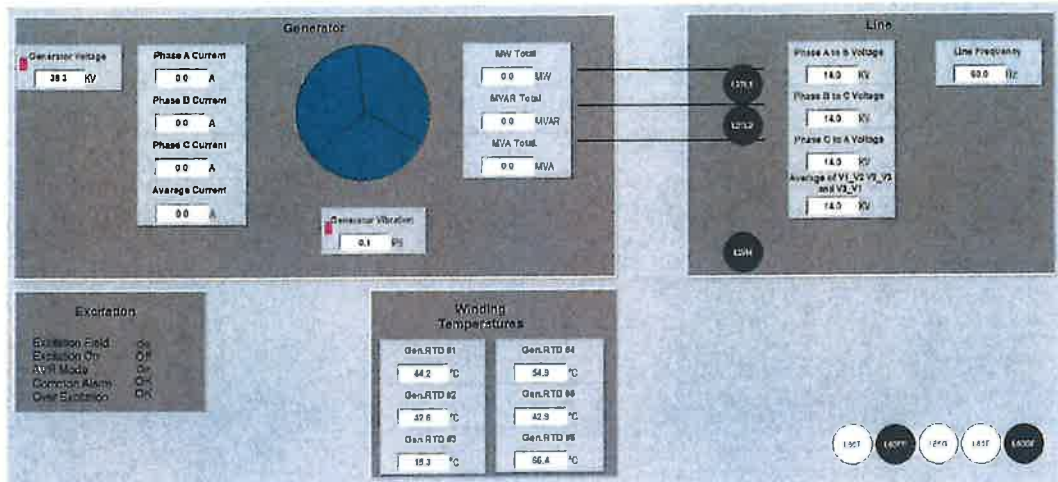
11.1.7 EGT Monitor Screen

The EGT Monitor gives an overview of the EGT temperatures and how they relate to each other. A pie chart will show the temperatures represented as segments; when the temperature is even on all sensors the chart will be circular. On the left side there is a deviation chart which shows how much each reading deviates from the average. If any thermocouples should be rejected it will be indicated on this screen, in addition controls are provided to allow manual rejection of each thermocouple.



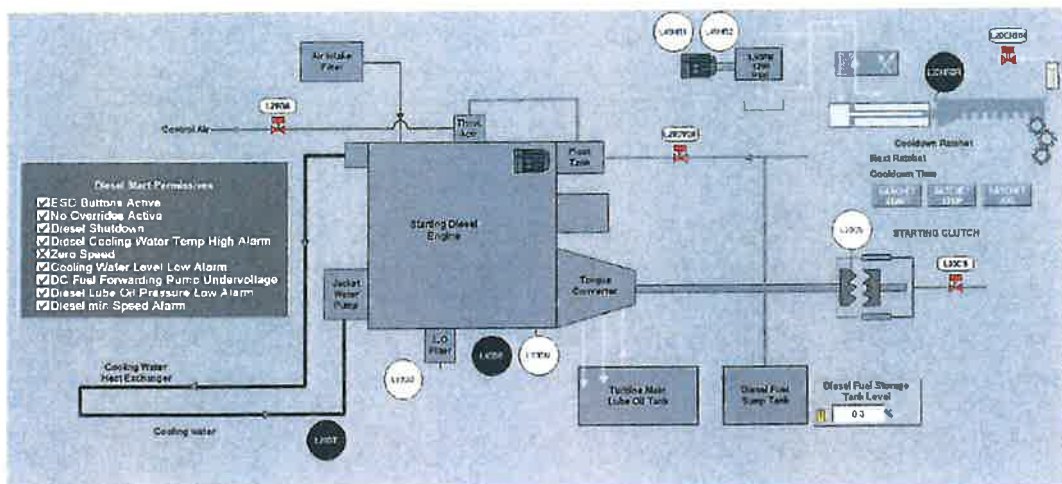
11.1.8 Generator Control and Overview Screens

This screen displays the generator voltage and current values, the bus voltage and frequency values, and excitation status.



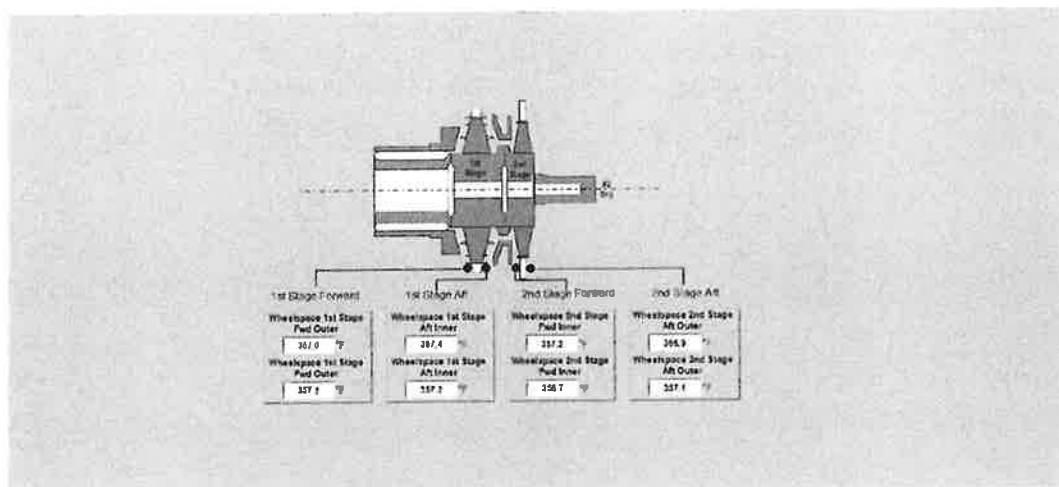
11.1.9 Ratchet and Starter

This screen displays the diesel starting engine and the hydraulic ratchet. All switches, valves and transmitters are animated to show the status of each piece of equipment. The start permissive for starting the diesel engine are also shown and operate in a similar way to the main start permissive.



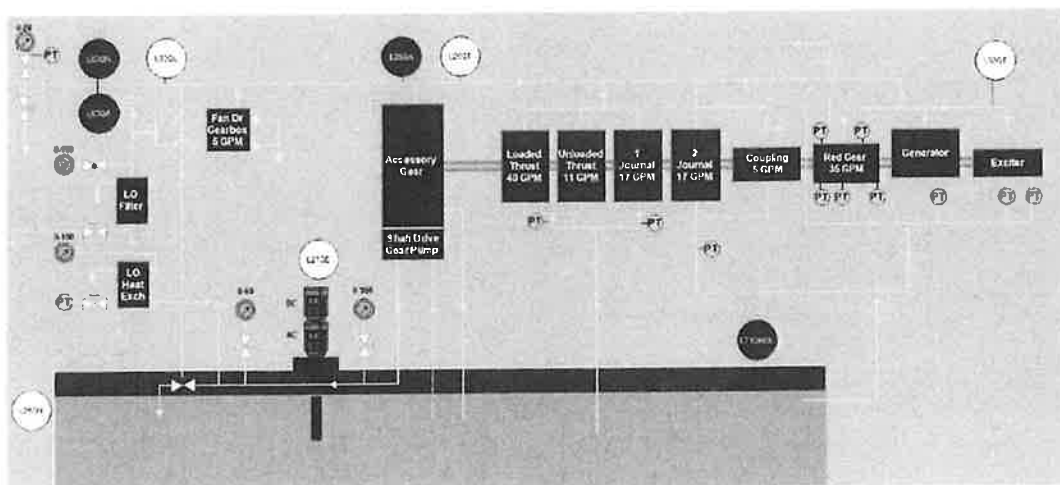
11.1.10 Wheelspace Temperatures

The wheelspace temperatures is used to monitor the temperatures from the Turbine wheelspace.



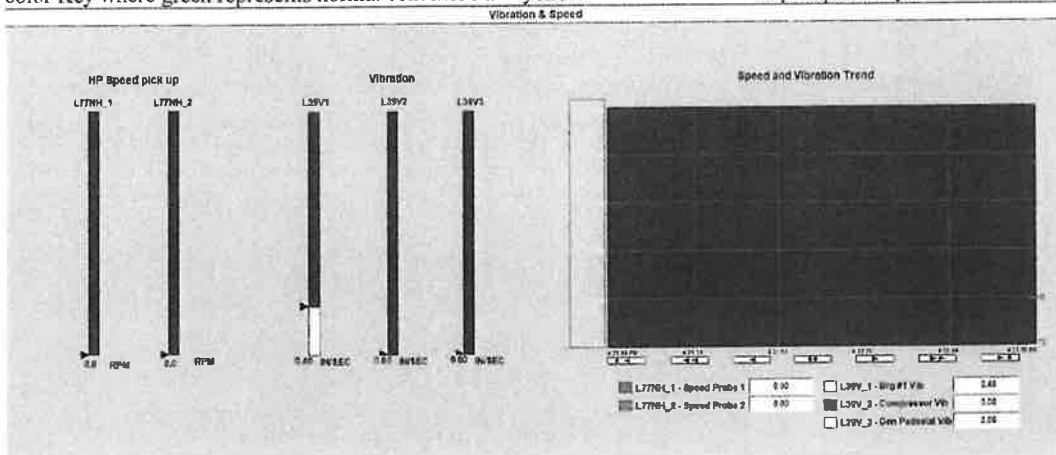
11.1.11 Lube Oil Screens

The Lube Oil System screen will show the pump and valve status, switches and transmitter readings for the lube oil system. The graphic on the screen will represent a simplified version of the unit PID.



11.1.12 Vibration and Speed Screen

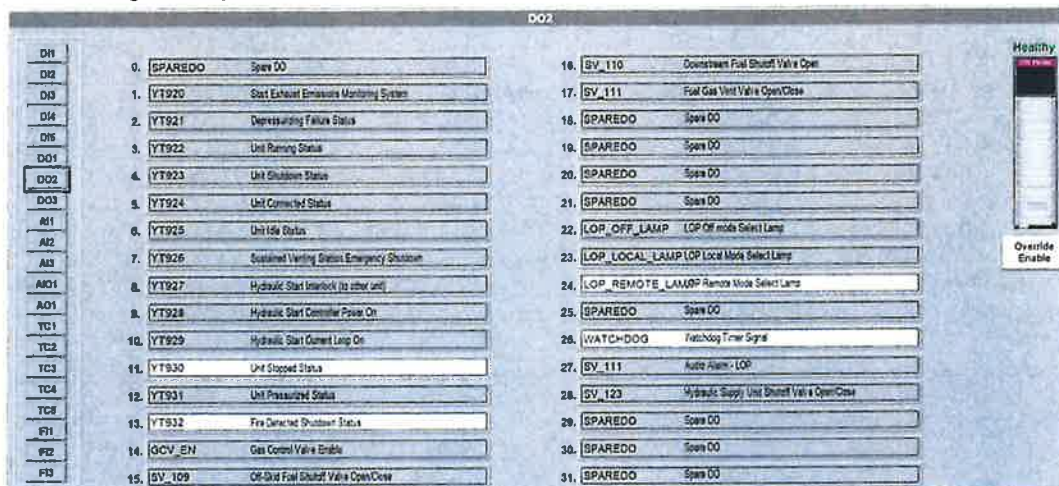
The Vibration and Speed screen gives an overview of the current values of vibration and speed. Also, the page has color Key where green represents normal conditions and yellow and red alarm and trip respectively.



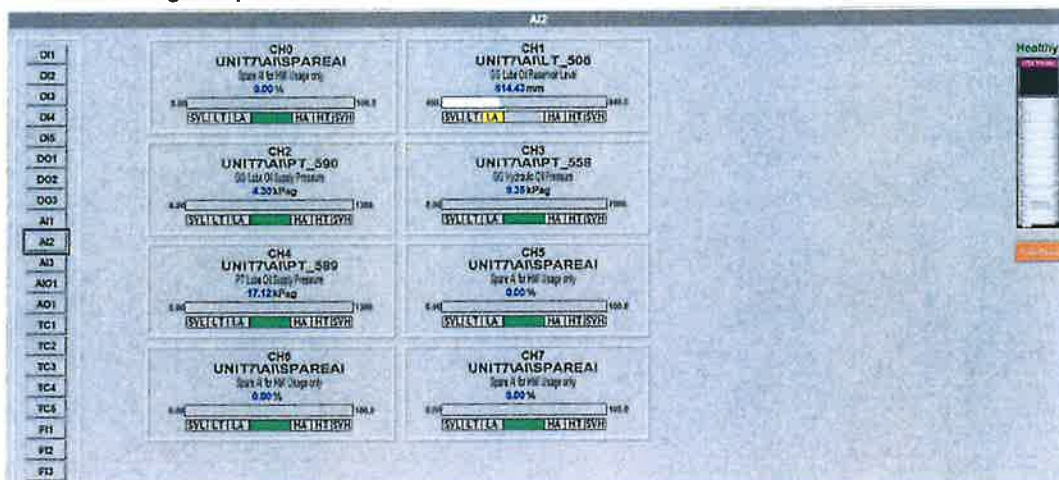
11.1.13 Individual I/O Screens

Here are a selection of I/O screens.

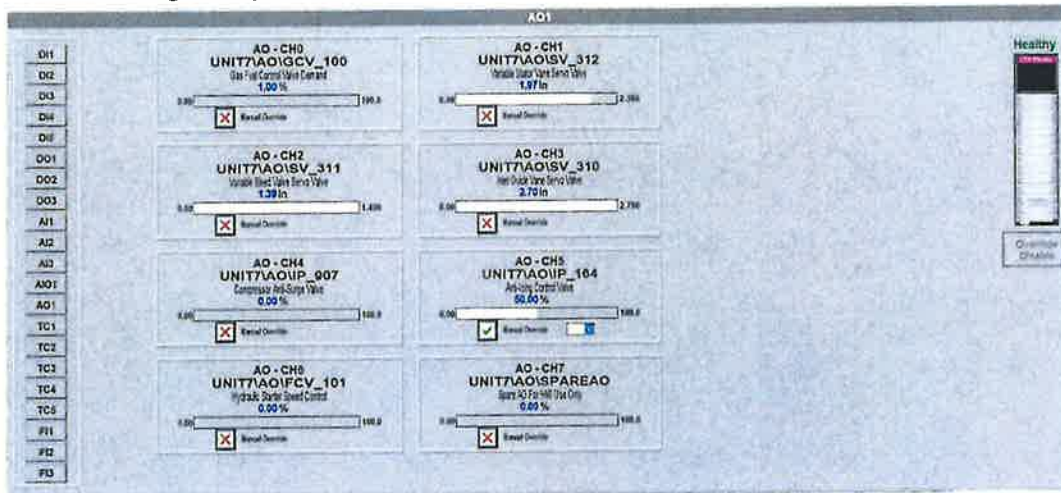
11.1.13.1 Digital Output Screen



11.1.13.2 Analogue Input Screen



11.1.13.3 Analogue Output Screen



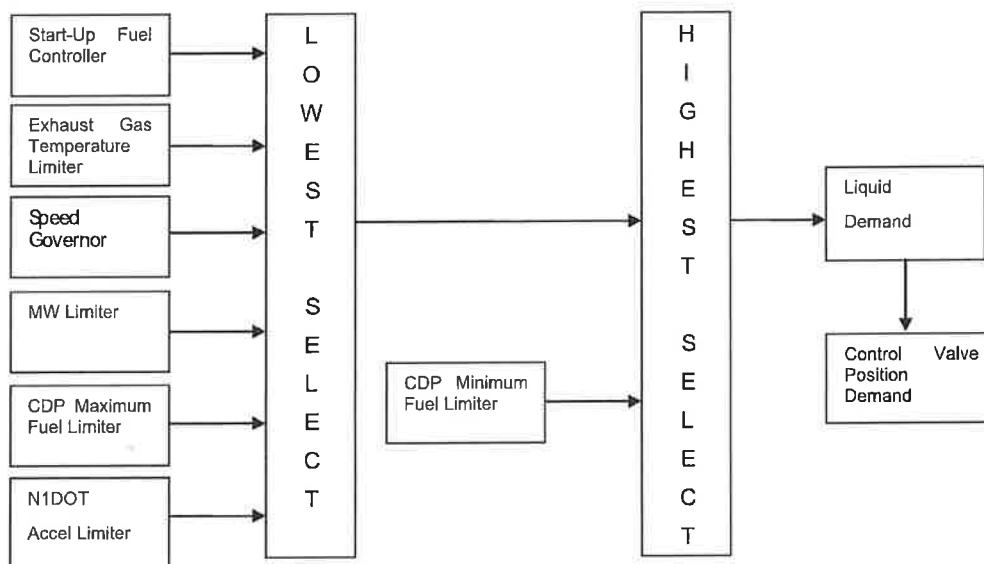
11.2 Engine Governor Definition

11.2.1 Summary of GOVERNOR Control Elements

The PLC controller provides a comprehensive fuel control system, equipped with a large number of relatively non-interactive controllers. HPI will configure the applicable controllers to control the speed and power output for the generator set.

11.2.2 Control Scheme Overview

The diagram below provides an overview of the typical HPI fuel control scheme, subsequent sub-sections provide additional detail. Even though the figure shows a liquid only system the offered control system considers a dual fuel (Gas and Liquid) functionality.



GE Frame 5 Governor Function Block

11.2.3 Fuel Demand Selection

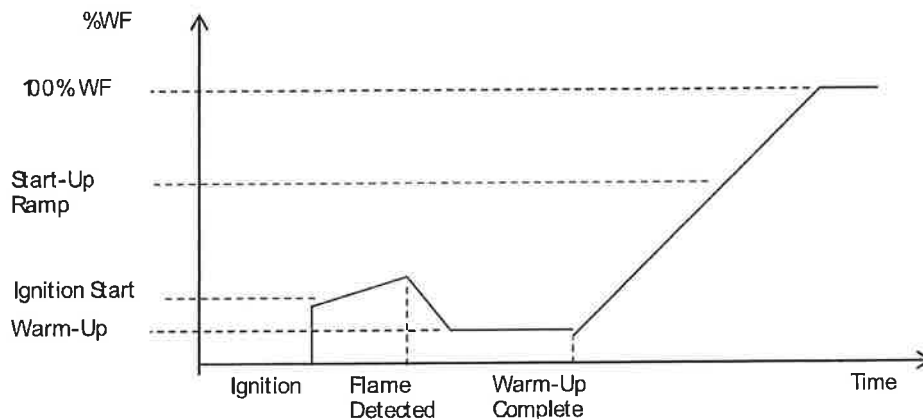
The gas turbine governor software algorithms provide start-up control, temperature limiting, acceleration limiting, speed governing, kW limiting, deceleration limiting and maximum fuel limiting. The output fuel demands generated by each of these governors/limiters are compared to each other. First, the lowest of the fuel demands resulting from this comparison is selected as the winning fuel demand. Then, this fuel demand is compared to the deceleration limiter fuel demand and the highest fuel demand is selected and is sent to the fuel controller.

Proportional and integral gain adjustments are provided in the controller software for each mode (as appropriate) to allow for tuning of the control system to meet site-operating conditions.

11.2.4 Start-Up Control/Acceleration Schedule

The start fuel controller (SFC) is responsible for the open-loop fuel scheduling from start initiation through to speed governing. On initiation of a turbine start-up, the SFC is reset to a minimum light-up fuel demand and then ramped at the light-up rate to a maximum light-up fuel demand. On detection of flame, the SFC is ramped to the warm-up value, at the end of the warm-up period the SFC is ramped at the light-off rate to a maximum light-off fuel demand. When speed governing is achieved, the SFC is reset to an absolute maximum demand, which allows the controller to become a backup maximum fuel limiter.

The shaft speed acceleration schedule provides a maximum fuel limit, scheduled against NHP or P2, protecting against gas generator surge.



11.2.5 Minimum Fuel Limiter

The deceleration schedule provides a minimum fuel limit, scheduled against NHP or CDP, protecting against gas generator flameout.

11.2.6 Maximum Fuel Limiter

The CDP or NHP maximum fuel limiter is a schedule of maximum fuel against compressor discharge pressure or Turbine speed. It's primary use is to prevent over fueling during unit start up and acceleration.

11.2.7. N1DOT Accel Limiter

The N1DOT accel limiter provides a shaft mechanical protection in the form of rate rotation limiting. The acceleration rate setpoint is formed from a user configured schedule of rate of acceleration (RPM/sec) versus speed breakpoints.

11.2.8 Temperature Limiting

In order to prevent turbine overheating and to prolong the life of the turbine, the controller continuously monitors the average turbine EGT. The maximum allowed exhaust temperature is limited by the governor. Two exhaust temperature versus CDP schedules are provided based on base or peak operation selection.

11.2.9 Speed Governing

Speed control is established when the unit reaches the minimum speed governing setpoint during start-up. Once speed governing has been achieved the unit is accelerated under speed governor control, until the Full Speed No Load (FSNL) speed is established. Prior to circuit breaker closure, the manual RAISE and LOWER inputs from the operator or automatic RAISE and LOWER inputs from the auto-synchronizer can be used to control the speed setpoint within the operating range of 95% – 104% rated speed.

Whenever the generator breaker is open, closed-loop speed control is provided in isochronous mode. When the generator breaker is closed, either isochronous or droop mode is selected, depending on parallel operation input. Closed-loop load control with bumpless transfer from one mode to the other is provided. After circuit breaker closure, the manual RAISE and LOWER inputs from the operator can be used to control the megawatt power output of the generator or alternatively a MW setpoint can be entered on the HMI.

With the breaker closed, on changeover from droop to isochronous mode, the speed setpoint is reset to the achieved gas turbine speed and the droop offset is reset to zero. With the breaker closed, on changeover from isochronous to droop mode, the speed setpoint is reset to the demanded setpoint plus the droop demand in order to provide a bumpless transfer.

11.2.10 Fuel Valve Operation

The fuel demand is first calculated by the following:

- Start Fuel Controller/Acceleration Limiter
- Speed Governor
- kW Limiter
- Exhaust Temperature Limiter
- Maximum Fuel Limiter
- Lube Oil Temperature Limiter

These controller fuel demands are compared on a lowest win basis, and then high selected with the deceleration fuel limiter to provide a final control fuel demand.

The control fuel demand is converted to a fuel metering valve position via a valve calibration schedule. The resultant valve position demand is limited by the upper and lower limits to form the final valve position demand.

The demanded fuel flow is compared with the fuel valve position feedback to determine the difference between the required and actual positions. This difference is used for closed loop control purposes and error detection.

On detection of a shutdown condition, the fuel demand output is instantly reset to zero, forcing the fuel-metering valve to zero.

11.2.11 Normal Shutdown Sequence

Following a normal shutdown request, the speed setpoint is ramped down at a pre-defined ramp rate. If the unit was on-line when the stop procedure was initiated, the unit will automatically unload until the generator power output is less than a pre-defined minimum set point. When the circuit

breaker opens, turbine cool down begins and the controller speed setpoint is reset to the synchronous speed value. Following turbine cool down, the speed setpoint is reset to a low value and begins a controlled deceleration. Once turbine speed is below a pre-set value, all fuel is cut-off. This fired (soft) shutdown maintains flame to a lower speed, and thereby results in a significant reduction in the strain on the hot gas path parts at the time of fuel shutoff.

11.2.12 Unit Emergency Shutdown Operation

In the event of an emergency shutdown (e.g. ESD pushbutton, or trip condition detected), the governor will immediately close the fuel control valve and the sequence logic will command all shut-off valves to close.

11.2.13 Blade/Path / Wheelspace Temperature Monitoring

The PLC monitors all blade/Path / wheelspace thermocouples. All thermocouple signals, suitably validated and compensated, will be available to HMI for display. Thermocouple channel fault status is also available for display.

PLC provides the following functions:

- Individual thermocouple values monitored.
- Grouping of thermocouples based on physical location.
- The average of each group is calculated and displayed.
- Indication and automatic rejection of faulty thermocouples.
- High group alarm function.
- High group shutdown function

11.2.14 EGT Temperature Monitoring

The PLC monitors all individual EGT thermocouples. All thermocouple signals, suitably validated and compensated, will be available to HMI for display on the EGT spread monitor mimic. Thermocouple channel fault status is also available for display.

The PLC provides the following functions:

- Individual thermocouple values monitored.
- The average of the healthy EGT thermocouples.
- The maximum difference of healthy thermocouples from the overall average.
- The Identity of the thermocouple with the maximum difference from the average.
- Indication of faulty thermocouples.
- High average alarm function, with adjustable limit (these limits will be CDP biased).
- High average shutdown function, with adjustable limit (these limits will be CDP biased).
- High spread (difference between the highest and the lowest value) alarm function, with adjustable limit and Gas Turbine speed enable setting.
- High spread shutdown function, with adjustable limit.

- Thermocouple deviation from the average - alarm function, with adjustable limit and time delay. (The thermocouple must exceed the alarm limit for a period greater than the time delay before an alarm is generated).
- Automatic Thermocouple Rejection if a thermocouple deviates from the average by more than a set limit or if the device is determined to be faulty. If a second thermocouple is rejected, the turbine is shutdown.
- Manual Thermocouple Rejection of a noisy thermocouple to allow the operator to stabilize control of the turbine until the faulty instrument can be replaced.

12 FACTORY ACCEPTANCE TEST

The new control systems will be hardware tested at a HPI facility following completion of the manufacturing process. The new control panels and sub-panels will be connected to a simulator and Factory Acceptance Testing will be carried out to prove the correct operation of the entire system and software. Following the successful completion of this testing, the customer will be invited to attend a minimum 3 day witness test of the operation of the system.

The FAT will be carried out against a preapproved test procedure.

Unless otherwise specified the customer will be responsible for all costs associated with their engineer's attendance of the witness test. Following completion of the test the equipment will be delivered to site in preparation for installation.

Due to the constricted delivery schedule of this project and the longer than normal delivery time from some of our vendors the FAT will be carry out to the equipment or material that arrive on time for such test.

14 INSTALLATION & COMMISSIONING

HPI will provide an experienced Installation Engineering Team to perform the installation of the new control system. Once installed, the HPI Installation Engineering Team will perform all necessary tests to ensure that the system has been installed correctly. HPI will then provide an experienced Commissioning Engineer to perform the re-commissioning of the system.

All installation and commissioning activities will be carried out against an approved procedure. The Installation and Commissioning Manual supplied by HPI will detail the procedures involved in a much greater detail.

The on-site labour included for this scope is as follows:

1 Commissioning Engineer for a period of 15 continue days

2 Installation technicians for a period of 15 continue days

1 Installation Supervisor for a period of 15 continue days

Any additional site labor due to issues beyond HPI's control will be the responsibility of the customer and will be subject to charges in accordance with our Field Service Rate Schedule.

In order to comply with the installation and IMU schedule it is required that our personnel work 12hrs/day x 7 days a week.

14.1 Typical Demolition and Installation Procedures

The following list briefly explains the steps involved during the demolition and installation stages of a project. A more detailed procedure will supplied by HPI in the Installation and Commissioning Manual.

1. Receive site safety orientation from the customer for HPI employees arriving on site
2. Before commencing the demolition of the existing system, Lock Out Tag Out shall be accomplished and signed off by the customer in accordance to an Electrical and Mechanical Isolation Procedure.
3. Isolate all power supplies and confirm using the Lock Out Tag Out procedure. Confirm there is no power present in the panels prior to the commencement of work
4. The existing panels shall be inspected for any inhibits or overrides that have been installed previously. All inhibits and overrides shall be recorded in the punch list.
5. Commence with demolition of all the existing panels. All removed parts that will not be reused will be handed over to the customer for disposal.
6. Placing all cables in a position as to not get damaged, mark, measure and drill the holes for installation of the new HPI supplied panels.
7. Once panels are installed terminate all internal cables between HPI supplied sub-panels.
8. Terminate all existing field wiring to the HPI supplied sub-panels. HPI panel drawings will be highlighted on completed termination of each individual wire.

9. Reattach all panel doors with new equipment installed such as HMI's and hand switches.
10. Measure and run all communications cables between existing panels.
11. Perform Cold Loop checks. With no electrical power on the system check all control loops and highlight all panel drawings upon each loops completed test.
12. Release project over to commissioning engineers and handover all marked up drawings.

14.2 Commissioning

Once the installation and cold-loop testing is completed the project will be handed over to the lead commissioning engineer and an experienced commissioning team. The size of the commissioning team will be dependent on the size and schedule of each individual project. The commissioning process will consist of performing hot-loop tests on the entire system, testing each individual system and then running a full system test of the units. The Installation and Commissioning Manual supplied by HPI will detail the procedures involved in a much greater detail. The customer will witness all aspects of the commissioning process and sign off once each part is completed to satisfaction.

14.3 Installation Equipment Required

HPI will supply all necessary installation tooling and materials for running cables, installing instrumentation, tubing and termination of signals to the panels and junction boxes. The installation equipment required as a minimum, shall be as follows:

- All necessary hand tools, cutters, cable cutters, power tools, and measurement instruments etc. which will be required to complete the installation.
- Facilities and equipment for the uncrating and transportation within the plant site of the HPI supplied equipment

14.4 Customers Responsibilities

The customer will be responsible for the preparation of any necessary site work permits. The permits must be available for signoff when HPI arrives on site. The customer will be required to brief the HPI personnel on site specific safety regulations to ensure a safe working environment at all times. The customer will also ensure that the work area is unobstructed and access to the control panel will not be impeded by other activities or by other craftsman on site.

The HPI Installation Engineer will brief the site supervisor at the end of each day on the intended tasks and permit requirements for the following day and any possible customer manpower requirements. He will also submit a Service Report sheet on a weekly basis for approval signature by the onsite Supervisor.

14.5 Customer Supplied Manpower Required

HPI recommends that the customer allocates one supervisor on a full time basis to provide liaison between the HPI Engineer and onsite maintenance or operations departments, and also to sign-off on work completed. Any additional manpower required for specific tasks, such as disposal of redundant equipment, will be made known on an as required basis at the end of work briefing with the supplied supervisor.

14.6 Safety Orientation

All parties involved must be aware of general "industry-standard" safety procedure and the customer specific safety procedures. Prior to starting any work all parties involved will discuss and decide on all safety responsibilities for site work. This document does not include any procedures including specific safety procedure. It is recognized that the tests and inspections recommended in these specifications are potentially hazardous. Individuals performing these tests shall be qualified and capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved.

If more specific safety training is required then the customer will be responsible for providing a safety orientation for all HPI employees working on site.

14.7 HPI Standard Working Hours

The onsite working hours will be agreed upon with the customer prior to work commencement but the standard working day for the HPI Personnel is usually 7 days a week, not typically exceeding 11 hours including one hour for lunch.

Public Holidays will NOT be observed by the HPI Personnel. The HPI Engineer will be expecting to work on any statutory holidays and it will be necessary for the customer to:

- Make arrangements for access to site, and that the necessary personnel are available for work on that day.
- Inform the HPI Project Manager if the unit is unavailable, and make arrangements for standby time charges (if necessary).

15 TRAINING

15.1 For Operators Engineers

A course will be held during the commissioning and testing phase; this will cover but not be limited to the following:

- Overview of retrofitted control system.
- Detailed review of all functional differences to the old system.

Review of all alarms and trips including required actions and reset procedures. The course will include "hands-on" training at the control panel. Training manuals for all course participants will be provided; they will detail all course material and references.

15.2 For Control Technicians

A class and site equipment based course for control technicians will cover, but not be limited to the following:

- Overview of retrofitted control system.
- Detailed review of the PLC system, Hard-Wired Trip, Fuel controller and all plant interfaces.
- Turbine Governor theory and operation.
- Review of control schematics, Elementary wiring diagrams, mechanical systems and process connections.
- Programming and component calibration.
- Routine maintenance requirements.
- Troubleshooting including use of all diagnostic features.
- Review of maintenance and spare parts manual.

15.3 Duration

The duration of training courses is related to the number of personnel being trained, the estimated duration of each course is expected to be:

- Control Technicians Course – up to 2 Days.
- Operators Engineers Course – up to 1 Day.

Documentation

Typically HPI will provide the following documentation. It is assumed that the customer will make the existing site documentation available to HPI at the start of a project-

- Project Schedule
- Functional Design Specification
- Bill Of Material
- GCP Schematics
- AVR Schematics
- TCP Arrangement Drawings
- Communications Architecture
- FAT Procedure
- Commissioning & Installation Procedure
- Operations and Maintenance Manuals
- Spare Parts List
- Training Manual Documentation

16 DETAILED PLC SCOPE OF SUPPLY

For the purpose of this proposal, the following match of the MRKV I/O fit has been assumed. The assumption has been based upon HPI's knowledge of typical Frame 5 application, site survey and IMU's provided Technical documentation of the current system. Following any site inspection, if required HPI would modify the requirements to fit the specific site requirements

Signal Type	Quantity
Digital Inputs	96
Digital Outputs	64
Thermocouples RTD's	24
4-20mA Inputs	8
4-20mA Outputs	8
Frequency Inputs	6

16.1 Turbine Control Panel - PLC

Qty	Manufacturer	Part Number	Description
1	Allen-Bradley	1756-L81E	Controller,ControlLogix,3 MB User Memory,USB Port,1GB Ethernet port,100 EtherNet/IP Devices,4 Character Alpha/Numeric Display
3	Allen-Bradley	1756-CFM	Flowmeter Module,ControlLogix,2 Flowmeter Inputs,2 Current Sourcing DC Outputs,4 5.5 VDC, 10 31.2 VDC,Configurable,Totalizer mode for metering applications, Integral AGA 7 compensation
1	Allen-Bradley	1756-IF8I	Analog Input Module, 8 Isolated Points, Current, Current Sourcing and Voltage, 36 Pin
1	Allen-Bradley	1756-OF8I	Analog Output Module, 8 Isolated Points, Current and Voltage, 36 Pin
3	Allen-Bradley	1756-IRT8I	RTD / Ohms / Thermocouple / mV Input Module, 8 Individually Configurable Isolated Points, 36 Pin
3	Allen-Bradley	1756-IB32	Input Module,ControlLogix,DC Digital,32 Point,10 31VDC, Current Sinking,Input and Communication Status and Module Health Display

2	Allen-Bradley	1756-OB32	Output Module,ControlLogix,DC Digital,32 Point,10 31VDC,0.35 A Sourcing Outputs
1	Prosoft	MVI56E-MNET	Modbus Enhanced Network Interface Module for ControlLogix
1	Allen-Bradley	1756-EN2TR	EtherNet dual port 10 100M Interface Module (supports 128 TCP/IP connections, up to 8 axis), Ring and Linear topologies, ControlLogix XT
1	Allen-Bradley	1756-A17	Allen-Bradley Chassis, 17 Slot
1	Allen-Bradley	2711P-T12W22D9P-BSHK	Graphic Terminal, PanelView Plus 7 Performance, 12 in. wide, Color,Touchscreen, Without Keypad, Dual DLR Ethernet Port, Without SerialPort, 18-30 V DC, Without Branding, Stainless Steel Hygienic,Conformally Coated
1	Allen-Bradley	1444-DYN04-01RA	Dynamic Measurement Module,4 Dynamic Inputs,2 TTL Speed Inputs,1 Relay, 2-Port EtherNet/IP (DLR), Synchronous or Asynchronous Dynamic Measurements, Position Measurements.Use with 1444-TB-A Base and DYN RPC set.
1	Allen-Bradley	1444-TBA-RPC-SCW-01	Plug Connector set,Removable, Screw clamp, Includes top and bottom side connectors
1	Allen-Bradley	1444-DYN-RPC-SCW-01	Plug Connector set,Removable, Screw clamp, Includes top and bottom side connectors
1	Allen-Bradley	1444-TSC-RPC-SCW-01	Plug Connector set,Removable, Screw clamp, Includes top and bottom side connectors
1	Allen-Bradley	1444-TB-A	Terminal Base A,18 32V DC max 5A SELV/Class 2 Power Supply, 25 to +70 degC,Use with 1444 DYN04 01RA Measurement Module,Requires 1444 TBA RPC connector set.

17 COMMERCIAL INFORMATION

17.1 Terms and Conditions

This proposal is based on a potential mutually agreed Terms and Conditions, as clarified by IMU on Addendum 2 will be discussed with Successful Bidder.

17.2 Notes

This proposal covers the scope of work and supply detailed above. Any additional equipment or labor will be subject to charges in accordance with our Field Service Rate Schedule.

Pricing considers a control system delivery at IMU's plant at Indianola, IA - USA

Any delays at site due to issues beyond HPI's control will be the responsibility of the customer and may be subject to charges in accordance with our Field Service Rate Schedule.

Once the agreement is made, IMU will not be held responsible for quoted price change based on Texas based non Union labor.

Due to the longer than normal delivery times and sudden shortages of some materials and equipment HPI Energy Services reserves the right to change the brand and model of some its offering. However, any changes to brand or model shall be approved by IMU.

Sales price is in US dollars.

17.3 Delivery

Estimated delivery time is thirty (30) weeks after contract acceptance, which will allow the commence of installation not earlier than October 1 2023 and not later than February 15 2024 as requested in the RFQ. Any potential delay derived from supply change issues will be notified immediately to IMU.

17.4 Warranty

HPI warrants all work for a period of eighteen months from delivery or twelve months from the completion of commissioning, whichever occurs soonest.

17.5 Origin of Goods and Services

All parts are procured from sources within the United States. All engineering personnel are located in HPI's Houston facility.

17.6 Validity

This proposal is valid for sixty (60) days from issued.

17.7 Progress Payment Schedule

HPI propose the following progress payment schedule, these project milestone are negotiable after contract acceptance.

Milestone	%	Payment Terms
1. Contract Award	30%	30 Days
2. Release for Purchase of Material	20%	30 Days
3. After equipment received by IMU	20%	30 Days
4. Completion of Commissioning	25%	30 Days
5. Delivery of As-Built Documentation	5%	30 Days

18 STANDARD HPI SUPPORT

From experience accumulated by the HPI engineering team over the last 40 years, HPI is fully aware of the vital support functions associated with the supply of modern 'state-of-the-art' equipment. The purchase of a system is the first stage of a relationship that will continue for the life of the equipment. It is the policy of HPI to ensure that the highest level and quality of support are planned and provided.

18.1 Support Organization

HPI provides product support throughout the life of its equipment and projects. The HPI customer support team comprises only skilled personnel having many years of experience in the field of gas turbine technology. The following services are available from the HPI support team at any time:

18.2 Supervision of Installation and Commissioning

HPI offers Supervision for the installation and commissioning of its control systems.

18.3 Specialized Training

HPI can provide detailed instruction for both operators and maintainers in the use of the system. HPI will customize its training programs to fit the specific needs of its customer.

18.4 After-Sales Service

HPI offers support to installed equipment including modifications and upgrades.

18.5 Long-Term Maintenance Support

It is the policy of HPI to ensure that long-term support for spares and repairs to hardware and software maintenance is available throughout the life of the system.

18.6 Telephone / E-mail Support

HPI provides a telephone / e-mail support service to discuss and assist with problems that may occur during normal working hours. If it is not possible to solve the problem this way, HPI offers a Call-Out Service for the benefit of our customers. Please refer to the HPI Field Rate Schedule located elsewhere in this proposal.

19 CONTACT PERSON

For any technical/commercial comments or questions about this proposal, the following personnel will be available:

Eduardo Inciarte



281-728-5463 (cell)

713-457-7507 (office)

713-457-7501 (fax)

e-mail: einciarte@hpienergy.com

web: www.hpienergy.com

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The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to:

Indianola Municipal Utilities
110 North 1st Street
Indianola, Iowa, 50125

The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

- A. Required Bid security;
- B. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
- C. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
- D. A completed Iowa Department of Labor Bidder Status Form (309-6001) regarding the Contractor's resident status within the State of Iowa.
- E. Bidder shall provide an Executive Summary with the bid that concisely summarizes, in two double-spaced pages or less, the qualifications of the Bidder and the functionality, key benefits, and capability to be provided by the Bidder. Include a history of the Bidder's organization and the number of years of involvement with turbine controls. Provide a list of recent projects involving control work or mechanical upgrades or modifications on GE Frame 5 turbines, including references. Pricing shall NOT be included in the Executive Summary.

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 Lump Sum Bids

A. Bidder (HPI ENERGY SERVICES, LLC) will complete the Work in accordance with the Contract Documents for the following lump sum (stipulated) price(s),

1. Lump Sum Price (Base Bid and Alternates)

Lump Sum Bid Price for Base Bid	\$ <u>580,506.76</u>
Alternate 1- Replace and upgrade flame sensors in accordance with Section 13310 Part 7 [Add]	\$ <u>NO CHARGE</u> <u>See Proposal</u>
Alternate 2- Provide NOx control algorithm in accordance with Section 13310 Part 7 [Add]	\$ <u>NO CHARGE</u> <u>See Proposal</u>
Alternate 3- Retain third party testing contractor to perform stack testing in accordance with Section 13310 Part 7 [Add]	\$ <u>NO Bid</u>

ARTICLE 4—TIME OF COMPLETION

- 4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 4.02 The Contract includes Liquidated Damages in accordance with Part 1, Paragraph 1.2A of Section 13300.

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 Bid Acceptance Period

A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 Instructions to Bidders

A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 Receipt of Addenda

A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date
ADDENDUM 1	<u>NOV 17 2022</u>
ADDENDUM 2	<u>NOV 22/2022</u>

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site, if any, that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the---- Bidding Documents.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 Bidder's Certifications

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
 - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
 - d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.



BIDDER hereby submits this Bid as set forth above:

Bidder:

HPI ENERGY SERVICES, LLC

By: Thomas Levitz (typed or printed name of organization)
(Individual's signature)
Name: THOMAS LEVITZ (typed or printed)
Title: COO (typed or printed)
Date: DEC 01/2022 (typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest: _____ (Individual's signature)
Name: _____ (typed or printed)
Title: _____ (typed or printed)
Date: _____ (typed or printed)

Address for giving notices:

14430 Medical complex Dr. Suite 100
Tomball TX, 77377

Bidder's Contact:

Name: EDUARDO INCIARTE (typed or printed)
Title: ENGINEERING MANAGER (typed or printed)
Phone: (281) 728 5463
Email: einciarle@hpienergy.com
Address: 14430 Medical Complex Dr., Suite 100
TOMBALL, TX - 77377

Bidder's Contractor License No.: (if applicable)

WILL BE PROVIDED IF HPI IS SELECTED AS THE SUCCESSFUL BIDDER, ACCORDING TO BID SPECS



Field Service Rate Schedule 2022

HPI Energy Services, LLC owns the copyright to this document, which is supplied upon the express condition that it is to be treated as strictly confidential. Without the written permission of *HPI Energy Services, LLC*, no part of this document may be reproduced or communicated to any third party, nor may any information contained in this document be used for any purpose other than that for which it is supplied.

Issue 2

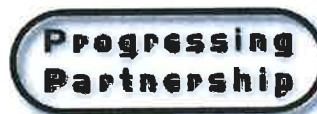


September 2022

RESTRICTIONS ON USE AND DISCLOSURE OF HPI ENERGY SERVICES PROPOSAL INFORMATION

This proposal and the correspondence and communications concerning this proposal (collectively the "proposal") developed by HPI Energy Services (HPI) and provided to this customer are the property of HPI. The proposal and the information contained therein is furnished with the understanding that it will not, without the prior written consent of HPI, be used for any purposes other than in connection with the evaluation of HPI's proposal and the selection of suppliers for the project and in no event shall the proposal or any information contained therein be disclosed to any third party without the prior written consent of HPI. The proposal contains information that is confidential and proprietary to HPI including without limitation information relating to price, payment terms, warranty, and

The owner/customer agrees to return the proposal and all copies or extracts thereof upon termination of HPI's participation in the project, or upon written request from HPI.



First Point Assessment Registration No: #10049487



Certificate No. EN 1301

Certificate No. 6783

Certificate No. OH 1352

HPI Energy Services, LLC ISO-9001, ISO-14001, ISO-18001 Certificates

FIELD SERVICE RATE SCHEDULE

EFFECTIVE 01-01-2022

Field Services consist of:

- **System Installation**
- **System Testing, Calibration & Commissioning**
- **Fault Finding/Troubleshooting**
- **Specialist Services**
- **Repairs & Training**

HOURLY BILL RATES (In US Dollars)

CLASSIFICATION	Rates
DLE Mapping Specialist Engineer - DLE System Test & Commissioning	\$290.00/Hr
Project Manager	\$275.00/Hr
Consultant Engineer	\$270.00/Hr
Controls Engineer – Systems Trouble Shooting & Commissioning	\$220.00/Hr
Controls Installation Supervisor – Supervision of System Installation	\$179.00/Hr
Controls Service Technician – System Test & Calibration of Instrumentation	\$179.00/Hr
Quality Control Technician	\$150.00/Hr
CAD Designer	\$118.00/Hr
Controls Installation Technician	\$80.00/Hr
Mechanical Field Service Engineer – Technical Lead & Commissioning	\$175.00/Hr
Mechanical Field Service Technician -	\$135.00/Hr
International (Non USA)	Add 15%
Offshore/Hazardous Area	Add 25%

Hours are charged as follows: -

- All hours worked in excess of 8 hours during the weekday will be charged as overtime (1.5 times the straight time rate).
- Standard time is based on applicable local time between 7:00 a.m. and 5:00 p.m. as determined by customer schedule, and between Monday through Friday.
- The first 8 hours worked on Saturday will be overtime and each additional hour and all-day Sunday shall be at double time (2.0 times the straight time rate).
- All hours worked on statutory American holidays shall be at the double time rate.
- A minimum billing charge of 4 hours shall be applied for work less than 4 hours.
- On projects where "Prevailing Wage" is required, Prevailing Wage Overtime Rules will apply.
- All rates are subject to annual adjustment.
- Note: When any part of a day is worked offshore or in a hazardous area, the 25% premium applies to that whole day.

ENGINEERING DESIGN SERVICES



In-house engineering design services can be provided on request. This service will be charged at 75% of the field site rates above.

TRAVEL

Travel time shall be charged at straight time rates up to 8 hours in one day, if exceeded then overtime charges apply. Daily travel to the job site shall be charged at straight time rates.

Staff deployment is normally from Houston, Texas, USA. Occasionally, deployment is from the U.K.

EXPENSES

All expenses i.e. airfare, lodging, rental car, etc. shall be charged at cost plus a 15% handling fee. A Per Diem of \$75.00 per day will be charged.

All material cost and sub-contractor fees will be charged at cost plus a 20%.

Specialized test equipment shall be billed additionally. Prices shall be quoted on request.

PREPARATION TIME / FIELD SERVICE REPORTS

In-House Engineering Support time spent prior to departure shall be billed at the Standby Rate. This time will be used as necessary to research the site application in order to optimize our staff's time on-site.

Formal Service Reports are available upon request. This service is performed on-site at the end of the job at the prevailing rates.

TERMS

All work shall be invoiced against customer's Purchase Order. Purchase Order must be issued prior to commencement of work. Terms of payment are net 30 days from date of invoice for work completed within a thirty-day period. For work exceeding thirty days monthly progress payments shall be required.

This offer is made subject to HPI Energy Services Standard Terms and Conditions of Sale, which shall form the basis of the contract between HPI Energy Services, LLC and the customer. Notwithstanding anything to the contrary in the Customer's Standard Terms and Conditions of Purchase, these conditions shall apply except so far as is expressly agreed in writing by those persons duly appointed by HPI Energy Services, LLC.

All Prices are exclusive of taxes and duties.

JOB SCOPE

HPI's technical know-how and expertise is limited to goods and services supplied under contract. Any warranty, whether expressed or implied as to engine, plant and/or machinery operational performance is excluded.

HPI reserves the right to recall its staff after 21 calendar days and send replacement staff. Travel charges and expenses for replacement staff shall be paid by customer.

EXPIRES 12:00 AM ON, 1/1/2023



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The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to:

Indianola Municipal Utilities
110 North 1st Street
Indianola, Iowa, 50125

The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

- A. Required Bid security;
- B. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
- C. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
- D. A completed Iowa Department of Labor Bidder Status Form (309-6001) regarding the Contractor's resident status within the State of Iowa.
- E. Bidder shall provide an Executive Summary with the bid that concisely summarizes, in two double-spaced pages or less, the qualifications of the Bidder and the functionality, key benefits, and capability to be provided by the Bidder. Include a history of the Bidder's organization and the number of years of involvement with turbine controls. Provide a list of recent projects involving control work or mechanical upgrades or modifications on GE Frame 5 turbines, including references. Pricing shall NOT be included in the Executive Summary.

**ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES****3.01 Lump Sum Bids**

- A. Bidder (Petrotech, Inc.) will complete the Work in accordance with the Contract Documents for the following lump sum (stipulated) price(s),

1. Lump Sum Price (Base Bid and Alternates)

Lump Sum Bid Price for Base Bid	\$ 581,757
Alternate 1- Replace and upgrade flame sensors in accordance with Section 13310 Part 7 [Add]	\$ 0
Alternate 2- Provide NOx control algorithm in accordance with Section 13310 Part 7 [Add]	\$ 13,140
Alternate 3- Retain third party testing contractor to perform stack testing in accordance with Section 13310 Part 7 [Add]	\$ 18,157

ARTICLE 4—TIME OF COMPLETION

- 4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 4.02 The Contract includes Liquidated Damages in accordance with Part 1, Paragraph 1.2A of Section 13300.

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA**5.01 Bid Acceptance Period**

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 Instructions to Bidders

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 Receipt of Addenda

- A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date
1	11/17/2022
2	11/22/2022



ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site, if any, that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the---- Bidding Documents.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.



11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
 - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
 - d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

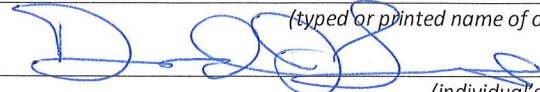
Name of Bidder Petrotech, Inc.



BIDDER hereby submits this Bid as set forth above:

Bidder:

Petrotech, Inc.

By: 
(individual's signature)

Name: David Lavie
(typed or printed)

Title: Executive Vice President
(typed or printed)

Date: 11/29/2022
(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest: 
(individual's signature)

Name: Mark Welch
(typed or printed)

Title: Applications Engineering Manager
(typed or printed)

Date: 11/29/2022
(typed or printed)

Address for giving notices:

151 Brookhollow Esplanade
New Orleans, LA 70123

Bidder's Contact:

Name: Mark Welch
(typed or printed)

Title: Applications Engineering Manager
(typed or printed)

Phone: 504-620-5335

Email: mwelch@petrotechinc.com

Address: 151 Brookhollow Esplanade
New Orleans, LA 70123

Bidder's Contractor License No.: (if applicable) C122776



Petrotech, Inc.
151 Brookhollow Esplanade
New Orleans, Louisiana 70123
USA

Phone: (504) 620-6600
Fax: (504) 620-6601
info@petrotechinc.com
petrotechinc.com

November 29, 2022

Petrotech Proposal 22-0101 Bid Alternate 1 Options

REF: Indianola Municipal Utilities Turbine 8 Control Replacement Project

Bid Alternate 1 for Replacing the UV Flame Sensors has the following possible approaches:

1. Software Based Flame Confirmation: \$0
 - a. Petrotech has provided Control Systems on many different types of Turbines including GE Frame 5 Turbines that did not have any flame scanners where the Flame Detection was done in the software using thermocouple data. This approach can be taken at no additional cost to the owner above the base price, since Petrotech's standard licensed Turbine Fuel Regulator (TFR) application product has functionality for this purpose that only requires configuration by the programming engineer. This approach was utilized by Petrotech for Indianola Municipal Utilities on the Turbine 7 Control Replacement Project, therefore Petrotech has included this approach and the associated cost of \$0 as the price for this item on the bid form.
2. Replacing Sensors with Current Product: \$42,524
 - a. However, Petrotech recommends the use of flame scanners for this application and has included this optional pricing for Flame Scanners replacement with a current product. Petrotech has performed and provided control system upgrades on over 200 GE Frame 5 Turbines where most of them had Flame Scanners; for most units that did not have any Flame Scanners, Petrotech added new ones. The flame scanners that Petrotech has provided in this option have been successfully installed and working on many GE Frame 5 applications.

IOWA SECRETARY OF STATE
PAUL D. PATE



CERTIFICATE OF REGISTRATION

Issue Date: 11/28/2022

Name: PETROTECH, INC. (490 FP - 478075)

Authorized Date: 5/1/2014

Duration: PERPETUAL

State of Incorporation: DELAWARE

I, Paul D. Pate, Secretary of State of the State of Iowa, custodian of the records of incorporations, certify the following for the corporation named on this certificate:

- a. The entity is registered to do business in this state.
- b. All fees, taxes, and penalties owed to this state have been paid.
- c. The most recent biennial report required has been filed with the Secretary of State.

Certificate ID: **CS260195**

To validate certificates visit:

sos.iowa.gov/ValidateCertificate

A handwritten signature in black ink that reads "Paul D. Pate". The signature is stylized with a large, looped "P" and a cursive "Pate".

Paul D. Pate, Iowa Secretary of State



CONTRACTOR REGISTRATION
CERTIFICATE

STATE OF IOWA
DIVISION OF LABOR

150 Des Moines St, Des Moines, IA 50309
Phone: 515-242-5871 | FAX: 515-725-2427
www.iowacontractor.gov | contractor.registration@iwd.iowa.gov

DATE ISSUED:
09/30/2022

DATE EXPIRES:
08/13/2023

REGISTRATION NUMBER:
C122776

PETROTECH INC
151 BROOKHOLLOW ESPLANE ST BLDG
JEFFERSON, LA 70123

Rod A. Roberts, Labor Commissioner

Bidder Status Form

To be completed by all bidders

Part A

Please answer "Yes" or "No" for each of the following:

- ☒ Yes ☐ No My company is authorized to transact business in Iowa.
(To help you determine if your company is authorized, please review the worksheet on the next page).
- ☐ Yes ☒ No My company has an office to transact business in Iowa.
- ☐ Yes ☒ No My company's office in Iowa is suitable for more than receiving mail, telephone calls, and e-mail.
- ☒ Yes ☐ No My company has been conducting business in Iowa for at least 3 years prior to the first request for bids on this project.
- ☐ Yes ☒ No My company is not a subsidiary of another business entity or my company is a subsidiary of another business entity that would qualify as a resident bidder in Iowa.

If you answered "Yes" for each question above, your company qualifies as a resident bidder. Please complete Parts B and D of this form.

If you answered "No" to one or more questions above, your company is a nonresident bidder. Please complete Parts C and D of this form.

To be completed by resident bidders

Part B

My company has maintained offices in Iowa during the past 3 years at the following addresses:

Dates: ____ / ____ / ____ to ____ / ____ / ____ Address: _____

City, State, Zip: _____

Dates: ____ / ____ / ____ to ____ / ____ / ____ Address: _____

City, State, Zip: _____

Dates: ____ / ____ / ____ to ____ / ____ / ____ Address: _____

You may attach additional sheet(s) if needed. City, State, Zip: _____

To be completed by non-resident bidders

Part C

1. Name of home state or foreign country reported to the Iowa Secretary of State:

Louisiana

2. Does your company's home state or foreign country offer preferences to resident bidders, resident labor force preferences or any other type of preference to bidders or laborers? ☒ Yes ☐ No

3. If you answered "Yes" to question 2, identify each preference offered by your company's home state or foreign country and the appropriate legal citation.

See Attached List of Louisiana Preferences to Bidders

You may attach additional sheet(s) if needed.

To be completed by all bidders

Part D

I certify that the statements made on this document are true and complete to the best of my knowledge and I know that my failure to provide accurate and truthful information may be a reason to reject my bid.

Firm Name: Petrotech, Inc.

Signature: _____

Date: 11/28/2022

You must submit the completed form to the governmental body requesting bids per 875 Iowa Administrative Code Chapter 156. This form has been approved by the Iowa Labor Commissioner.



Petrotech, Inc.
151 Brookhollow Esplanade
New Orleans, Louisiana 70123
USA

Phone: (504) 620-6600
Fax: (504) 620-6601
info@petrotechinc.com
petrotechinc.com

November 29, 2022

Petrotech Proposal 22-0101 List of Louisiana Preferences to Bidders

REF: Indianola Municipal Utilities Turbine 8 Control Replacement Project

- BJ 10-16: Small Purchase Procedures
- Section 27.246: Utilization of Louisiana goods and services; employment criteria
- Section 38.2184: Preference given to supplies, material, or equipment produced or offered by Louisiana citizens
- Section 38.2225: Preference in letting contracts for public work
- Section 38.2225.1: Contracts in which the state or political subdivision are participants; preferences; assistance; exclusions
- Section 38.2251: Preference for products produced or manufactured in Louisiana; exceptions
- Section 38.2251.1: Preference for milk and dairy products produced or processed in this state
- Section 38.2251.2: Preference for steel rolled in Louisiana
- Section 38.2253: Preference to firms doing business in state
- Section 38.2255: Printing contracts; bids
- Section 38.2256: Supplies not ordinarily obtainable from Louisiana firms
- Section 39.1594: Competitive sealed bidding
- Section 39.1604: Preference for all types of products produced, manufactured, assembled, grown, or harvested in Louisiana; exceptions
- Section 39.1604.1: Preference in awarding contracts
- Section 39.1604.2: Preference in letting contracts for public work
- Section 39.1604.3: Preference in awarding contracts for certain services
- Section 39.1604.5: Preference for items purchased from Louisiana retailers
- Section 39.1604.6: Preference for steel rolled in Louisiana
- Section 39.1800.6: Hiring preference
- Section 48.255.6: Preference in letting contracts for public works
- Section 48.255.7: Contracts in which the department is a participant; preferences; assistance; exclusions



Petrotech, Inc.
151 Brookhollow Esplanade
New Orleans, Louisiana 70123
USA

Phone: (504) 620-6600
Fax: (504) 620-6601
info@petrotechinc.com
petrotechinc.com

November 29, 2022

Petrotech Proposal 22-0101 Executive Summary

REF: Indianola Municipal Utilities Turbine 8 Control Replacement Project

Petrotech is pleased to offer our proposal to upgrade the GE Frame 5 Turbine Control package for Indianola Municipal Utilities. Based on our extensive experience retrofitting every type of gas turbine, we have put together a comprehensive proposal for the upgrade of the GE Speedtronic Mark V controller. This proposal is turnkey, and will include all services required for design, fabrication, testing, installation, commissioning, and training. All of these services will be provided by Petrotech Personnel without using any subcontractors (unless the Bid Alternate 3 for emissions testing is needed). Petrotech is ISO9001 certified and also has an Electrical Contractor license in the state of Iowa (Registration No. C122776).

Petrotech has over 45 years of experience in the turbomachinery controls business and has retrofitted every type of gas turbine in both power generation and mechanical drive. We have completed over 200 GE Frame 5 Control System upgrades on all major PLC platforms, including the Allen Bradley ControlLogix platform requested for this project. We have successfully delivered over 2000 systems accounting for over 10 million of running hours making us the trusted experts in this field. A few examples of projects that Petrotech has completed for GE Frame 5 upgrades include:

- Arizona Public Service Company at Yucca Plant – Two (2) GE Frame 5 Controls Upgrade – Reference: Ray Ingram Email: Ray.Ingram@aps.com
- Marquette Board of Light & Power – One (1) GE Frame 5 Controls Upgrade – Reference: Brett Kyllonen Email: bkyllonen@mblp.org

Additionally, Petrotech completed the controls upgrade of Indianola Municipal Utilities Turbine 7. Additional GE Frame 5 project examples and references can be provided upon request.

Petrotech Turbine Fuel Regulator (TFR) and Sequencing & Protection Application for the GE Frame 5 Generator Drive will be integrated into an Allen Bradley ControlLogix Platform. Petrotech software is developed using the concept of open architecture where IMU will have access to all the logic for Fuel Regulation, Water Injection,



sequencing and protection, I/O configuration, alarms configurations, communications, set-points, etc. throughout the life of the control system. Additionally, Petrotech offers 24/7 telephone support for all of our installations free of charge. This proposal also includes a secure remote access gateway that IMU can connect to the internet for Petrotech to provide remote access support.

The Petrotech provided control system contains a Critical Function Redundancy (CFR) Assembly which consists of redundant hardwired shutdowns for Over-Speed, Over-Temperature, and Main PLC Watchdog to safely shut down of the gas turbine in case of the unlikely failure of the controls. The HMI application will be based on the latest FactoryTalk Platform at the time of award that meets IMU specifications. The generator protection relays and power monitoring will be upgraded to set of two (2) SEL-700G1+, two (2) SEL-2664, one (1) SEL-751, and one (1) SEL-735. The turbine control and generator protection and metering equipment will be provided on new subplates and doors to mount in the existing cabinets. The generator excitation system will be upgraded to a new Basler DECS-250 system provided in a new cabinet assembled by Basler. SEL SCADA equipment, including an SEL-3620 (Ethernet Security Gateway) and SEL-2440 (DPAC) will be provided to interface with the existing SEL-2240 (Axiom) in the owner's existing RTU. A new Operator Control panel will be provided in the control building with the meters and control switches as defined in the specification. Field devices included in this proposal include Vibration Sensors (39V-1, 2, & 3), Water Flow Signal Converters (77WN-1A & 1B), Compressor Discharge Pressure Transmitter (96CD), Fuel Flow Meter, and a Diesel Starting Engine Gauge Panel consisting of Oil Pressure, Water Temperature, Tachometer (65DE), and Hour Counter. Replacement of the water-cooling skid main junction box with a new stainless-steel enclosure is also included in this proposal. Petrotech has included all new wire/cable and conduits within buildings/skids as required to complete the scope of work as defined in the specification. All other control components will be retained and reused including but not limited to F&G system, sensors, fuel valves, igniters, etc.

Our proposal meets or exceed the IMU specifications as clarified by the attached response to specifications. We appreciate the opportunity to bid on this project and we are available to answer any questions about the scope and/or our capabilities. We look forward to working with the Indianola Municipal Utilities project group in completing the upgrade of this system.



Petrotech, Inc.
151 Brookhollow Esplanade
New Orleans, Louisiana 70123
USA

Phone: (504) 620-6600
Fax: (504) 620-6601
info@petrotechinc.com
petrotechinc.com

November 29, 2022

Petrotech Proposal 22-0101 Response to Specifications

REF: Indianola Municipal Utilities Turbine 8 Control Replacement Project

Petrotech confirms that complete design, installation, commissioning, and documentation for this Unit Control System Upgrade will be furnished as specified in technical requirements of the RFQ with the following clarifications:

1. Petrotech has included in its offer a six (6) day work week for all installation and commissioning activities. Indianola Municipal Utilities supported a similar working schedule for the Turbine 7 Control Replacement Project completed by Petrotech.
2. Petrotech will have a four (4) man crew for installation and a two (2) man crew for commissioning and plans to set up a table in the control building for staging and plans to store control panels and materials in the warehouse, therefore an office and sanitary facilities are not included in Petrotech's offer.
3. Petrotech has included two (2) on-site engineering meetings, including the requested kickoff meeting. The remainder of meetings required for successful execution of the project will be handled via Microsoft Teams.
4. Clarifications for Bid Alternate 3:
 - a. Stack testing, if required, will be performed by Erthwrks Inc. as a subcontractor to Petrotech. The testing includes three (3) 1-hour tests to be completed within one (1) day measuring for NOx (Method 7E) and PM (Method 5/201A_202).
5. Clarifications to Addendum 2:
 - a. Petrotech proposes that liquidated damages should be capped to 5% of the total contract value instead of the 10% proposed by the owner in Addendum 2.



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November 29, 2022

Petrotech Proposal 22-0101 Warranty and Support Information

REF: Indianola Municipal Utilities Turbine 8 Control Replacement Project

Petrotech Standard Warranty

Petrotech standard warranty is defined by Petrotech Limited Warranty Bulletin 03007 included with this proposal.

Extended Warranty and Support Agreement Availability

Petrotech is capable of offering extended warranties or maintenance/support agreements. These offerings are typically catered to the specific customer request/needs. Petrotech is available to discuss options for Extended Warranty and Maintenance/Support Agreements with Indianola Municipal Utilities to determine the best fit and can provide a quote based on those determinations.

Support Options

It is important to note that Petrotech offers 24/7 telephone support for all of our installations free of charge.

Support is coordinated through our service coordinator who assigns an engineer to the case. The assigned engineer sees the support case through to completion and the service coordinator follow up with the customer to ensure that the support case has been satisfactorily completed.

Petrotech can also provide field service for service calls upon request at our then prevailing Turbomachinery Service Rates.

Remote Support

This proposal includes a secure remote access gateway that Indianola Municipal Utilities can connect to the internet for Petrotech to provide remote access support. The remote access gateway will allow the Petrotech engineer assigned to a support case to get online with the provided control system for troubleshooting assistance. The remote support gateway requires an Ethernet connection to the internet to be provided by Indianola Municipal Utilities. If



an Ethernet connection to the internet is not available, a cellular version of this device is available, however Indianola Municipal Utilities would need to provide the cellular data plan.

Similar to the extended warranty and support agreements, Petrotech can offer remote support agreements which are typically catered to the specific customer request/needs. Petrotech is available to discuss options for Remote Support Agreements with Indianola Municipal Utilities to determine the best fit and can provide a quote based on those determinations.

LIMITED WARRANTY

MAY 2012

LIMITED WARRANTY

Petrotech, Inc. warrants to its original Buyer only that goods sold by Petrotech, Inc. are free from defects in material and workmanship, under normal conditions of use and service for the lesser of twelve (12) months from date of startup or eighteen (18) months from the date of shipment. If the Buyer discovers a defect in materials or workmanship within the warranty period the Buyer must promptly notify Petrotech, Inc. in writing at the below address. Within a reasonable time after notification, Petrotech, Inc. will repair or replace any component found defective, upon its return, all transportation charges prepaid by Buyer.

LIMITATION OF REMEDY AND LIABILITY

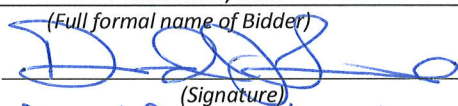
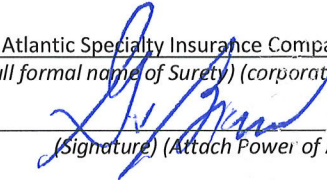
The foregoing limited warranties and remedies are in lieu of all other warranties and remedies available by law or by agreement, expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. The buyer waives all other causes of action and any entitlement to special, incidental, or consequential damages based upon any legal theory including, but not limited to, property damage, loss of profits, loss of savings or revenue, loss of use of the product or any associated equipment, or cost of capital.

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BID BOND (PENAL SUM FORM)

Bidder Name: Petrotech, Inc. Address (principal place of business): 151 Brookhollow Esplanade New Orleans, LA 70123	Surety Name: Atlantic Specialty Insurance Company Address (principal place of business): 605 Highway 169 North, Suite 800 Plymouth, MN 55441
Owner Name: INDIANOLA MUNICIPAL UTILITIES Address (principal place of business): 210 WEST 2ND AVE INDIANOLA, IA 50125	Bid Project (name and location): INDIANOLA MUNICIPAL UTILITIES TURBINE 8 CONTROL REPLACEMENT PROJECT Bid Due Date: DECEMBER 1, 2022
Bond Penal Sum: Five Percent (5%) of the Amount Bid Date of Bond: December 1, 2022	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder PetroTech, Inc. (Full formal name of Bidder) By:  (Signature) Name: David J. Larive (Printed or typed) Title: Executive V.P. Attest:  (Signature) Name: Mark Welch (Printed or typed) Title: Applications Engineering Manager	Surety Atlantic Specialty Insurance Company (Full formal name of Surety) (corporate seal) By:  (Signature) (Attach Power of Attorney) Name: George V. Baus, Jr. (Printed or typed) Title: Attorney-In-Fact Attest:  (Signature) Name: Jean Viola (Printed or typed) Title: Account Manager
Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.	

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.



Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York corporation with its principal office in Plymouth, Minnesota, does hereby constitute and appoint: **George V. Baus, Jr, Kathleen L. Berni, Gregory R. Weston, Edward J. Murphy, III, John W. Watson, Elizabeth Hamrick, Jean Viola**, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf as surety, any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof; provided that no bond or undertaking executed under this authority shall exceed in amount the sum of: **unlimited** and the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof in pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an "Authorized Officer") may execute for and in behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute on behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and in the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed and sealed by an Authorized Officer and, further, the Attorney-in-Fact is hereby authorized to verify any affidavit required to be attached to bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this twenty-seventh day of April, 2020.

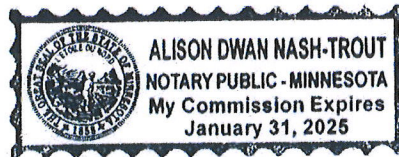
STATE OF MINNESOTA
HENNEPIN COUNTY



By

Paul J. Brehm, Senior Vice President

On this twenty-seventh day of April, 2020, before me personally came Paul J. Brehm, Senior Vice President of ATLANTIC SPECIALTY INSURANCE COMPANY, to me personally known to be the individual and officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, that he is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument is the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.



Notary Public

I, the undersigned, Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.

Signed and sealed. Dated 1st day of December, 2022.

This Power of Attorney expires
January 31, 2025



Kara Barrow, Secretary

Board Member _____ introduced the following resolution entitled "RESOLUTION MAKING AWARD OF CONSTRUCTION CONTRACT FOR THE TURBINE 8 CONTROL REPLACEMENT PROJECT" and moved its adoption. Board Member _____ seconded the motion to adopt. The roll was called, and the vote was:

AYES:

NAYS:

ABSENT:

Whereupon, the Chair declared the following Resolution duly adopted:

**RESOLUTION MAKING AWARD OF CONSTRUCTION CONTRACT
FOR THE TURBINE 8 CONTROL REPLACEMENT PROJECT**

BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE INDIANOLA MUNICIPAL UTILITIES:

Section 1. The base bid from Petrotech in the amount of \$581,757.00 and bid alternate number three in the amount of \$18,157.00 for a total of \$599,914.00 for the Turbine 8 Replacement Control Project for Indianola Municipal Utilities, Indianola, Iowa, described in the plans and specifications previously adopted by this Board on the 12th day of December 2022, is accepted, it being the most responsible bid for the project.

Section 2. The IMU General Manager is hereby authorized to execute a contract with the contractor for the construction of the public improvement, the contract not to be binding on the Board of Trustees until approved by the Board.

PASSED AND APPROVED this 12th day of December 2022.

Lori Smith, Chairperson

ATTEST:

Jackie Raffety, City Clerk

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities

From:

Date: December 12, 2022

Subject: Resolution approving a marketing agent agreement between Indianola Municipal Utilities and the Municipal Energy of Nebraska (MEAN).

Recommendation: Roll call is in order.

Attachments:

1. Res 2022- approving MEAN Agreement
2. GeneralTermsAndConditionsFinalApproved20200123
3. Indianola_Marketing Agent Agmt_20221201Final

Indianola Municipal Utilities
RESOLUTION NO 2022-

RESOLUTION APPROVING A MARKETING AGENT AGREEMENT BETWEEN INDIANOLA MUNICIPAL UTILITIES AND THE MUNICIPAL ENERGY AGENCY OF NEBRASKA (MEAN)

WHEREAS, MEAN and Indianola Municipal Utilities have entered into the Schedule M Agreement, incorporated herein by reference, with a term effective April 1, 2009; and

WHEREAS, the IMU Board of Trustees approved the MEAN Marketing Agreement at their January 25, 2021, which is in effect until May 21, 2023, at which time the Agreement will terminate; and

WHEREAS, the IMU Board of Trustees desires to extend the MEAN Marketing Agreement as attached through May 31, 2025.

NOW, THEREFORE, BE IT RESOLVED by the Board of Trustees of the Indianola Municipal Utilities, Iowa, that the Agreement between Indianola Municipal Utilities and Municipal Energy of Nebraska (MEAN) is hereby approved and the Board Chair is hereby authorized and directed to execute the Agreement on behalf of Indianola Municipal Utilities.

Approved this 12th day of December 2022.

Lori Smith, Board Chair

ATTEST:

Jackie Raffety, City Clerk

MEAN MUNICIPAL ENERGY AGENCY OF NEBRASKA	Version No.	1.0
	Effective Date	January 23, 2020
General Terms and Conditions of Service		Distribution Restriction: Public Document

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I. APPLICABILITY

These General Terms and Conditions of Service are approved by and may be modified from time to time by the Municipal Energy Agency of Nebraska (MEAN) Board of Directors and shall apply to all services provided by MEAN to its Participants, as defined below, under a Participation Agreement, as defined below, including without limitation those participating under Service Schedules M, K/K-1 or J, and those who are not total requirements purchasers from MEAN but receive marketing agent, transmission agent, or other utility-related services under a qualifying written agreement with MEAN. These General Terms and Conditions shall serve as part of the “policies and procedures” and “rules and regulations” authorized by, and to be made pursuant to, the Participation Agreement between MEAN and the Participant. For Service Schedules M and K/K-1, these General Terms and Conditions shall be incorporated into and attached to the Schedule of Rates and Charges which is a part of the applicable Participation Agreement. In the event of a conflict between the provisions in this document and the provisions of the Participation Agreement, the provisions of the Participation Agreement shall prevail.

II. DEFINITIONS

For the purposes of these General Terms and Conditions and of the Participation Agreements which Participant may execute, the following definitions shall apply:

- 2.01 Contract Capacity shall have the meaning ascribed thereto in the then-current rules, regulations, policies and procedures established by MEAN regarding Participant generation contractually committed to MEAN.
- 2.02 Force Majeure: An event of Force Majeure means any act of God, labor disturbance, act of the public enemy, war, terrorism, insurrection, riot, fire, storm, lightning, flood, earthquake, explosion, breakage or accident to machinery or equipment, material shortage, sabotage, any curtailment, order, regulation or restriction imposed by governmental, military, or lawfully established civilian authorities, failure of or threat of failure of facilities, action or non-action by, or failure to obtain the necessary authorizations or approvals from, any governmental agency or authority, or any other cause beyond MEAN’s or a Participant’s control, which by exercise of due diligence such party could not reasonably have been expected to avoid and which by exercise of due diligence it shall be unable to overcome. A Force Majeure event does not include an act of negligence or intentional wrongdoing.

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- 2.03 General Terms and Conditions shall mean these General Terms and Conditions of Service issued by MEAN, as they may be modified or superseded from time to time including without limitation any successor document.
- 2.04 Participant (Party) shall mean any of the following that enter into a Participation Agreement with MEAN: a municipal corporation, autonomous utility board acting for or on behalf of a municipality, or other political subdivision or legal entity established by municipalities. Certain entities entering into agreements with MEAN for the sale or purchase of capacity or energy at wholesale may be excluded by MEAN from the definition of Participant.
- 2.05 Participation Agreement shall mean a written agreement executed between MEAN and the Participant under which MEAN provides energy, capacity, marketing agent, transmission agent or other products or services to Participant. Participation Agreement shall include but not be limited to the following: Service Schedule M, Service Schedules K and K-1, Supplemental Agreement for Firm Power Interchange Service, Supplemental Agreement for Wind-Generated Energy Purchase, Supplemental Agreement for Purchase of Landfill Gas Energy Environmental Attributes, Agreement for Firm Power Interchange Service, marketing agent agreement, transmission agent agreement, or other utility-related service agreement. Participation Agreement shall not include certain agreements designated by MEAN as wholesale power sales to or purchases from third parties.
- 2.06 Total Requirements Participant shall mean a Participant that has executed Service Schedule M, Service Schedule K or K-1, Supplemental Agreement for Firm Power Interchange Service, or an Agreement for Firm Power Interchange Service, with MEAN.
- 2.07 WAPA shall mean the Western Area Power Administration or its successor.

III. PARTICIPATION PREREQUISITES

Total Requirements Participants of MEAN are and shall remain voting members in good standing of the Nebraska Municipal Power Pool as defined in the Articles of Incorporation and the By-Laws of the Nebraska Municipal Power Pool, or its successor entities.

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IV. DUTIES OF MEAN

4.01 The duties of MEAN include but are not limited to those set forth below. MEAN may perform any and all of its duties and exercise its rights and powers by or through agents, subcontractors or employees appointed by MEAN. In addition, MEAN may delegate all or a portion of its duties to agents, employees or third parties from time to time. The Board of Directors shall at all times adhere to sound engineering principles and prudent utility practice.

- a. Establish rates and charges for products and services provided by MEAN to Participants.
- b. MEAN shall prepare a load and capability report when requested by the Board of Directors or required by regulation or law, which shall include long range plans, size and type of generating units, transmission requirement and installation of facilities.
- c. Review plans and procedures relating to the coordination of the bulk power production and transmission facilities and operations with adjoining systems, pools and regional power coordinating groups.
- d. Establish and revise policies and procedures relating to the effect of abnormal system conditions and related operating conditions.
- e. Coordinate the scheduling and operation of the following assets in the most efficient and economical way consistent with good utility practice: Participant-owned electrical assets leased or marketed by MEAN, Participant-owned behind-the-meter-generation that modifies load that MEAN markets or serves, and MEAN assets that are necessary to effect the delivery and sale of bulk power supply to the Total Requirements Participants.
- f. For Participants' generating units committed to MEAN, the Board of Directors shall determine the Participants' Contract Capacity amount to be compensated by MEAN. Determinations of Contract Capacity shall be reviewed by the Board of Directors from time to time, and any appropriate changes resulting from such review shall be made. The Board of Directors will establish the rules and regulations for determining Contract Capacity in order to secure consistency and continuity in such determination.

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- g. MEAN will assist and make recommendations for planning, negotiating, designing, contracting for and administering all generation and transmission arrangements and facilities necessary to effect the delivery and sale of such bulk power supply to the Total Requirements Participants.
- h. MEAN may in its sole discretion enter into interconnection agreements and wheeling agreements if necessary or desirable for delivery of power and energy to Participants.

V. DUTIES OF PARTICIPANT

- 5.01 Each Participant shall retain the sole responsibility for the operation of its system in accordance with the General Terms and Conditions, the then-current policies and procedures approved by MEAN, and any Participation Agreement or other agreement entered into with MEAN, and for the utilization of the information which may be provided from MEAN.
- 5.02 Participant shall comply with the then-current policies and procedures approved by MEAN governing Participant generation.
- 5.03 Any Participant from whom MEAN leases generation, shall upon request by MEAN, supply to MEAN energy up to the full amount of its Contract Capacity as determined by MEAN net of any derated amount communicated to MEAN.
- 5.04 The systems of the Participants shall be interconnected continuously under normal system conditions. The Participants shall cooperate in keeping the frequency of the interconnected systems of the Parties as closely to 60 Hz as is practicable, in keeping the interchange of power and energy between the systems of the Participants as closely as is practicable to the scheduled amounts or as determined by economic dispatch, and in maintaining mutually satisfactory voltage levels. Each Participant shall be responsible for the reactive volt-ampere requirements of its system. Reactive volt-amperes may be interchanged between systems from time to time, subject to agreement between the Participants involved, when benefit to one system may be gained by the interchange without causing hardship to another system.
- 5.05 The systems of the Participants shall normally be maintained and operated in accordance with good utility practice so as to minimize the likelihood of a

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disturbance originating in the system of one Participant causing impairment to the service of the system of any other Participant, or any other system with which the systems of the Participants are interconnected.

- 5.06 All Participants will be required to prepare and submit all such reports concerning schedules, loads, capabilities and generating facilities as may be reasonably requested by MEAN.
- 5.07 Participant shall maintain one telephone number continuously available and manned for contact by MEAN and response by the Participant.
- 5.08 In the event power is supplied to Participant through the system of an intervening agency other than service already included in the rates, Participant shall fully reimburse MEAN for any wheeling/transmission costs incurred in the delivery of such power and energy. In all cases, wheeling/transmission costs shall include payment for losses. Such payment may be in either the form of energy or money, in the sole discretion of MEAN.

VI. SERVICES TO BE RENDERED

- 6.01 The agreements to be utilized by MEAN for total power requirements power purchase agreements with Participants are listed as follows and may include provisions for transmission agent, marketing agent and associated utility-related services to such Participants:
 - a. Firm Power Interchange Service
 - b. Bulk Power Supply – Service Schedules K and K-1
 - c. Total Power Requirements Power Purchase Agreement – Service Schedule M

Other schedules and agreements may be established from time to time at the discretion of the Board of Directors.

- 6.02 MEAN offers marketing agent, transmission agent and other utility-related services to non-Total Requirements Participants from time to time by written agreement.

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VII. METERING AND RECORDS

7.01 Metering, telemetry and recordkeeping requirements are set forth in the Asset Management Policies and Procedures.

VIII. BILLINGS AND PAYMENTS

8.01 All bills for services supplied by MEAN shall be rendered monthly by MEAN to the Participant not later than thirty (30) days after the end of the period to which such bills are applicable. Unless otherwise agreed upon by the Board of Directors such periods shall be from 12:01 A.M. of the first day of the month to 12:01 A.M. of the first day of the succeeding month. Bills shall be due and payable on or before the due date specified on the bill, and payment shall be made when due and without deduction. Interest on any unpaid amount from the date due until the date upon which payment is made shall accrue at the rate specified on the bill.

8.02 In the event a Participant desires to dispute all or any part of the charges submitted by MEAN, it shall nevertheless pay the full amount of the charges when due and give notification to MEAN in writing within sixty (60) days from the date of the bill stating the specific grounds on which the charges are disputed and the amount in dispute. The complaining Participant will not be entitled to any adjustment on account of any disputed charges which are not brought to the attention of MEAN within the time and in the manner herein specified. If settlement of the dispute results in a refund to the Participant, interest at one percent (1%) per month or fraction thereof shall be added to the refund.

IX. UNCONTROLLABLE FORCES

9.01 Neither MEAN nor Participant will be considered in default as to any obligation under these General Terms and Conditions or a Participation Agreement, if prevented from fulfilling the obligation due to an event of Force Majeure. However, MEAN and Participants whose performance is hindered by an event of Force Majeure shall make all reasonable efforts to perform their obligations under these General Terms and Conditions and the applicable Participation Agreement(s). This Section 9.01 shall not apply to obligations under a Participation Agreement that provides an alternative definition of Force Majeure or uncontrollable forces.

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X. NOTICES

- 10.01 Any notice provided pursuant to, required by or authorized by the agreement may be addressed to the Participant's MEAN Board of Directors member representative, or the Participant's governing body Mayor/Board Chair or the city/village clerk at the address of such Participant.
- 10.02 Any written notice or request of a routine character in connection with delivery of power and energy or in connection with operation of facilities shall be given in such a manner as the Board of Directors from time to time shall establish.

XI. RELATION TO OTHER AGREEMENTS AND OBLIGATIONS

- 11.01 Each Participant represents that there are no conditions in such Participant's existing agreements, including financing agreements, which will preclude such Participant from performance of all obligations under a Participation Agreement; and, further, each Participant agrees not to enter into an agreement which will preclude performance under the Participation Agreement. The failure by any Participant to get approval under any financing agreement for entering into a contract, or amending or terminating any existing agreement, shall not excuse performance under the Participation Agreement.
- 11.02 The expiration or termination of the Electrical Resources Pooling Agreement (ERPA) shall not impair, amend or change any previous contracts or agreements, and such contracts and agreements shall continue until the expiration of such contracts and agreements, including all rates, terms, obligations and conditions.

XII. MISCELLANEOUS

- 12.01 Resale of Firm Electric Service from WAPA: Participant shall not sell any firm electric power or energy from WAPA, or from MEAN sourced from WAPA, to any electric utility customer of the Participant for resale by that utility customer.
- 12.02 Benefits of Firm Electric Service from WAPA: Participant agrees that the benefits of firm electric power or energy supplied by WAPA, or by MEAN sourced from WAPA, shall be made available to its consumers at rates that are established at the lowest possible level consistent with sound business principles, and that these rates will be established in an open and public manner. Participant further agrees

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that it will identify the costs of firm electric power or energy supplied under the contract and power from other sources to its consumers upon request.

- 12.03 Remedies Upon Breach: Upon the failure by MEAN or a Participant to perform any obligation on its part under these General Terms and Conditions or the Participation Agreement, including the obligation to make payment for services provided when said payment is due, the other party to such Participation Agreement may, following such failure, make a written demand upon the non-performing party. If such non-performance is not cured within thirty (30) days from the date of transmittal of said demand, such non-performance shall, at the expiration of the 30-day period, constitute a default under the agreement. If the default involves a failure to make payment when due and if the defaulting party disputes in writing the existence or extent of the default prior to the end of the 30-day period, the party shall nevertheless make the payment prior to the end of the 30-day period under written protest. Upon any such default described in this Section 12.03, the party claiming default may at any time thereafter take any action in law or equity to enforce the agreement, including but not limited to cessation of deliveries, termination of the agreement, or action for specific performance, and to recover for any loss or damage directly resulting from the default under the Participation Agreement. Termination for default due to non-payment shall not affect the obligation to pay any unpaid amounts.
- 12.04 Governing Law and Venue: These General Terms and Conditions and the Participation Agreement shall be governed by the laws of the State of Nebraska, without regard to principles of conflicts of law that would require the application of the laws of another jurisdiction. Any action or proceeding to enforce or arising out of the Participation Agreement shall be commenced in the state courts, or in the United States District Court, of Nebraska. MEAN and Participant consent to such jurisdiction, agree that venue will be proper in such courts and waive any objections based upon Forum Non Conveniens.
- 12.05 Assignment of Agreements: No party shall assign a Participation Agreement without the consent in writing of the other parties except in connection with the sale and merger of a substantial portion of its properties. The provisions of these General Terms and Conditions and the Participation Agreement are not intended to and shall not create rights of any character whatsoever in favor of any persons, corporations, or associations other than the Participants executing the written agreement with MEAN, and the obligations herein assumed are solely for the use and benefit of such Participants.

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Revision History

Version	Effective Date	Description of Revision
1.0	January 23, 2020	Adoption of General Terms and Conditions of Service

MARKETING AGENT AGREEMENT

This Marketing Agent Agreement (Agreement), dated June 1, 2023, is made and entered into by and between the Municipal Energy Agency of Nebraska (MEAN) and Indianola Municipal Utilities, acting for and on behalf of the City of Indianola, Iowa (Participant). This Agreement is subject to the MEAN General Terms and Conditions of Service adopted by the MEAN Board on January 23, 2020, as such document may be modified from time to time by the MEAN Board (General Terms and Conditions) and the Service Schedule M, Total Power Requirements Power Purchase Agreement (Schedule M Agreement) executed as of March 31, 2009 between the parties, as such agreement may be modified from time to time by the parties, including any successor or replacement agreement to the Service Schedule M Agreement. This Agreement shall supersede and replace, effective June 1, 2023, the Marketing Agent Agreement executed as of January 29, 2021 between the parties.

WHEREAS, MEAN and Participant have entered into the Schedule M Agreement, incorporated herein by reference, with a term effective April 1, 2009, and

WHEREAS, the MEAN Board of Directors placed a moratorium on leasing any new or additional generation, effective January 20, 2005, until such time peaking capacity generation is needed (Moratorium), and

WHEREAS, MEAN and Participant have entered into an Amended and Restated Supplemental Agreement Regarding Participant-Owned Capacity effective as of June 1, 2018, as such agreement may be modified from time to time (Supplemental Agreement) under which MEAN purchases capacity from certain Participant generating units, as an exception to the Moratorium, and

WHEREAS, Participant has excess capacity and desires MEAN to perform services to offer the excess capacity into the Midcontinent Independent System Operator, Inc. (MISO) capacity market, sell all or a portion of the excess capacity to MEAN from time to time, or find other value for such capacity.

NOW, THEREFORE, in consideration of the covenants and agreements herein contained, it is mutually agreed as follows:

Section 1. Term: This Agreement shall become effective as of June 1, 2023 and remain in effect until 11:59 PM on the last day of the annual MISO Planning Year 2024-2025, currently scheduled to be May 31, 2025, at which time this Agreement shall terminate.

Section 2. Services: MEAN agrees to use reasonable efforts to provide, under the terms set forth in this Agreement and in the General Terms and Conditions, the following services to the Participant:

Monthly Services as set forth on Exhibit A attached hereto and made part of the Agreement. Exhibit A may be modified from time to time by written agreement of the parties.

Section 3. Agent Designation: Participant hereby designates MEAN as Participant's exclusive agent for marketing the generating units set forth in Exhibit B (including without limitation for MEAN to perform merchant and transmission functions) as necessary or convenient for MEAN to perform its services under the terms of this Agreement. Notwithstanding the preceding, not later than September 15 for the next applicable MISO, Southwest Power Pool, Inc. (SPP) or other regional planning year, Participant may amend Exhibit B, attached hereto and made part of the Agreement, to remove units. In the event the applicable resource adequacy construct changes, Participant and MEAN agree to negotiate in good faith to modify the deadline for any changes to Exhibit B accordingly to allow MEAN sufficient time to meet planning or resource adequacy requirements. In order for MEAN to effectively provide the services listed

in this Agreement, Participant agrees to provide MEAN with an original or a copy of any notices relating to services provided under this agreement that impact available capacity. In lieu of the Participant's address, all notices, invoices and correspondence concerning the above-mentioned delegated duties shall be directed to MEAN at the following address or such address as MEAN may communicate to Participant in writing from time to time:

Invoices and other Accounting-related Notices:

Contact Person: Director of Finance & Accounting
Telephone: (402) 474-4759
E-mail: accounting@nmppenergy.org

Address: 8377 Glynoaks Drive
Lincoln, NE 68516

All other Notices:

Contact Person: Executive Director
Telephone: (402) 474-4759

Address: 8377 Glynoaks Drive
Lincoln, NE 68516

MEAN may perform any and all of its duties and exercise its rights and powers under this Agreement by or through agents, subcontractors or employees appointed by MEAN. MEAN may delegate any or all of its duties under this Agreement to agents, employees or third parties appointed by MEAN. No such delegation or hiring of agents, subcontractors or employees will relieve MEAN of its obligations under this Agreement.

Section 4. Billing and Payment: MEAN will bill Participant and Participant agrees to pay, as set forth herein, for the services described in this Agreement and Exhibit A hereto. Participant agrees to pay applicable Regional System (as such term is defined below) fees, charges, taxes, and any applicable surcharges which are directly a result of transactions under Section 2 of this Agreement. "Regional System" shall be defined to mean any transmission system or energy or capacity market utilized to market or transmit the output from Participant's generating units, including but not limited to MISO, SPP and other transmission service providers or transmission providers. Payment is due in accordance with the terms of the General Terms and Conditions. MEAN will credit Participant monthly, on Participant's purchased power bill, for all amounts owed to Participant under this Agreement and Exhibit A hereto, net of applicable Regional System fees, charges, taxes, and any applicable surcharges which are directly a result of transactions under Section 2 of this Agreement. Notwithstanding any other provision of this Agreement, the rates and charges to Participant shall be adjusted to reflect the impact of any governmental imposition, such as changes in or additions to sales tax, property tax, energy use tax, surcharge, or other governmental or regulatory fees (including without limitation emissions allowances, renewable portfolio standards, carbon taxes, charges or expenses), or any Regional System fees or costs, which are adopted, implemented or enforced after the execution of this Agreement or which occur as a result of a change after the execution of this Agreement in the interpretation or enforcement by the governmental or regulatory body of an existing governmental imposition. MEAN will endeavor to provide Participant or Participant's MEAN Board of Directors Representative with advance notice of any such governmental imposition that will be passed through to Participant under this Agreement whenever MEAN receives advance notice of such governmental imposition.

Section 5. Events of Default: The following events shall constitute an event of default (Event of Default) hereunder:

- A. Participant is unable to pay its debts as they fall due; Participant has not paid any amount due MEAN hereunder on or before the second business day following written notice that such payment is due; or material breach by Participant of any obligation hereunder which is not remedied on or before the second business day following written notice that such material breach has occurred. In the event of a default under this Agreement, MEAN shall have the right, at its

sole election, to immediately withhold and/or suspend services, deliveries or payments upon written notice, and/or to terminate this Agreement in the manner provided below, in addition to any and all other remedies available hereunder or at law or in equity. If an Event of Default has occurred and is continuing, the non-defaulting party shall have the right, by written notice to the defaulting party, to designate a day, no earlier than the day such notice is given and no later than 15 days after such notice is given, as an early termination date for this Agreement and all services and deliveries hereunder. Participant acknowledges and agrees that in the event of a suspension or termination of services as permitted by this Section, MEAN shall not be responsible for any penalties or charges incurred by the Participant arising out of or in connection with the suspension or termination of services including without limitation Real-Time charges, imbalance charges, transaction fees and charges, applicable Regional System fees and charges, taxes, and any applicable surcharges.

- B. MEAN has not paid or credited any amount due Participant hereunder on or before the second business day following written notice that such payment or credit is due; or material breach by MEAN of any obligation hereunder which is not remedied on or before the second business day following written notice that such material breach has occurred. In the event of a default under this Agreement, Participant shall have the right, at its sole election, to immediately withhold and/or suspend the assignment of capacity or other services, deliveries or payments upon written notice, and/or to terminate this Agreement in the manner provided below, in addition to any and all other remedies available hereunder or at law or in equity. If an Event of Default has occurred and is continuing, the non-defaulting party shall have the right, by written notice to the defaulting party, to designate a day, no earlier than the day such notice is given and no later than 15 days after such notice is given, as an early termination date for this Agreement and all services and deliveries hereunder. MEAN acknowledges and agrees that in the event of a suspension or termination of the assignment of capacity or other services, deliveries or payments as permitted by this Section, Participant shall not be responsible for any penalties or charges incurred by MEAN arising out of or in connection with the suspension or termination of the assignment of capacity or other services, deliveries or payments or other Participant obligations hereunder. Notwithstanding the preceding sentence, nothing in this Agreement limits the responsibilities under Participant's Service Schedule M Membership with MEAN, including but not limited to payments required thereunder.

Section 6. Applicable Rules, Policies and Procedures; Indemnification; Limitation of Liability:

Participant must maintain compliance with, and the operations under this Agreement are subject to, then-current policies and procedures adopted by the MEAN Board of Directors, including without limitation the Asset Management Policies and Procedures, and all applicable laws, ordinances, orders, rules, regulations, tariffs, policies, protocols, business practices, criteria and standards (collectively referred to herein as "Governmental Standards") regarding Participant's generating units which are subject to this Agreement, including but not limited to those Governmental Standards adopted at the local, state, regional, or federal level by MISO, SPP, other Regional System, Midwest Reliability Organization (MRO), North American Electric Reliability Corporation (NERC), Federal Energy Regulatory Commission (FERC), Environmental Protection Agency (EPA), Iowa Department of Natural Resources (Iowa DNR), Iowa Utilities Board, or other third party or governmental entity asserting jurisdiction (collectively, the Regulators). The terms and conditions stated in this Agreement are subject to modifications resulting from changes in any such Governmental Standards. Participant must promptly inform MEAN in writing in the event of Participant's noncompliance with any Governmental Standards and in writing in advance of the implementation of any changes to the limitations on generation provided by Participant's Iowa DNR Title V Permit and any other limitations which may be imposed by the Regulators. MEAN shall have no liability for Participant's non-compliance with such Governmental

Standards. Participant shall reimburse MEAN for any penalties, fines, charges, study or upgrade costs, costs of replacement capacity or other expenses (collectively, the “Damages”) incurred by MEAN arising from or relating to Participant’s noncompliance, Participant’s failure to notify MEAN in writing in advance of the implementation of any changes to the limitations on generation described above, or arising from or relating to other actions or inaction which were solely within the control of Participant or were taken without approval of an authorized representative of MEAN, including without limitation failure to run generating unit(s) or a change of status such as suspension or retirement of unit(s). MEAN shall have no liability, and Participant shall reimburse MEAN for, any Damages incurred by MEAN resulting from or arising out of a conflict between a Regional System’s Governmental Standards and those of other Regulators or Participant’s Iowa DNR Title V Permit. Further, MEAN shall have no liability in the event Participant fails to qualify for the capacity credits described in Exhibit A. Notwithstanding any other provision of this Agreement, MEAN’s total liability to Participant for any loss or damage, including, but not limited to, special and/or consequential damages, arising out of or in connection with the performance of services hereunder regardless of the form of action, whether based on contract, tort, negligence, strict liability, products liability or otherwise, shall not exceed an amount equal to the greater of 1) the fee compensation (excluding amounts paid for transaction fees and charges, applicable Regional System fees and charges, taxes, and any applicable surcharges or penalties) received by MEAN from Participant under this Agreement during the preceding twelve (12) months, or 2) the amount which will make Participant whole for lost revenue (based on market price) and Regional System penalties or charges incurred by Participant due to any gross negligence or intentional misconduct by MEAN, and Participant hereby releases and will hold harmless MEAN from any liability above such amount. Participant further agrees, to the fullest extent permitted by law, to defend, indemnify and hold harmless MEAN and its officers, employees and agents from and against all claims, damages, losses and expenses, direct or indirect, or consequential damages including, but not limited to, attorney’s fees arising out of or resulting from the performance of MEAN’s services hereunder, except when resulting from any gross negligence or intentional misconduct by MEAN. Any fines or penalties which arise, whether charged by any of the Regulators or other third party, shall be passed through by MEAN and paid by Participant, excluding those arising out of MEAN’s gross negligence.

Section 7. Force Majeure: MEAN and Participant shall not be considered to be in default in respect to any obligation hereunder if prevented from fulfilling such obligation by reason of uncontrollable forces. The term "uncontrollable forces" shall be deemed for the purposes hereof to mean any of the following, but only to the extent the uncontrollable force would also excuse a failure to perform such obligation under the MISO Open Access Transmission, Energy and Operating Reserve Markets Tariff, including all schedules or attachments thereto, as amended from time to time: storm, flood, lightning, earthquake, fire, explosion, failure of facilities not due to lack of proper care or maintenance, civil disturbance, labor disturbance, sabotage, terrorism, war, national emergency, health pandemic, restraint by court or public authority, directive or other act or omission by a regional transmission organization, or other causes beyond the control of MEAN or Participant, as applicable. In the event MEAN or Participant is unable to fulfill any obligation by reason of uncontrollable forces MEAN or Participant will exercise due diligence to remove such disability with reasonable dispatch, but such obligation shall not require the settlement of a labor dispute.

Section 8. Conflicts: Participant acknowledges that in the performance of services hereunder by MEAN, conflicts of interest may arise due to the nature of MEAN's duty to serve its participating municipalities and manage its power system. Accordingly, each determination of MEAN to implement prudent utility practices including, but not limited to, adjusting market positions, and compliance with market or reliability directives will be made with the intent, first, to keep MEAN whole and second, to maximize profit and minimize losses for the Participant, recognizing that priority to directives for the Participant will not take priority over market impacts for MEAN. Nothing in the Exhibits or the Agreement shall be deemed to require MEAN to take any action or make any sale of energy that causes a negative financial

impact to MEAN. THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, EXPRESS, IMPLIED OR STATUTORY.

Section 9. General: In no event shall the obligations imposed by this Agreement, be diminished or modified so as to jeopardize the effectiveness of the Agreement as security for the payment of notes, bonds, or other evidences of indebtedness issued by MEAN. This Agreement does not and is not intended to confer any rights or remedies upon any person other than MEAN and the Participant. MEAN shall be deemed and is an independent contractor, and this Agreement shall in no way be construed to provide for or create a partnership, joint venture, joint undertaking, or employer/employee relationship between the parties hereto. The Laws of the State of Nebraska shall govern this Agreement. This Agreement, the General Terms and Conditions, the Schedule M Agreement and the Supplemental Agreement constitute the complete agreement of the parties relating to the matter specified in this Agreement and supersede all prior representations or agreements, whether oral or written, with respect to such matters. No modification of this Agreement shall be binding upon either party unless agreed to in writing and signed by both parties.

Section 10. Limitation on Private Business Use: It is the intent of the Parties to preserve the tax-exempt status of any outstanding and future financing (including bonds, notes, or otherwise, collectively referred to herein as “Bonds”) used by Participant for or in relation to the generating units set forth in Exhibit B, including any improvements thereto, or which may be secured in any way by the generating units set forth in Exhibit B or any revenues generated therefrom (all of which shall be collectively referred to herein as the “Indianola Bonds”). Notwithstanding any other terms in this Agreement, MEAN represents and agrees that it has not entered into, nor will it enter into, any contract or other agreement that would jeopardize the tax exempt status of the Indianola Bonds (whether currently outstanding or thereafter to be issued), and it will not take any action, or fail to take any required action, that would jeopardize the tax exempt status of those bonds (whether currently outstanding or thereafter to be issued). Notwithstanding any other terms in this Agreement (including but not limited to Section 6 (regarding indemnification and limitation of liability) of this Agreement), if MEAN markets, transfers or sells any capacity or energy from the generating units set forth in Exhibit B to a third party and the use, transfer, or sale of the capacity and/or energy creates or constitutes "private business use" under the Internal Revenue Code or regulations promulgated thereunder in an amount that would affect the eligibility of interest on the Indianola Bonds (whether then outstanding or thereafter to be issued) for Federal tax-exempt status, MEAN agrees to indemnify and hold harmless Participant from and against any and all losses, costs, liabilities, damages and expenses (including without limitation attorneys’ fees and expenses and the marginal costs of the Indianola Bonds being declared taxable) of any kind incurred or suffered by Participant, as a result of or in connection with any use, transfer, sale, or resale of the capacity and/or energy.

Section 11. Provision of Information: Upon request, MEAN and Participant will provide each other information including Regional System portal exports, screen shots, information on unit testing and other information necessary to assist with the responsibilities of this Agreement.

Section 12. Sales to Third Parties: Subject to the Right of First Refusal in Subsection A. below and the Planning Period in Subsection B. below, Participant reserves the right to sell to another party during the term of the Agreement any and all of Participant’s capacity portfolio in excess of (i) the 15,000 kW sold to MEAN under the Supplemental Agreement, (ii) any Increased Purchase sold to MEAN under Section 1.f. of the Supplemental Agreement, (iii) any capacity that has been committed to a Regional System as capacity or applied to meet MEAN’s resource adequacy requirements, or that has been designated as a network resource by MEAN, for the time period of the potential sale to the third party, (iv) any capacity that has been sold to a third party by MEAN for the time period of the potential sale to the third party, (v) any capacity that has been purchased by MEAN in the performance of services under this Agreement or

under any other agreement, for the time period of the potential sale to the third party, and (vi) any capacity that has been designated as Short-Term Leased Capacity under Exhibit C, for the time period of the potential sale to the third party. In addition to the advance notice required under Section 12.A, Participant shall inform MEAN of any such sales of capacity within one (1) business day of Participant's agreement to enter into the transaction. MEAN shall have no liability under this Agreement, including without limitation Section 6 or Section 10, for any sales of capacity to a third party by Participant. Any capacity sold in such manner shall automatically be deemed removed from Exhibits A and B of the Agreement for the term of such sale.

- A. **Right of First Refusal.** In the event Participant desires to sell excess capacity and/or energy from any of the units listed on Exhibit B which are eligible for sales to third parties as described above in this Section 12, Participant shall notify MEAN in writing in advance of such sale. MEAN will have ten (10) business days from receipt of said notice from Participant to give notice to Participant that MEAN has decided to exercise its Right of First Refusal. In the event MEAN gives notice to Participant that it is not exercising its Right of First Refusal or in the event no timely notice is given by MEAN to Participant, this Right of First Refusal shall expire. In the event MEAN exercises its Right of First Refusal, (i) the proposed sale to the third party by Participant will not be consummated, and (ii) MEAN will pay Participant for such capacity at a rate that matches the rate negotiated in the proposed sale to the third party.
- B. **Planning Period.** To facilitate compliance with Regional System deadlines for resource planning and resource adequacy, Participant acknowledges and agrees that its rights under Section 12 shall not include a sale of capacity during the planning period of September 15 through March 31 each year, unless Participant provided MEAN with written notice of such sale at least 10 business days prior to September 15 and complies with all other provisions of Section 12. In the event the applicable resource adequacy construct changes, Participant and MEAN agree to negotiate in good faith to modify this planning period limitation accordingly to allow MEAN sufficient time to meet planning and resource adequacy requirements.

Section 13. Accuracy of Data: MEAN shall have no liability for the accuracy of, or for Participant's failure to timely notify MEAN of, necessary information described in Exhibit A for MEAN to perform the services hereunder. MEAN shall be entitled to use and rely upon all information and data provided by or on behalf of the Participant as accurate without independent verification in the completion of the services provided hereunder. The accuracy of any data submitted for regulatory or compliance purposes and the services provided hereunder are dependent upon the accuracy and completeness of the information which is provided to MEAN by the Participant. It is understood that if MEAN does not obtain all relevant and accurate information, the reliability and accuracy of the data submitted by MEAN for regulatory or compliance purposes on behalf of the Participant and the services provided hereunder may be adversely affected. Accordingly, Participant agrees to bear total responsibility for problems with the Participant's data or submissions of the Participant's data, and for fines or penalties, which arise because of omissions or technical inaccuracies or missing data which Participant provides or fails to provide to MEAN.

Section 14. Metering and Equipment:

- A. **Participant's Lines and Equipment.** MEAN reserves the right to designate the necessary equipment, pursuant to prudent utility practice, to be installed by it at or for each generation resource, and that to be installed and operated by the Participant.
- B. The right is reserved by MEAN to require that the Participant, within the Participant's own system, install and maintain in good operating condition and operate such protective equipment at

any generation resource as MEAN in its discretion may deem necessary for the protection of MEAN's equipment and service or the equipment and service of others whom it may serve at such point. However, the exercise of such right shall not render MEAN, its officers, agents or employees, liable for any loss, damage or accident resulting from defects in such installation, or the misapplication or malfunctioning of such equipment.

- C. Participant's Responsibility for MEAN's Property. All meters and other facilities furnished by MEAN and installed on the Participant's property shall be and remain MEAN's property, and the right to remove, replace or repair such meters and other facilities is expressly reserved to MEAN. The Participant shall exercise due care to protect MEAN's property located on the Participant's premises, and MEAN shall exercise due care to protect the Participant's property located on MEAN's premises.
- D. Right of Access. MEAN shall have access to the Participant's premises at all reasonable times for the purpose of reading meters and for testing, repairing, renewing, exchanging or removing any or all equipment installed by MEAN, and the Participant shall have similar rights of access in respect of equipment installed by the Participant on MEAN's premises.
- E. All equipment and facilities furnished and installed by Participant shall be and remain the property of Participant.

[SIGNATURE PAGE FOLLOWING]

IN WITNESS WHEREOF, MEAN and the Participant have caused this Marketing Agent Agreement to be executed by these duly authorized representatives, the day and year shown below.

MUNICIPAL ENERGY AGENCY
OF NEBRASKA

PARTICIPANT: INDIANOLA MUNICIPAL
UTILITIES, ACTING FOR AND ON BEHALF OF
THE CITY OF INDIANOLA, IOWA

By: _____

By: _____

Title: _____

Title: _____

Date: _____

Date: _____

**EXHIBIT A
MONTHLY SERVICES
TO
MARKETING AGENT AGREEMENT**

Issued to be effective as of June 1, 2023

Pursuant to the Marketing Agent Agreement dated June 1, 2023 (Agreement) between the Municipal Energy Agency of Nebraska (MEAN) and the Indianola Municipal Utilities, acting for and on behalf of the City of Indianola, Iowa (Participant):

As described in Section 2 of the Agreement, MEAN will use reasonable efforts to provide the following services to Participant beginning with the MISO Capacity Auction for MISO Planning Year 2023-2024:

1. Utilize Participant's Marketable Capacity, as that term is defined in Exhibit B, in one or more of the manners set forth below as determined by MEAN in its sole discretion, which determination may change from time to time, and will be in accordance with the following provisions and the Agreement:
 - a. MEAN-leased generation (hereinafter referred to as "Short-Term Leased Capacity"),
or
 - b. Excess capacity (hereinafter referred to as "Excess Capacity")
2. MEAN has determined the marketing manner it will utilize for each MW of Marketable Capacity for the MISO Planning Year 2023-2024, which determination is as set forth in Exhibit C attached hereto and made part of the Agreement.
3. Each year, on or before November 1 (hereinafter referred to as the "Determination Deadline"), MEAN will determine which marketing manner(s) it will utilize for each MW of Marketable Capacity for the next June 1 through May 31 MISO Planning Year and will communicate such determination in writing to Participant in the form of an updated Exhibit C. The Participant and MEAN agree to negotiate in good faith to modify the Determination Deadline as necessary to allow MEAN sufficient time to meet planning or resource adequacy requirements in the event the applicable resource adequacy construct changes.
4. MEAN shall provide compensation to Participant as follows, subject to the provisions of the Agreement:
 - a. For Excess Capacity, MEAN shall pay Participant at a rate equal to the lesser of (i) the seasonal MISO clearing price for Zone 3 in the MISO Planning Resource Auction, or (ii) the net revenue received from MISO for such capacity.
 - b. For Short-Term Leased Capacity, MEAN shall pay Participant \$2.00/kW-mo.
5. Participant agrees that for purposes of the Asset Management Policies and Procedures, Marketable Capacity will be treated as generation leased to MEAN and will be subject to the Asset Management Policies and Procedures and any successor document including without limitation the exercise and capability testing requirements therein (excluding capacity compensation therein), as well as applicable MISO requirements. Compensation for energy production from such units will be at the rate determined by the MEAN Board of Directors from time to time for generation leased to MEAN.

6. In accordance with the Asset Management Policies and Procedures, for purposes of billing under the Participant's Schedule M Agreement, MEAN will add back to the Participant's total load calculation the hourly energy production provided during generation to ensure proper billing of monthly peak demand and energy and to ensure proper reporting of network load for transmission purposes.
7. With respect to the generating units in Exhibit B to the Agreement, Participant agrees to generate up to the full extent of the generation capacity of the Marketable Capacity, in accordance with Good Utility Practice, NERC, EPA, MISO or other Regional System, or any successor requirements and industry standards, each as they may be modified from time to time, to the extent applicable to MEAN and Participant, respectively. Notwithstanding the preceding sentence, such generation shall at all times be subject to and limited by Participant's Iowa DNR Title V Permit and any other limitations which may be imposed by the Iowa DNR or the EPA. MEAN is not responsible for any Damages resulting from or arising out of changes in limitations. Participant retains responsibility for compliance with applicable environmental regulations. Participant will promptly inform MEAN of generator unavailability and will provide MEAN with monthly operating reports including fuel usage.
8. Participant acknowledges and agrees that MEAN has exclusive rights to all capacity credits received from MISO or other Regional System for the Marketable Capacity.

Terms used but not defined in this Exhibit shall have the meaning ascribed thereto in the Agreement.

This Exhibit may be modified from time to time in accordance with the Agreement.

All other terms and conditions for this arrangement will be governed by the Agreement between MEAN and Participant.

EXHIBIT B
APPLICABLE PARTICIPANT GENERATING UNITS
TO
MARKETING AGENT AGREEMENT

Issued to be effective as of June 1, 2023

Pursuant to the Marketing Agent Agreement dated June 1, 2023 (Agreement) between the Municipal Energy Agency of Nebraska (MEAN) and the Indianola Municipal Utilities, acting for and on behalf of the City of Indianola, Iowa (Participant):

UNIT ID	TYPE UNIT	NAMEPLATE CAPACITY (MW)	NET DEPENDABLE CAPACITY (MW)	FUEL USE*
Unit 7	CT	17.5		D
Unit 8	CT	20.2		D**
Total		37.7	35.0	
*D = Diesel No. 2				
**Dual fuel unit, but no natural gas source				

For purposes of the Agreement and the marketing services thereunder, the following definitions shall apply:

Total Capacity is defined as the lesser of nameplate or temperature corrected unit capability testing results for all units shown on this Exhibit B.

Marketable Capacity is defined as Total Capacity minus the sum of the following: (i) all MW leased to MEAN (currently 15 MW) under the Amended and Restated Supplemental Agreement Regarding Participant-Owned Capacity entered into as of June 1, 2018, as such agreement may be amended from time to time, plus (ii) sales to third parties as permitted by the Agreement, plus (iii) reductions described below to Excess Capacity, as that term is defined in Exhibit A.

Net Dependable Capacity is defined as the maximum power a generating unit can supply under peak seasonal conditions for a given time interval without exceeding approved limits of temperature and stress. The value is stated net of station service. This capacity is determined by the levels reliably achieved during the seasonal Unit Capability Tests.

Participant acknowledges and agrees that for Marketable Capacity determined by MEAN to be Excess Capacity in accordance with Exhibit A, the Excess Capacity will be adjusted to be equal to the MISO Seasonal Accredited Capacity amount for such capacity.

This Exhibit B may be modified from time to time, upon mutual consent of both Parties as is evidenced by execution of an amended Exhibit B. Notwithstanding anything herein to the contrary, this Exhibit B may be annually modified at the discretion of Participant pursuant to and in accordance with Section 3 of the Agreement.

EXHIBIT C
MARKETING MANNER
TO
MARKETING AGENT AGREEMENT

Issued to be effective as of June 1, 2023

Pursuant to the Marketing Agent Agreement dated June 1, 2023 (Agreement) between the Municipal Energy Agency of Nebraska (MEAN) and the Indianola Municipal Utilities, acting for and on behalf of the City of Indianola, Iowa (Participant):

For the MISO Planning Year 2023-2024, MEAN has determined the following marketing manner(s) for each MW of Participant's Marketable Capacity:

MISO 2023-2024 Planning Year	
Short Term Leased Capacity	20 MW
Excess Capacity	0 MW

This Exhibit C shall be updated annually by MEAN in accordance with Exhibit A to the Agreement.

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities

From: Elisha Brown

Date: December 12, 2022

Subject: Consider approval of utility accounts to be written off and to use any customary collection method, including submission to the state offset program, and to charge any applicable collection fees.

Recommendation: Attached are uncollected electric, water and telecommunication billing amounts from the third quarter of 2022 that will be written off.

The amount for each utility is listed below:

Electric	\$19,033.37
Water	\$1,967.77
Telecommunications	\$6,588.42
Total	\$27,589.56

Simple motion is in order.

Attachments:

1. Q3 Write Offs July 31 2022 12.22
2. IMU Write Off Report 12.22

2022 Q3 Write Offs

Electric Billed	\$5,039,338.97	
Electric Write-off	\$19,033.37	0.38%
Water Billed	\$828,909.28	
Water Write-off	\$1,967.77	0.24%
Telecom Billed	\$1,156,788.20	
Telecom Write-off	\$6,588.42	0.57%

Total # of accounts wrote off - 62

<u>Service</u>	<u>Total Dollar Amount</u>
Admin Fee Telecom	\$ 143.40
Electric	19,033.37
Internet	2,006.42
Video	4,394.80
Water	1,967.77
Phone	\$43.80
Grand Total	\$ 27,589.56

	Electric	Water	Fiber	Total		Billed	
2020 Q1	\$ -	\$ -	\$ -	\$ -		\$ -	2020 Q1
2020 Q2	\$ -	\$ -	\$ -	\$ -		\$ -	2020 Q2
2020 Q3	\$ -	\$ -	\$ -	\$ -		\$ -	2020 Q3
2020 Q4	\$ 94,423.05	\$ 10,258.90	\$ 21,030.59	\$ 125,712.54	2020 Year Total	\$22,791,382.92	2020 Q4
Total	94423.05	10258.9	21030.59		\$ 125,712.54	\$22,791,382.92	Total
2021 Q1	\$ 15,295.20	\$ 1,916.64	\$ 1,579.28	\$ 18,791.12		\$ 5,156,082.50	2021 Q1
2021 Q2	\$ 24,269.78	\$ 3,613.11	\$ 7,325.55	\$ 35,208.44		\$ 4,731,319.59	2021 Q2
2021 Q3	\$ 30,962.47	\$ 3,166.59	\$ 5,782.16	\$ 39,911.22		\$ 6,461,485.61	2021 Q3
2021 Q4	\$ 16,663.91	\$ 2,745.50	\$ 1,793.22	\$ 21,202.63	2021 Year Total	\$ 5,734,992.34	2021 Q4
Total	\$ 87,191.36	\$ 11,441.84	\$ 16,480.21		\$ 115,113.41	\$22,083,880.04	Total
2022 Q1	\$ 23,751.80	\$ 4,140.98	\$ 4,893.85	\$ 32,786.63		\$ 4,903,775.99	2022 Q1
2022 Q2	\$ 14,131.61	\$ 5,200.81	\$ 2,827.08	\$ 22,159.50		\$ 5,048,142.99	2022 Q2
2022 Q3	\$ 19,033.37	\$ 1,967.77	\$ 6,588.42	\$ 27,589.56		\$ 7,026,036.45	2022 Q3
2022 Q4				\$ -	2022 Year Total		2022 Q4
Total	\$ 56,916.78	\$ 11,309.56	\$ 14,309.35		\$ 82,535.69	\$16,977,955.43	Total
2023 Q1				\$ -			2023 Q1
2023 Q2				\$ -			2023 Q2
2023 Q3				\$ -			2023 Q3
2023 Q4				\$ -	2023 Year Total		2023 Q4
Total	\$ -	\$ -	\$ -		\$ -	\$0.00	Total
2024 Q1				\$ -			2024 Q1
2024 Q2				\$ -			2024 Q2
2024 Q3				\$ -			2024 Q3
2024 Q4				\$ -	2024 Year Total		2024 Q4
Total	\$ -	\$ -	\$ -		\$ -	\$0.00	Total
2025 Q1				\$ -			2025 Q1
2025 Q2				\$ -			2025 Q2
2025 Q3				\$ -			2025 Q3
2025 Q4				\$ -	2025 Year Total		2025 Q4
Total	\$ -	\$ -	\$ -		\$ -	\$0.00	Total

0.55%

0.52%

0.49%

2020-2025	Electric	Water	Fiber	2020-2025 Total
Totals	\$ 238,531.19	\$ 33,010.30	\$ 51,820.15	\$ 323,361.64
Averages	\$ 39,755.20	\$ 5,501.72	\$ 8,636.69	\$ 53,893.61

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities

From:

Date: December 12, 2022

Subject: Discussion and direction on the Fiscal Year 24 budget.

Recommendation:

Attachments:

1. FY23-28 5 YR EL CIP
2. FY23-28 5 YR WA CIP
3. FY23-28 5 YR FIBER CIP

**5 YR CAPITAL IMPROVEMENT PLAN
ELECTRIC UTILITY**

PROJECT	2022-23	ReEstimated 2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
<u>VEHICLES</u>							
Pickups/SUV's				55,000			
Line Truck							350,000
Digger Derrick/Crane					350,000		
Skid Steer				100,000			
Dump Truck						90,000	
Directional Boring Machine	1,030,000	1,030,000					
730-8200-67100	1,030,000	1,030,000	-	155,000	350,000	90,000	350,000
<u>TURBINES/SUBSTATIONS/SPECIALIZED EQUIPMENT</u>							
Major Maintenance	75,000	75,000	80,000	80,000	85,000	85,000	90,000
69kV Relays				360,000			
Turbine 8 Controls Update	80,000	80,000	800,000				
Fuel Tank Inspections					15,000		
SCADA Controls Update					130,000		
East Iowa 1 Batteries						45,000	
Plant Batteries						25,000	
Title V - 5 Year	18,000	18,000					20,000
Turbine Painting						175,000	
730-8200-67245	173,000	173,000	880,000	440,000	230,000	330,000	110,000
<u>CUSTOMER PAID MATERIALS</u>							
New Service Installation, Streetlights							
730-8200-67304	100,000	100,000	100,000	100,000	100,000	100,000	100,000
<u>TRANSMISSION FACILITIES</u>							
69kV Line Major Maintenance	157,500	157,500	175,000	183,800	193,000	202,700	212,800
730-8200-67305	157,500	157,500	175,000	183,800	193,000	202,700	212,800
<u>PROJECT 700</u>							
Private Service Upgrades							
730-8200-67307	3,000	3,000	3,500	3,500	3,500	3,500	3,500
<u>LINE CONSTRUCTION</u>							
Major Line Replacement	200,000	200,000	115,000	120,800	126,800	133,100	139,800
K St	50,000	50,000	500,000				
Hillcrest	25,000	25,000	100,000				
Electric Underground Conversion	600,000	600,000	700,000	735,000	771,800	810,400	850,900
730-8200-67311	875,000	875,000	1,415,000	855,800	898,600	943,500	990,700
<u>STREETLIGHT REPLACEMENT</u>							
Major Streetlight Replacement - 67313	50,000	50,000	50,000	50,000	20,000	20,000	20,000
730-8200-67313	50,000	50,000	50,000	50,000	20,000	20,000	20,000
<u>BUILDING MAINTENANCE</u>							
Major Building Maint.	35,000	35,000	36,800	38,600	40,500	42,500	44,600
730-8200-67900	35,000	35,000	36,800	38,600	40,500	42,500	44,600
<u>COMPUTER SOFTWARE</u>							
Network Upgrades	10,000	10,000	10,000	10,000	10,000	10,000	10,000
730-8200-67901	10,000	10,000	10,000	10,000	10,000	10,000	10,000
<u>RADIO READ METERS</u>							
Meter Replacement	44,000	44,000	46,000	48,000	50,000	52,000	54,000
730-8200-67904	44,000	44,000	46,000	48,000	50,000	52,000	52,000
ANNUAL ELECTRIC TOTALS	\$ 2,477,500	\$ 2,477,500	\$ 2,716,300	\$ 1,932,700	\$ 1,945,600	\$ 1,846,200	\$ 1,947,600

**5 YR CAPITAL IMPROVEMENT PLAN
WATER UTILITY**

PROJECT	2022-23	Re-Estimated 2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
VEHICLES							
Pickup Replacement			30,000			30,000	
Vacuum Trailer					100,000		
Excavation Equipment						100,000	100,000
8100-67100-700	-	-	30,000	-	100,000	130,000	100,000
PLANT/TOWER MAINTENANCE							
SCADA/Plant Control Upgrades	100,000	175,000	50,000				
Filter Upgrades		80,000			100,000		
Plant Upgrades/Tower Maintenance	300,000	150,000	100,000	100,000	200,000		
Back Up Generation			300,000	300,000			
Plant & Garage Roof Upgrades				150,000			
Clear Well Upgrade						100,000	100,000
8100-67402-700	400,000	405,000	450,000	550,000	300,000	100,000	100,000
WELL MAINTENANCE							
Backwash & High Service Pumps	64,000	30,000	30,000	30,000	30,000	30,000	30,000
Well #9			110,000				
Well #10							150,000
Well #11		140,000					
Well #12		140,000					
8100-67403-700	64,000	310,000	140,000	30,000	30,000	30,000	180,000
VALVE/HYDRANT REPLACEMENT							
Gate Valve & Hydrant Replacement	10,000	10,000	20,000	20,000	20,000	20,000	20,000
8100-67405-700	10,000	10,000	20,000	20,000	20,000	20,000	20,000
WATER MAINS							
Downtown Streetscape	300,000	300,000	200,000				
Downtown Streetscape Southeast			150,000	150,000			
W Clinton, Howard to Buxton	300,000		100,000				
N 6th & E Franklin 6th-9th				100,000	200,000		
N 9th St, Salem to Euclid & N F St, W 2nd to W Detroit				200,000	400,000	300,000	300,000
N H, Boston to Detroit & 400 Block E 3rd				200,000	100,000		
N J, Euclid to Detroit & W Detroit, G to J					200,000	200,000	100,000
N K, Clinton to Euclid and 1300 blk W Detroit						300,000	300,000
Caroline Terrace & Stephen Ct & W Clinton, D to F						400,000	400,000
8100-67406-700	600,000	300,000	450,000	650,000	900,000	1,200,000	1,100,000
WATER METERS							
Water Meter Maintenance	100,000	175,000	200,000	150,000	200,000	200,000	200,000
8100-67905-700	100,000	175,000	200,000	150,000	200,000	200,000	200,000
ANNUAL WATER TOTALS	\$ 1,174,000	\$ 1,200,000	\$ 1,290,000	\$ 1,400,000	\$ 1,550,000	\$ 1,680,000	\$ 1,700,000

**5 YR CAPITAL IMPROVEMENT PLAN
FIBER UTILITY**

PROJECT	2022-23	Re Est 2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
<u>28E CAPITAL CONTRIBUTION</u>							
Annual Headend Upgrades	75,000	75,000	40,000	45,000	10,000	10,000	25,000
8500-67400-740	75,000	75,000	40,000	45,000	10,000	10,000	10,000
<u>IPTV EQUIPMENT</u>							
IPTV Equipment	10,000	10,000	7,500	7,500	7,500	7,500	7,500
8500-67404-740	10,000	10,000	7,500	7,500	7,500	7,500	7,500
<u>Over the Air Channels</u>							
Over the Air Channels	5,000	10,000	40,000	10,000	10,000	10,000	5,000
8500-67405-740	5,000	10,000	40,000	10,000	10,000	10,000	5,000
<u>Customer Premise Equipment</u>							
CPE	100,000	240,000	300,000	325,000	340,000	355,000	380,000
8500-67406-740	100,000	240,000	300,000	325,000	340,000	355,000	380,000
<u>CORE NETWORK EQUIPMENT</u>							
Switches, Servers, Storage	90,000	60,000	50,000	40,000	35,000	35,000	35,000
8500-67407-740	90,000	60,000	50,000	40,000	35,000	35,000	35,000
<u>Building Improvements</u>							
Building Improvements	10,000	15,000	80,000	20,000	25,000	10,000	10,000
8500-67408-740	10,000	15,000	80,000	20,000	25,000	10,000	10,000
<u>VEHICLES</u>							
3/4 Ton Pickup							70,000
Aerial Truck				35,000			
Plant Vehicle			50,000	50,000			
Tech Vehicle		50,000		60,000	60,000		
8500-67409-740	-	50,000	50,000	145,000	60,000	-	70,000
<u>General Equipment</u>							
General Equipment	10,000	15,000	25,000	25,000	25,000	15,000	15,000
8500-67410-740	10,000	15,000	25,000	25,000	25,000	15,000	15,000
<u>OUTSIDE PLANT IMPROVEMENTS</u>							
Outside Plant Expansion	1,572,000	475,000	400,000	300,000	250,000	200,000	200,000
8500-67413-740	1,572,000	475,000	400,000	300,000	250,000	200,000	200,000
<u>Fiber Drop Install/Materials</u>							
Fiber Drop Install/Materials	153,000	153,000	140,000	125,000	110,000	100,000	100,000
8500-67414-740	153,000	153,000	140,000	125,000	110,000	100,000	100,000
<u>Series 2022A Fiber Construction</u>							
Pella Transport Line, Construction & Engineering		1,170,000					
Pella Transport Line, Operational Hardware		110,000					
Central Office Upgrade		252,000					
ABR Hardware			100,000				
XGS-PON Rollout			145,000				
8500-67602-740	-	1,532,000	245,000	-	-	-	-
ANNUAL FIBER TOTALS	\$ 2,025,000	\$ 2,635,000	\$ 1,377,500	\$ 1,042,500	\$ 872,500	\$ 742,500	\$ 832,500

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities

From:

Date: December 12, 2022

Subject: Enter into closed session in accordance with Iowa Code Section 388.9(1) to discuss marketing and pricing strategies and proprietary information of the telecommunications division whose competitive position will be harmed by public disclosure that is not required of potential or actual competitors and no public purpose is served by such disclosure.

Recommendation: Roll call to enter and exit the closed session is in order.

Attachments: None

MEMORANDUM

To: IMU Board of Trustees of the Electric, Water and Communications Utilities
From:
Date: December 12, 2022
Subject: Approval of a CISCO equipment purchase for the Communications Department.

Recommendation: Simple motion is in order.

Attachments: None