

CRYO RIO-08 BILL OF MATERIAL					
ITEM NO.	QTY	DESCRIPTION	VENDOR	PART NUMBER	SUPPLIED BY
1	1	CONCEPT WALL MOUNTED ENCLOSURE	HOFFMAN	CSD603612SS	PANEL SHOP
2	1	BACK PANEL	HOFFMAN	CP6036	PANEL SHOP
3	1	ENCLOSURE MOUNTING BRACKET	HOFFMAN	CMFKSS	PANEL SHOP
4	1	ETHERNET ADAPTER 16 MODULES RJ45	ALLEN-BRADLEY	1794-AENTR	PANEL SHOP
5	4	DISCRETE INPUT, 16 POINT, MODULE	ALLEN-BRADLEY	1794-IB16	PANEL SHOP
6	1	DISCRETE OUTPUT, 16 POINT	ALLEN-BRADLEY	1794-OB16	PANEL SHOP
7	5	MOUNTING BASE	ALLEN-BRADLEY	1794-TB3	PANEL SHOP
8	A/R	DIN RAIL, 35 MM, PERFORATED, 7.5	ALLEN-BRADLEY	199-DR1	PANEL SHOP
9		END ANCHOR	ALLEN-BRADLEY	1492-EAJ35	PANEL SHOP
10	1	ISOLATED GROUND BAR ASSEMBLY	DWG#	L1901-NPDC-ELE-DWG-00002	PANEL SHOP
11	1	EQUIPMENT GROUND BAR ASSEMBLY	DWG#	L1901-NPDC-ELE-DWG-00002	PANEL SHOP
12	1	DC POWER DISTRIBUTION TERMINAL ASSEMBLY	DWG#	L1901-NPDC-INS-DWG-02004	PANEL SHOP
13	4	16-POINT 24VDC DISCRETE INPUT ASSEMBLY	DWG#	L1901-NPDC-INS-DWG-02004	PANEL SHOP
14	1	16-POINT 24VDC DISCRETE OUTPUT ASSEMBLY	DWG#	L1901-NPDC-INS-DWG-02004	PANEL SHOP
15	A/R	WIREWAY, 3"x4", GRAY W/COVER (DC)	PANDUIT	F3X4LG6	PANEL SHOP
16	3	TERMINAL BLOCK	ALLEN-BRADLEY	1492-J10	PANEL SHOP
17	1	HAZARDOUS-AREA RATED SILICONE HEATING BLANKET, 240VAC, 720 WATTS, 12"x24"	BRISK HEAT	SRX12247202PT3	PANEL SHOP
18	1	HEAVY DUTY BOLT-ON WASHER THERMOCOUPLE ASSEMBLY	OMEGA	WTJ-HD-72-S	PANEL SHOP
19	1	ISOLATED TEMPERATURE TRANSMITTER	MOORE INDUSTRIES	SPT/TPRG/PRG/U/C (D IN)	PANEL SHOP
20	2	END ANCHOR	ALLEN-BRADLEY	1492-EAJ35	PANEL SHOP
21	1	GROUP MARKER	ALLEN-BRADLEY	1492-GM35	PANEL SHOP
22	1	ANALOG INPUT, 8 POINT	ALLEN-BRADLEY	1794-IE8	PANEL SHOP
23	1	8 POINT ANALOG INPUT ASSEMBLY	DWG#	L1901-NPDC-INS-DWG-02004	PANEL SHOP

LAMACOID NAMEPLATE SCHEDULE				
ITEM NO.	FIRST LINE	SECOND LINE	THIRD LINE	SUPPLIED BY
1	CRYO	RIO-08		PANEL SHOP
2	ISOLATED	GROUND		PANEL SHOP
3	EQUIPMENT	GROUND		PANEL SHOP
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TB NAMEPLATE SCHEDULE				
ITEM NO.	FIRST LINE	SECOND LINE	THIRD LINE	SUPPLIED BY
1	TBDC			PANEL SHOP
2	R8S0			PANEL SHOP
3	R8S1			PANEL SHOP
4	R8S2			PANEL SHOP
5	R8S3			PANEL SHOP
6	R8S4			PANEL SHOP
7	TB-HTR			PANEL SHOP
8	R8S5			PANEL SHOP
9				
10				

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REF DWG. NO.	DESCRIPTION	REV	DESCRIPTION	DATE	BY	CHKD	LTES APV	LONEB APV	NPDC NWD APV
		A	ISSUED FOR APPROVAL	12/23/20	JJB	SRB	SCP		

AUTHORIZED FOR RELEASE		
TITLE	DATE	BY
LTES PROJECT MANAGER		
LONEB PROJECT MANAGER		



LONE TREE
ENGINEERING SERVICES
7801 E PEAKVIEW AVE, STE 150
CENTENNIAL, CO 80111, USA

CLIENT



NIGERIAN PETROLEUM DEVELOPMENT COMPANY



LONEB RESOURCES NIG. LTD

UTOROGU GAS EXPANSION PROJECT
UTOROGU, NIGERIA
L1901-NPDC
CRYO RIO-08
BILL OF MATERAILS

DRAWN BY	DATE	LTES NO:	DWG. NO	REV
A. HOGAN	06/08/20	19016-00	L1901-NPDC-INS-DWG-02000	A
SCALE: NONE				

CRYO RIO-09 BILL OF MATERIAL					
ITEM NO.	QTY	DESCRIPTION	VENDOR	PART NUMBER	SUPPLIED BY
1	1	CONCEPT WALL MOUNTED ENCLOSURE	HOFFMAN	CSD603612SS	PANEL SHOP
2	1	BACK PANEL	HOFFMAN	CP6036	PANEL SHOP
3	1	ENCLOSURE MOUNTING BRACKET	HOFFMAN	CMFKSS	PANEL SHOP
4	1	ETHERNET ADAPTER 16 MODULES RJ45	ALLEN-BRADLEY	1794-AENTR	PANEL SHOP
5	4	DISCRETE INPUT, 16 POINT, MODULE	ALLEN-BRADLEY	1794-IB16	PANEL SHOP
6	1	DISCRETE OUTPUT, 16 POINT	ALLEN-BRADLEY	1794-OB16	PANEL SHOP
7	5	MOUNTING BASE	ALLEN-BRADLEY	1794-TB3	PANEL SHOP
8	A/R	DIN RAIL, 35 MM, PERFORATED, 7.5	ALLEN-BRADLEY	199-DR1	PANEL SHOP
9		END ANCHOR	ALLEN-BRADLEY	1492-EAJ35	PANEL SHOP
10	1	ISOLATED GROUND BAR ASSEMBLY	DWG#	L1901-NPDC-ELE-DWG-00002	PANEL SHOP
11	1	EQUIPMENT GROUND BAR ASSEMBLY	DWG#	L1901-NPDC-ELE-DWG-00002	PANEL SHOP
12	1	DC POWER DISTRIBUTION TERMINAL ASSEMBLY	DWG#	L1901-NPDC-INS-DWG-02004	PANEL SHOP
13	4	16-POINT 24VDC DISCRETE INPUT ASSEMBLY	DWG#	L1901-NPDC-INS-DWG-02004	PANEL SHOP
14	1	16-POINT 24VDC DISCRETE OUTPUT ASSEMBLY	DWG#	L1901-NPDC-INS-DWG-02004	PANEL SHOP
15	A/R	WIREWAY, 3"x4", GRAY W/COVER (DC)	PANDUIT	F3X4LG6	PANEL SHOP
16	3	TERMINAL BLOCK	ALLEN-BRADLEY	1492-J10	PANEL SHOP
17	1	HAZARDOUS-AREA RATED SILICONE HEATING BLANKET, 240VAC, 720 WATTS, 12"x24"	BRISK HEAT	SRX12247202PT3	PANEL SHOP
18	1	HEAVY DUTY BOLT-ON WASHER THERMOCOUPLE ASSEMBLY	OMEGA	WTJ-HD-72-S	PANEL SHOP
19	1	ISOLATED TEMPERATURE TRANSMITTER	MOORE INDUSTRIES	SPT/TPRG/PRG/U/C (D IN)	PANEL SHOP
20	2	END ANCHOR	ALLEN-BRADLEY	1492-EAJ35	PANEL SHOP
21	1	GROUP MARKER	ALLEN-BRADLEY	1492-GM35	PANEL SHOP
22	1	ANALOG INPUT, 8 POINT	ALLEN-BRADLEY	1794-IE8	PANEL SHOP
23	1	8 POINT ANALOG INPUT ASSEMBLY	DWG#	L1901-NPDC-INS-DWG-02004	PANEL SHOP

LAMACOID NAMEPLATE SCHEDULE				
ITEM NO.	FIRST LINE	SECOND LINE	THIRD LINE	SUPPLIED BY
1	CRYO	RIO-09		PANEL SHOP
2	ISOLATED	GROUND		PANEL SHOP
3	EQUIPMENT	GROUND		PANEL SHOP
4				
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TB NAMEPLATE SCHEDULE				
ITEM NO.	FIRST LINE	SECOND LINE	THIRD LINE	SUPPLIED BY
1	TBDC			PANEL SHOP
2	R9S0			PANEL SHOP
3	R9S1			PANEL SHOP
4	R9S2			PANEL SHOP
5	R9S3			PANEL SHOP
6	R9S4			PANEL SHOP
7	TB-HTR			PANEL SHOP
8	R9S5			PANEL SHOP
9				
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REF DWG. NO.	DESCRIPTION	REV	DATE	BY	CHKD	LTES APV	LONEB APV	NPDC NWD APV
		A	12/23/20	JJB	SRB	SCP		

AUTHORIZED FOR RELEASE		
TITLE	DATE	BY
LTES PROJECT MANAGER		
LONEB PROJECT MANAGER		



LONE TREE
ENGINEERING SERVICES
7801 E PEAKVIEW AVE, STE 150
CENTENNIAL, CO 80111, USA

CLIENT



NIGERIAN PETROLEUM DEVELOPMENT COMPANY

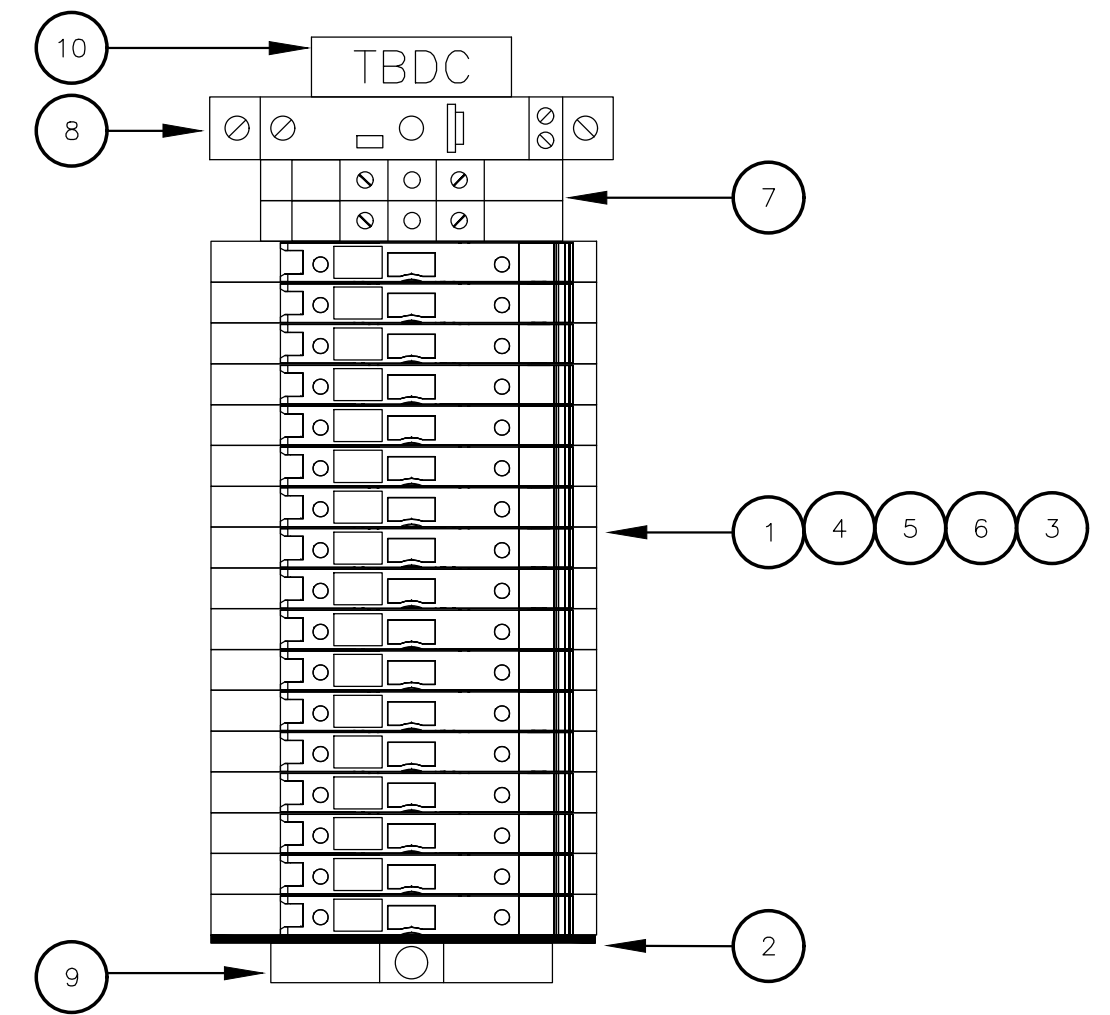


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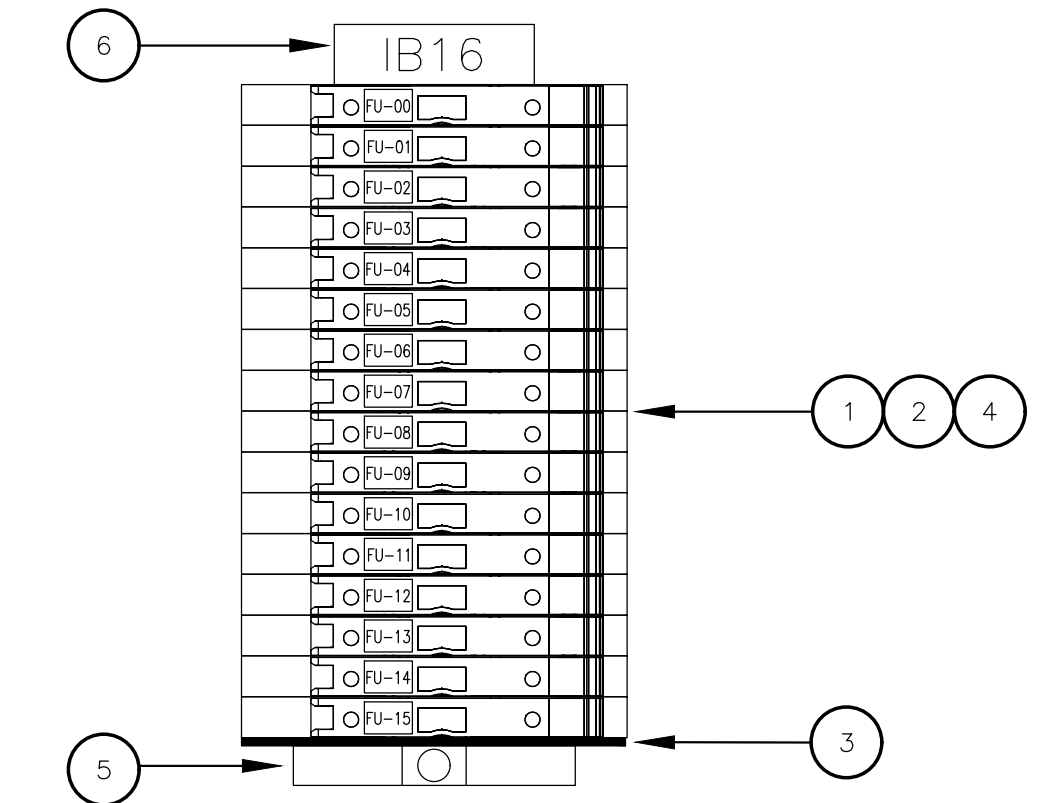
UTOROGU GAS EXPANSION PROJECT
UTOROGU, NIGERIA
L1901-NPDC
CRYO RIO-09
BILL OF MATERAILS

DRAWN BY	DATE	LTES NO:	DWG. NO	REV
A. HOGAN	06/08/20	19016-00	L1901-NPDC-INS-DWG-02001	A
SCALE: NONE				

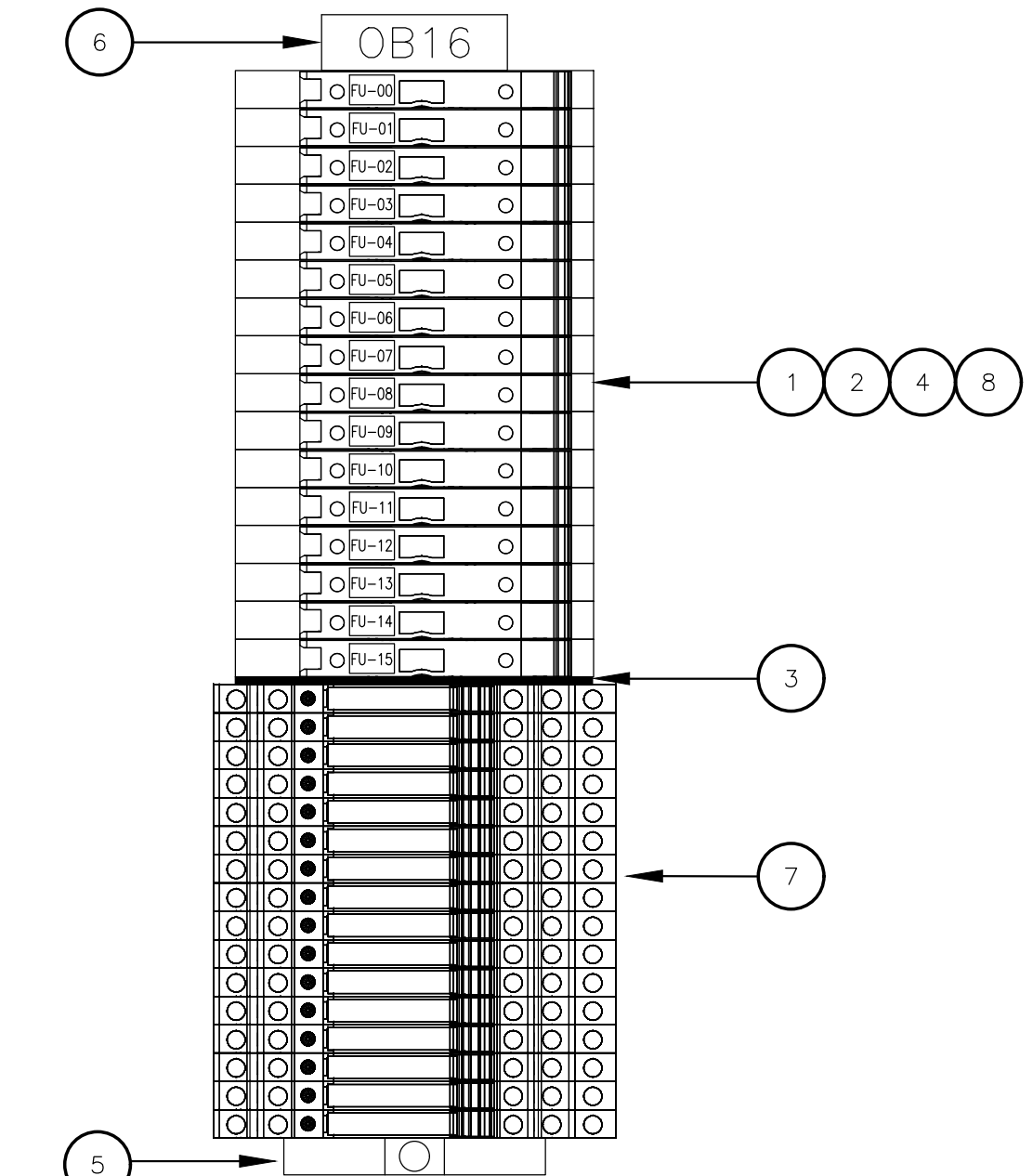
TBDC WIRING ASSEMBLY BILL OF MATERIAL				
ITEM NO.	QTY	DESCRIPTION	VENDOR	SUPPLIED BY
1	17	2-LEVEL TERMINAL BLOCK W/ FUSED CIRCUIT	ALLEN BRADLEY	PANEL SHOP
2	1	END BARRIER FOR JD3FB	ALLEN BRADLEY	PANEL SHOP
3	AR	JUMPER STOCK FOR 2-LEVEL TERMINAL BLOCKS	ALLEN BRADLEY	PANEL SHOP
4	13	FUSE, 5x20, 5A, CERAMIC	BUSSMAN	PANEL SHOP
5	2	FUSE, 5x20, 2A, CERAMIC	BUSSMAN	PANEL SHOP
6	2	FUSE, 5x20, 1A, CERAMIC	BUSSMAN	PANEL SHOP
7	2	TERMINAL BLOCK	ALLEN BRADLEY	PANEL SHOP
8	1	CIRCUIT BREAKER, CI, D2, 12A	PHOENIX CONTACT	PANEL SHOP
9	1	END ANCHOR	ALLEN BRADLEY	PANEL SHOP
10	1	GROUP MARKER	ALLEN BRADLEY	PANEL SHOP
11				
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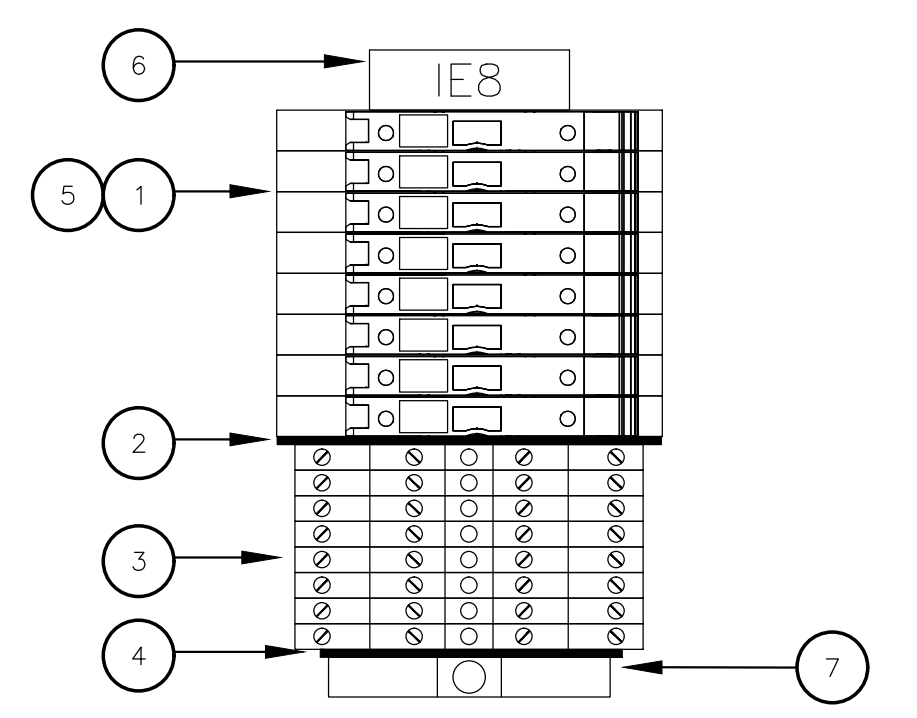
1794-IB16 WIRING ASSEMBLY BILL OF MATERIAL				
ITEM NO.	QTY	DESCRIPTION	VENDOR	SUPPLIED BY
1	16	2-LEVEL TERMINAL BLOCK W/ FUSED CIRCUIT	ALLEN BRADLEY	PANEL SHOP
2	16	FUSE 5x20 mm MEDIUM TIME LAG, 1A, CERAMIC (OR EQUAL)	BUSSMAN	PANEL SHOP
3	1	END BARRIER FOR 2-LEVEL TERMINAL BLOCK	ALLEN BRADLEY	PANEL SHOP
4	AR	JUMPER STOCK FOR 2-LEVEL TERMINAL BLOCKS	ALLEN BRADLEY	PANEL SHOP
5	1	END ANCHOR	ALLEN BRADLEY	PANEL SHOP
6	1	GROUP MARKER	ALLEN BRADLEY	PANEL SHOP
7				
8				



1794-OB16 WIRING ASSEMBLY BILL OF MATERIAL				
ITEM NO.	QTY	DESCRIPTION	VENDOR	SUPPLIED BY
1	16	2-LEVEL TERMINAL BLOCK W/ FUSED CIRCUIT	ALLEN BRADLEY	PANEL SHOP
2	16	FUSE 5x20 mm MEDIUM TIME LAG, 1A, CERAMIC (OR EQUAL)	BUSSMAN	PANEL SHOP
3	1	END BARRIER FOR 2-LEVEL TERMINAL BLOCK	ALLEN BRADLEY	PANEL SHOP
4	AR	JUMPER STOCK FOR 2-LEVEL TERMINAL BLOCKS	ALLEN BRADLEY	PANEL SHOP
5	1	END ANCHOR	ALLEN BRADLEY	PANEL SHOP
6	1	GROUP MARKER	ALLEN BRADLEY	PANEL SHOP
7	16	RELAY TERMINAL, SPDT, 24VDC	ALLEN BRADLEY	PANEL SHOP
8	1	JUMPER, 20 POS. GRAY, FOR RELAY COMMON	ALLEN BRADLEY	PANEL SHOP
9				
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1794-IE8 WIRING ASSEMBLY BILL OF MATERIAL				
ITEM NO.	QTY	DESCRIPTION	VENDOR	SUPPLIED BY
1	8	2-LEVEL TERMINAL BLOCK W/ FUSED CIRCUIT	ALLEN BRADLEY	PANEL SHOP
2	1	END BARRIER FOR JD3FB	ALLEN BRADLEY	PANEL SHOP
3	8	TERMINAL BLOCKS	ALLEN BRADLEY	PANEL SHOP
4	1	END BARRIER FOR TERMINAL BLOCK	ALLEN BRADLEY	PANEL SHOP
5	8	FUSE, 5x20, 500mA, CERAMIC	BUSSMAN	PANEL SHOP
6	1	GROUP MARKER	ALLEN BRADLEY	PANEL SHOP
7	1	END ANCHOR	ALLEN BRADLEY	PANEL SHOP



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REF DWG. NO.	DESCRIPTION	REV	DATE	BY	CHKD	LTES APV	LONEB APV	NPDC NWD APV
		A	12/23/20	JJB	SRB	SCP		

AUTHORIZED FOR RELEASE		
TITLE	DATE	BY
LTES PROJECT MANAGER		
LONEB PROJECT MANAGER		

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NIGERIAN PETROLEUM DEVELOPMENT COMPANY

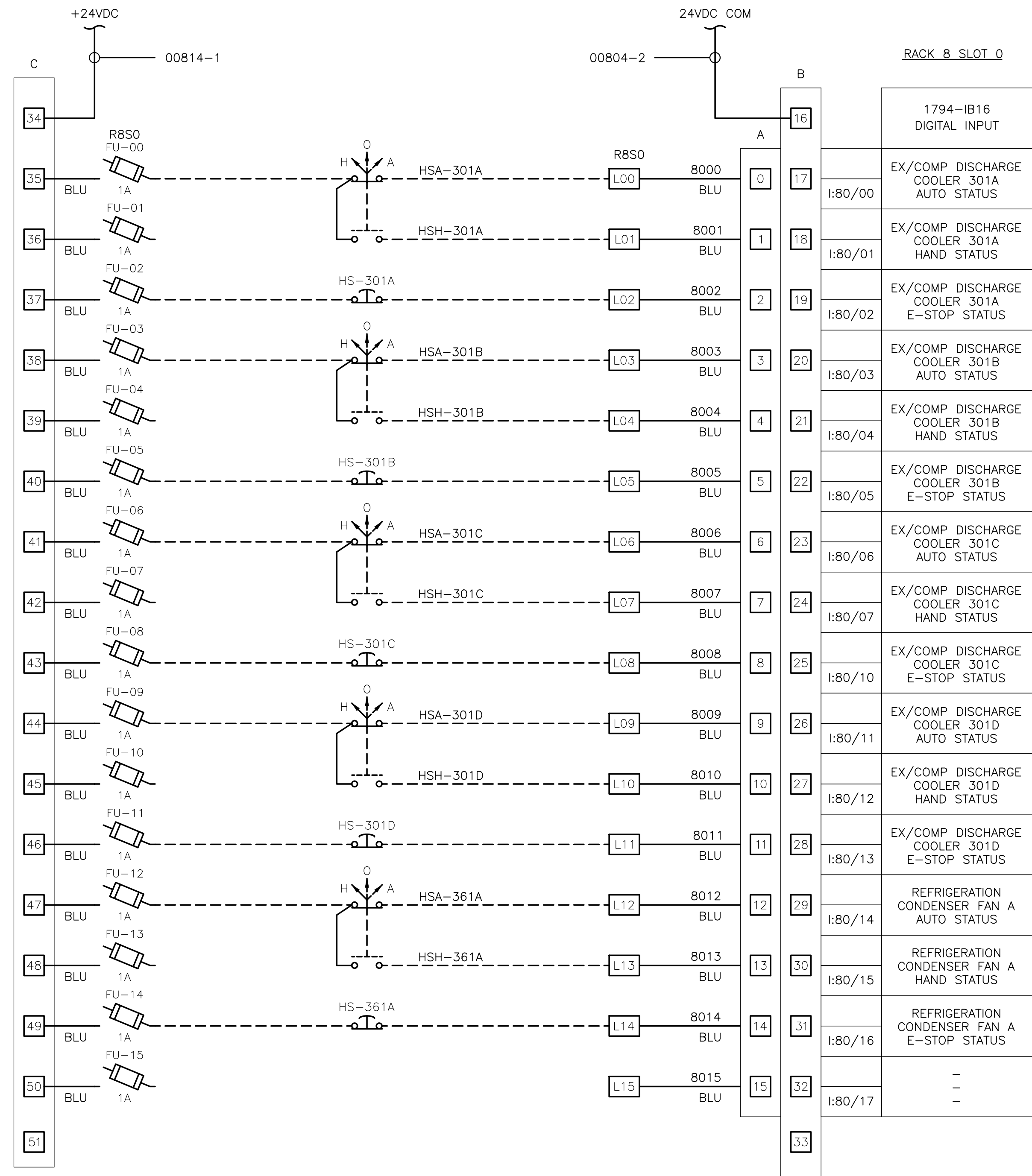
LONEB RESOURCES NIG. LTD

UTOROGU GAS EXPANSION PROJECT (NAG-3)
 UTOROGU, NIGERIA
 L1901-NPDC
 CRYO RIO
 TERMINAL BLOCK ASSEMBLIES

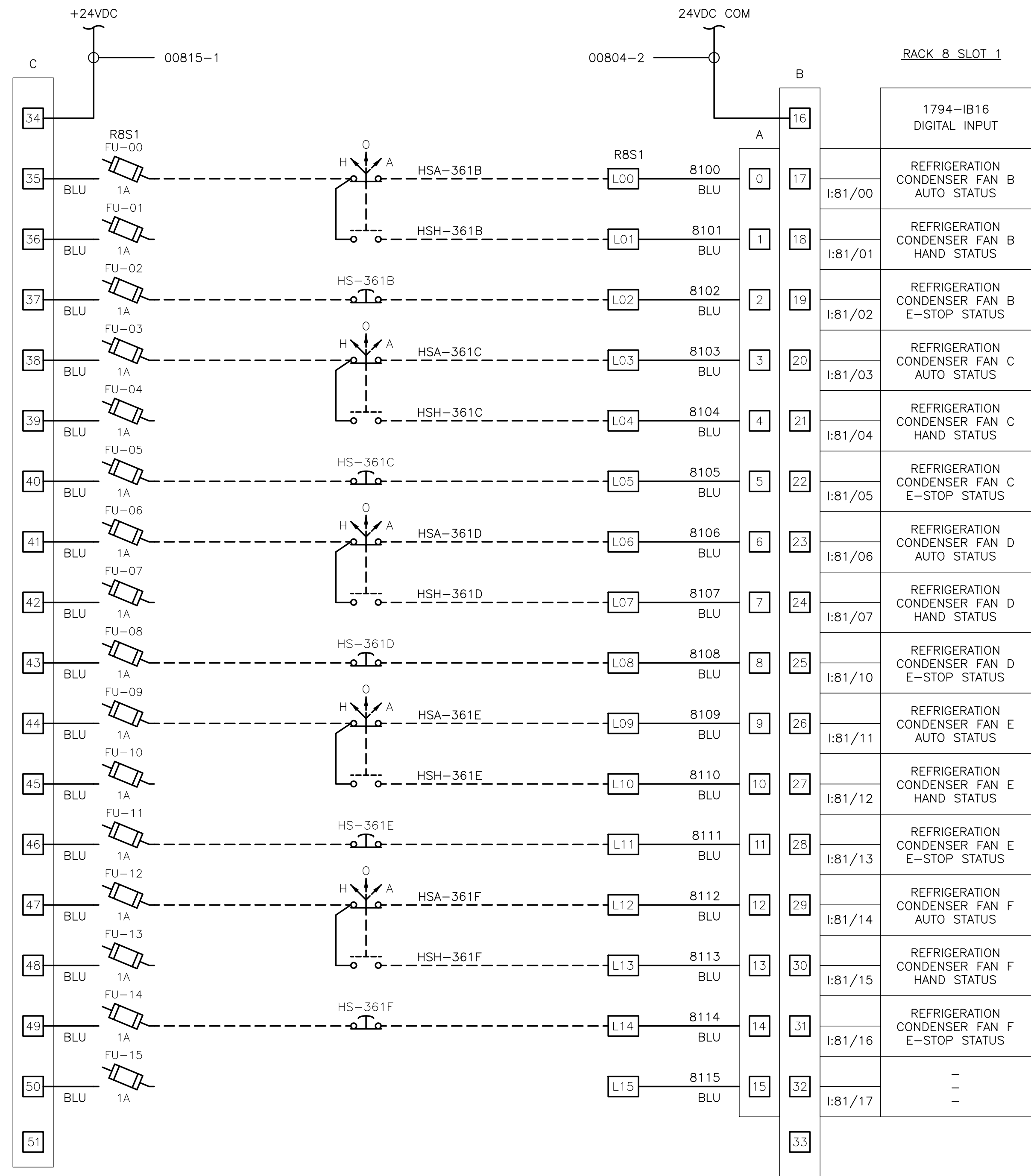
DRAWN BY	DATE	LTES NO: 19016-00	DWG. NO: L1901-NPDC-INS-DWG-02004	REV A
		SCALE: NONE		

Plotted by: JOSEPH.BRON Date: 12/23/2020 12:02 PM Drawing: P:\High Country Sales\Drawings\Electrical-Instrumentation\L1901-NPDC-INS-DWG-02004.dwg

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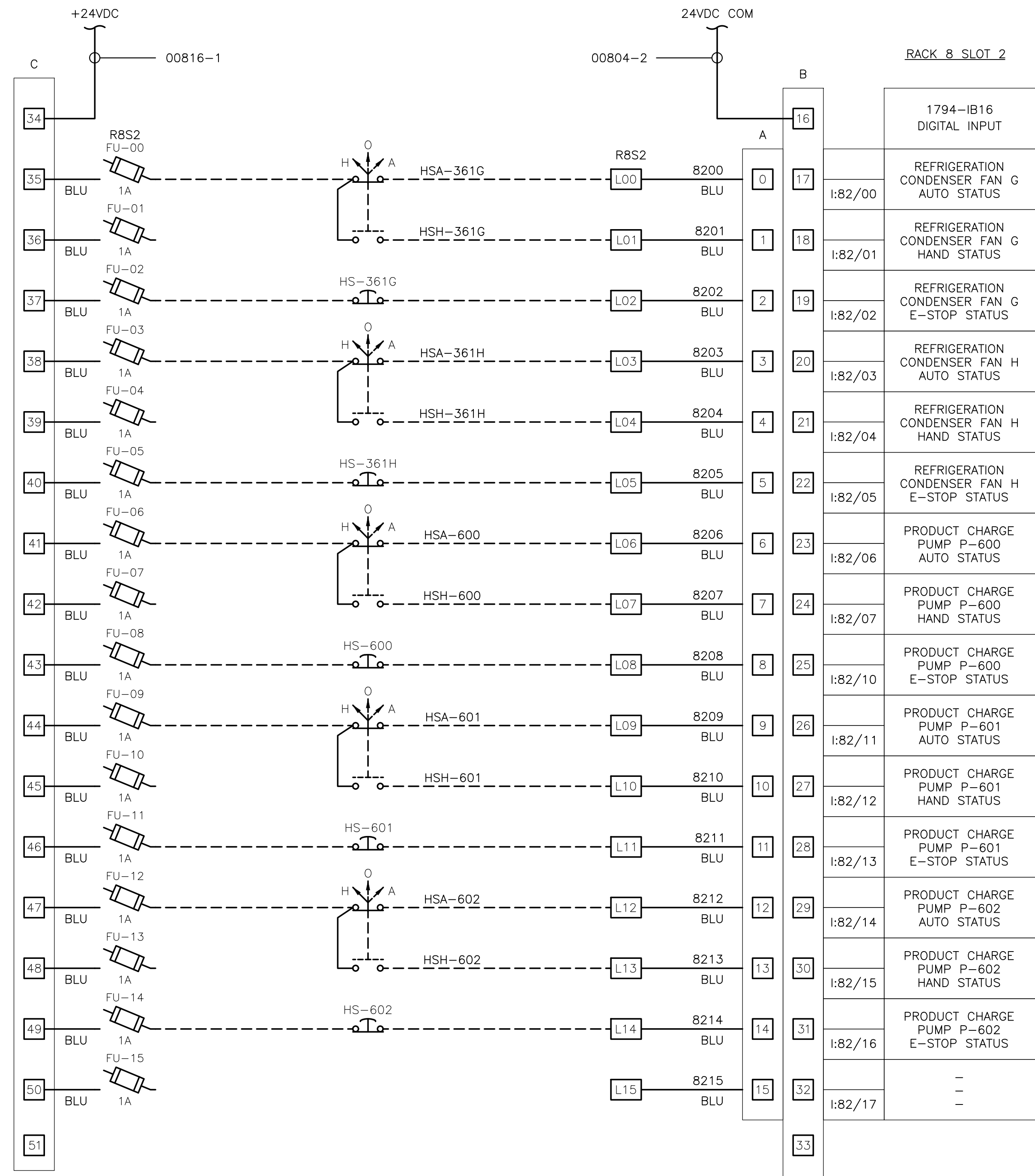
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			A	ISSUED FOR APPROVAL	12/23/20	JJB	SRB	SCP		

AUTHORIZED FOR RELEASE TITLE: LTES PROJECT MANAGER DATE: [] BY: LONEB PROJECT MANAGER			CLIENT NIGERIAN PETROLEUM DEVELOPMENT COMPANY
 LONE TREE ENGINEERING SERVICES 7807 E PEAKVIEW AVE, STE 150 CENTENNIAL, CO 80111, USA			 LONEB RESOURCES NIG. LTD

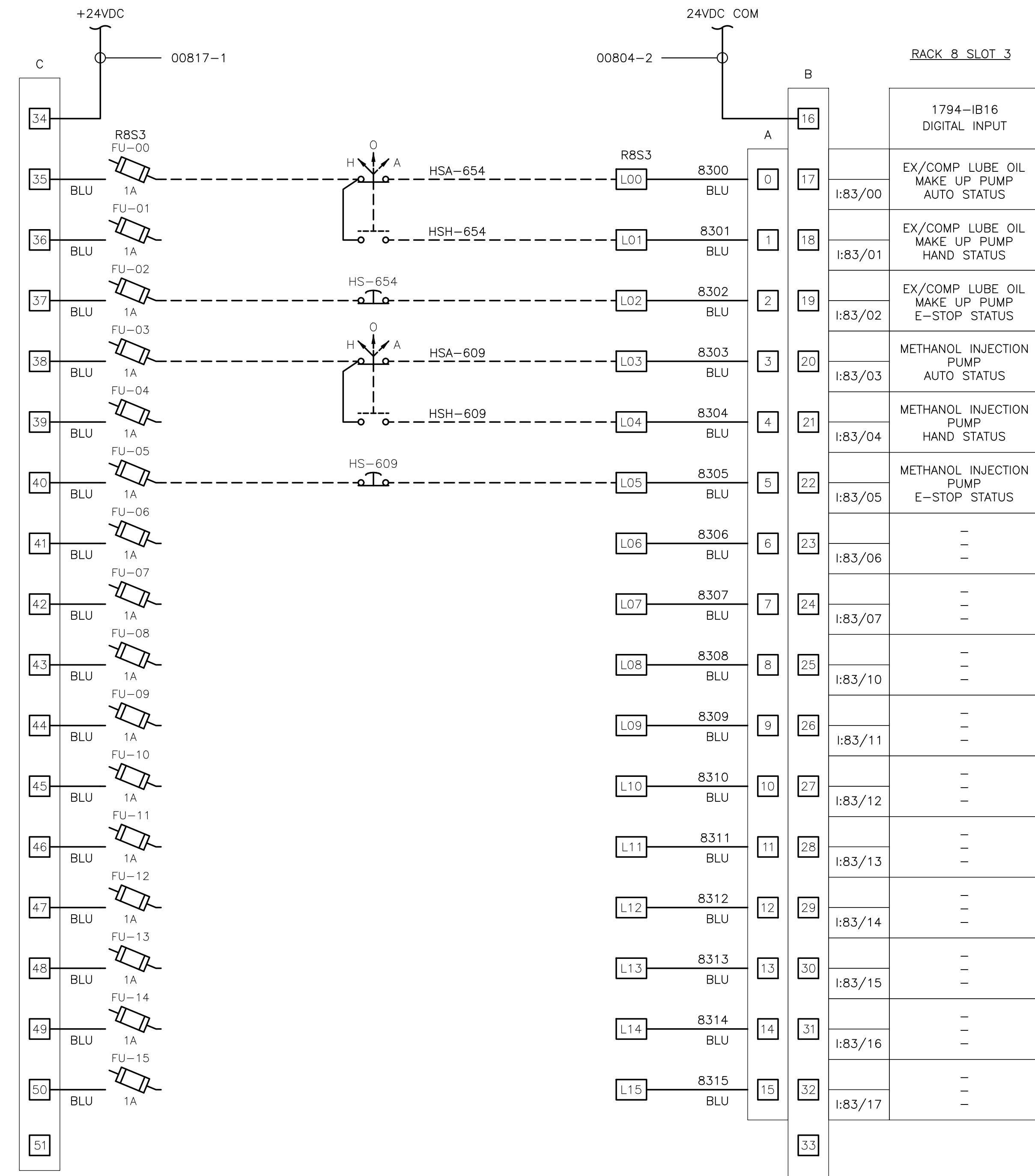
UTOROGU GAS EXPANSION PROJECT UTOROGU, NIGERIA L1901-NPDC CRYO RIO-08 LOOP DRAWING, RACK 8, SLOT 0 AND 1			
DRAWN BY	DATE	LTES NO:	DWG. NO.
A. HOGAN	06/08/20	19016-00	L1901-NPDC-INS-DWG-02010
SCALE:	NONE		REV A

Plotted by: JOSEPH BOND Date: 12/23/2020 12:10 PM Drawing: P:\High Country Sales\Utorogu_Cryo Drawings\Electrical-Instrumentation\L1901-NPDC-INS-DWG-02010.dwg

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			A	ISSUED FOR APPROVAL	12/23/20	JJB	SRB	SCP		

AUTHORIZED FOR RELEASE		
TITLE	DATE	BY
LTES PROJECT MANAGER		
LONEB PROJECT MANAGER		

CLIENT

NIGERIAN PETROLEUM DEVELOPMENT COMPANY

LONEB RESOURCES NIG. LTD

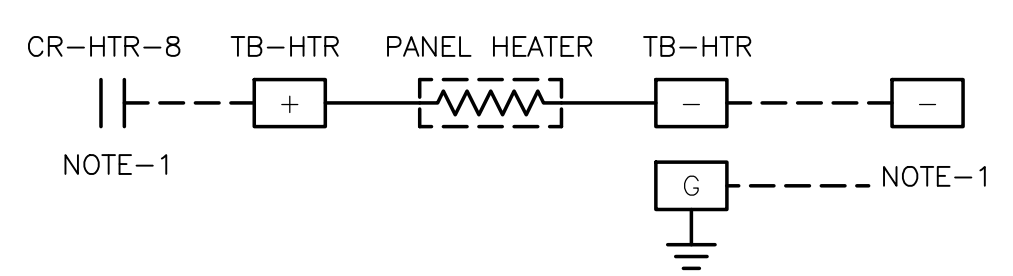
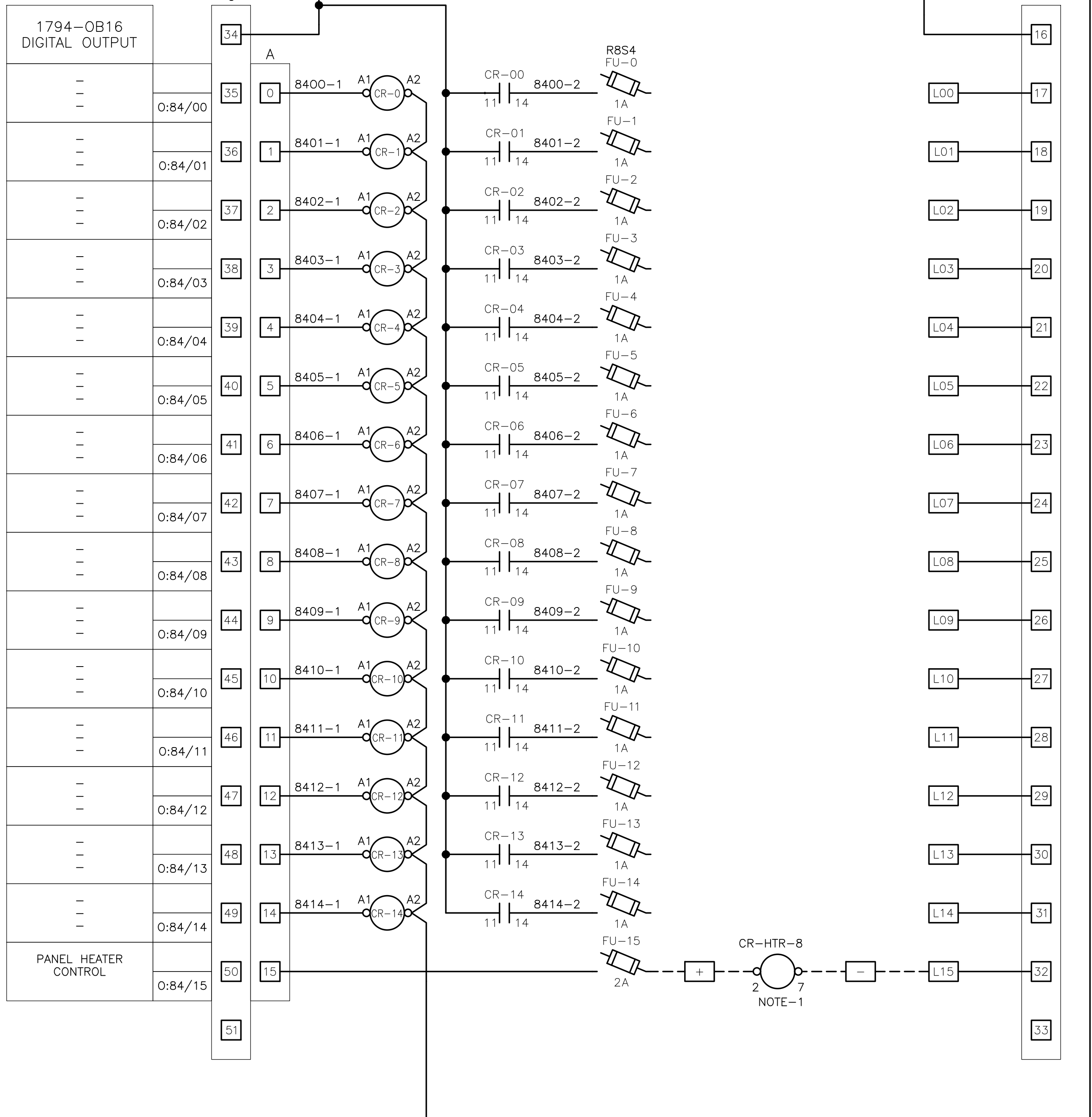
UTOROGU GAS EXPANSION PROJECT
UTOROGU, NIGERIA
L1901-NPDC
CRYO RIO-08
LOOP DRAWING, RACK 8, SLOT 2 AND 3

DRAWN BY	DATE	LTES NO: 19016-00	DWG. NO.	REV
A. HOGAN	06/08/20	SCALE: NONE	L1901-NPDC-INS-DWG-02011	A

Plotted by: JOSEPH BOND Date: 12/23/2020 12:10 PM Drawing: P:\High Country Sales\Utorogu_Cryo Drawings\Electrical-Instrumentation\L1901-NPDC-INS-DWG-02011.dwg

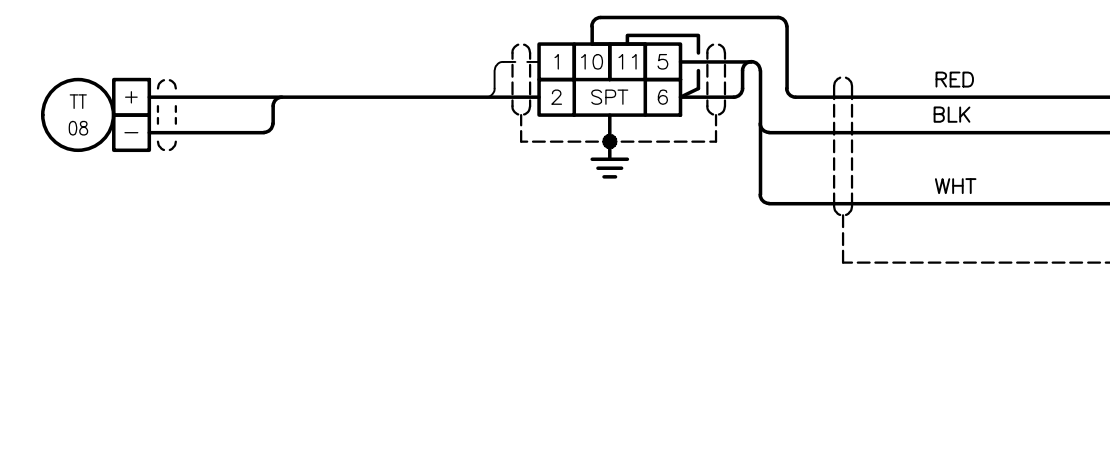
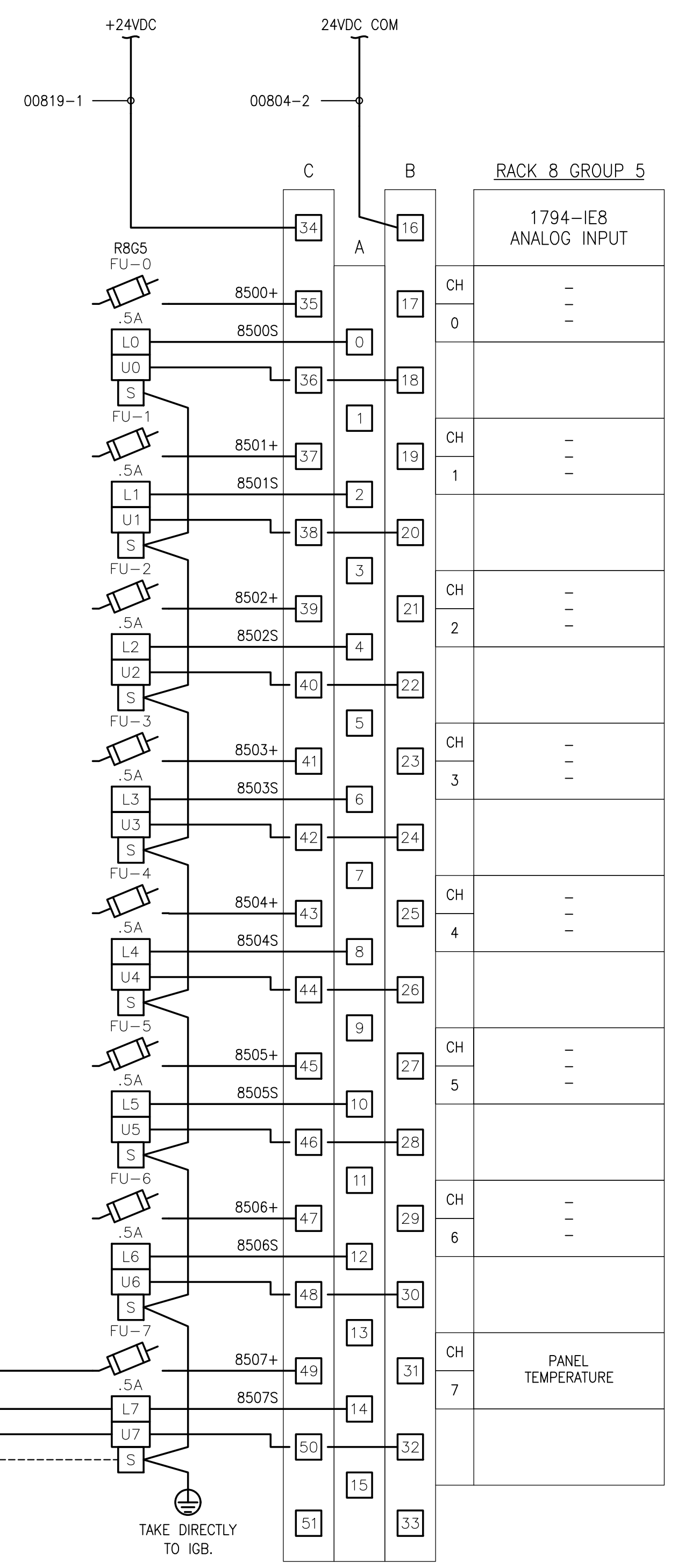
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RACK 8 GROUP 4



NOTES:
1. RELAYS AND TERMINAL ARE LOCATED IN P.S. PANEL. SEE DWG. INS-JBX-00023.

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REF DWG. NO.	DESCRIPTION	REV	DESCRIPTION	DATE	BY	CHKD	LTES APV	LONEB APV	NPDC NWD AP
		A	ISSUED FOR APPROVAL	12/23/20	JJB	SRB	SCP		

AUTHORIZED FOR RELEASE		
TITLE	DATE	BY
LTES PROJECT MANAGER		
LONEB PROJECT MANAGER		

CLIENT
NIGERIAN PETROLEUM DEVELOPMENT COMPANY

UTOROGU GAS EXPANSION PROJECT
UTOROGU, NIGERIA
L1901-NPDC
CRYO RIO-08
LOOP DRAWING, RACK 8, SLOT 4 AND 5

DRAWN BY	DATE	LTES NO: 19016-00	DWG. NO.	REV
A. HOGAN	06/08/20	SCALE: NONE	L1901-NPDC-INS-DWG-02012	A

Plotted by: JOSEPH BOND Date: 12/23/2020 12:11 PM Drawing: P:\High Country Sales\Utorogu Cryo Drawings\Electrical-Instrumentation\L1901-NPDC-INS-DWG-02012.dwg

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RACK 8, SLOT 6
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RACK 8, SLOT 7
SPACE

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		A	12/23/20	JJB	SRB	SCP		
	ISSUED FOR APPROVAL							

AUTHORIZED FOR RELEASE		
TITLE	DATE	BY
LTES PROJECT MANAGER		
LONEB PROJECT MANAGER		

CLIENT



NIGERIAN PETROLEUM DEVELOPMENT COMPANY

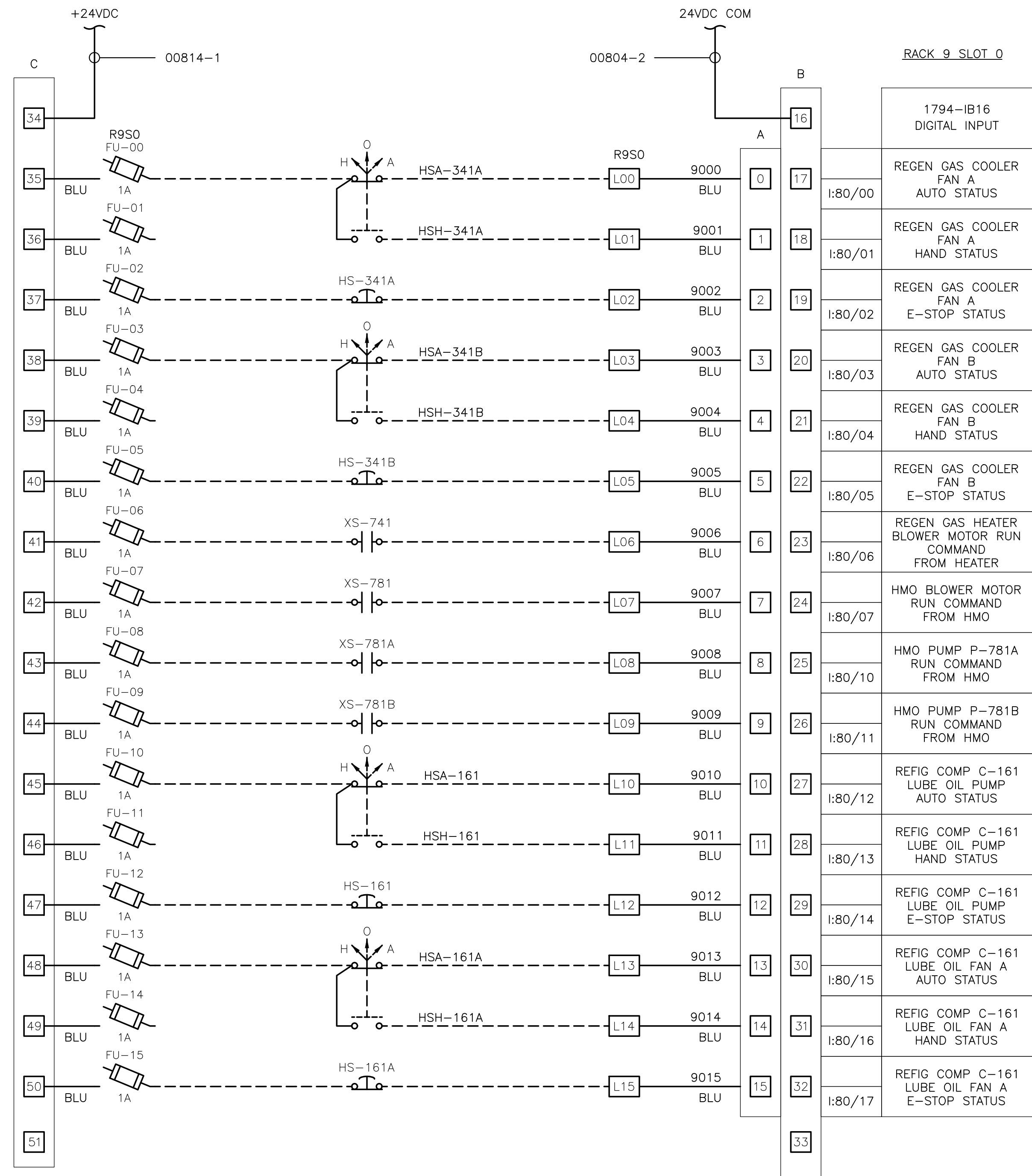


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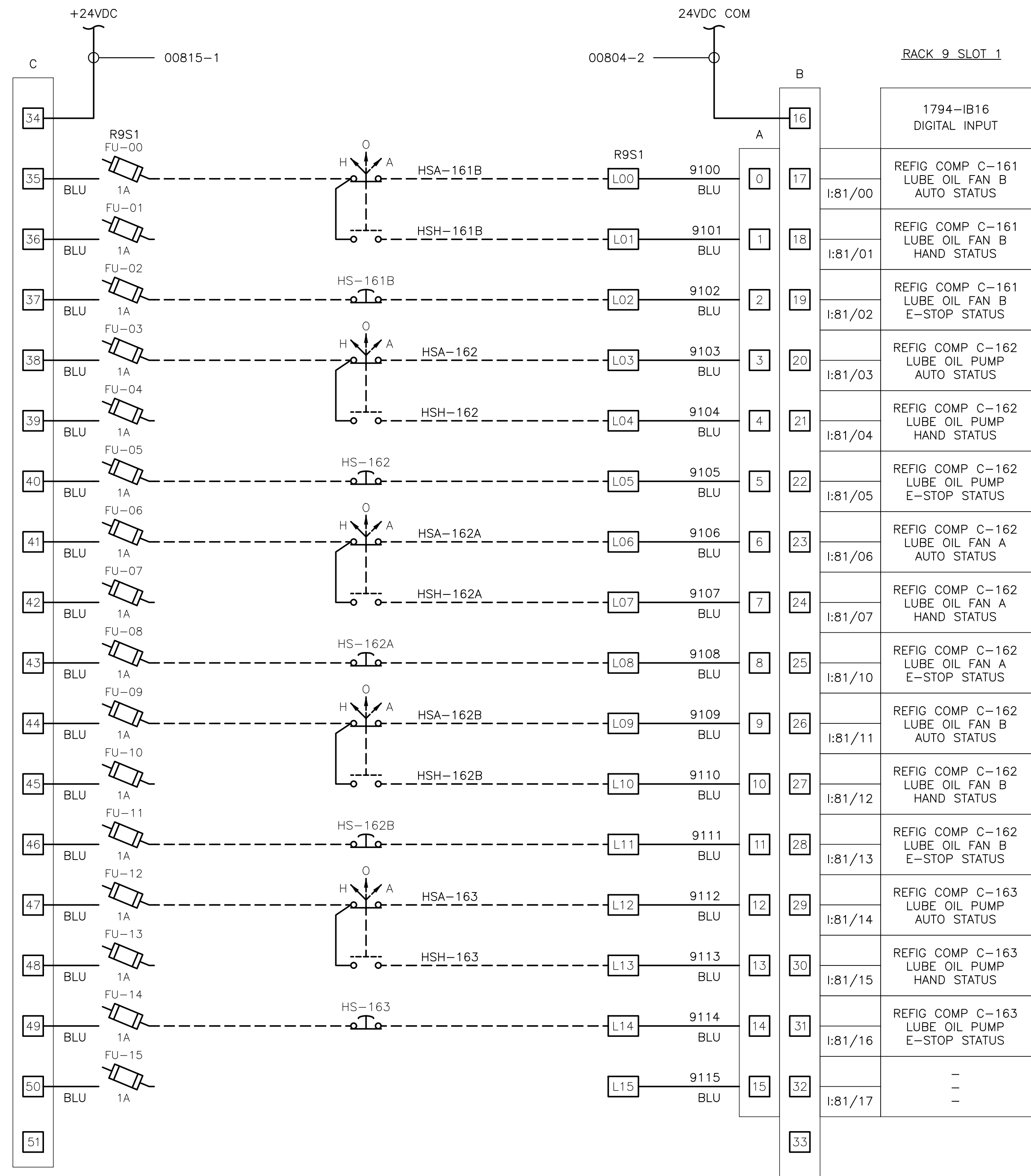
UTOROGU GAS EXPANSION PROJECT
UTOROGU, NIGERIA
L1901-NPDC
CRYO RIO-08
LOOP DRAWING, RACK 8, SLOT 6 AND 7

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A. HOGAN	06/08/20	SCALE: NONE	L1901-NPDC-INS-DWG-02013	A

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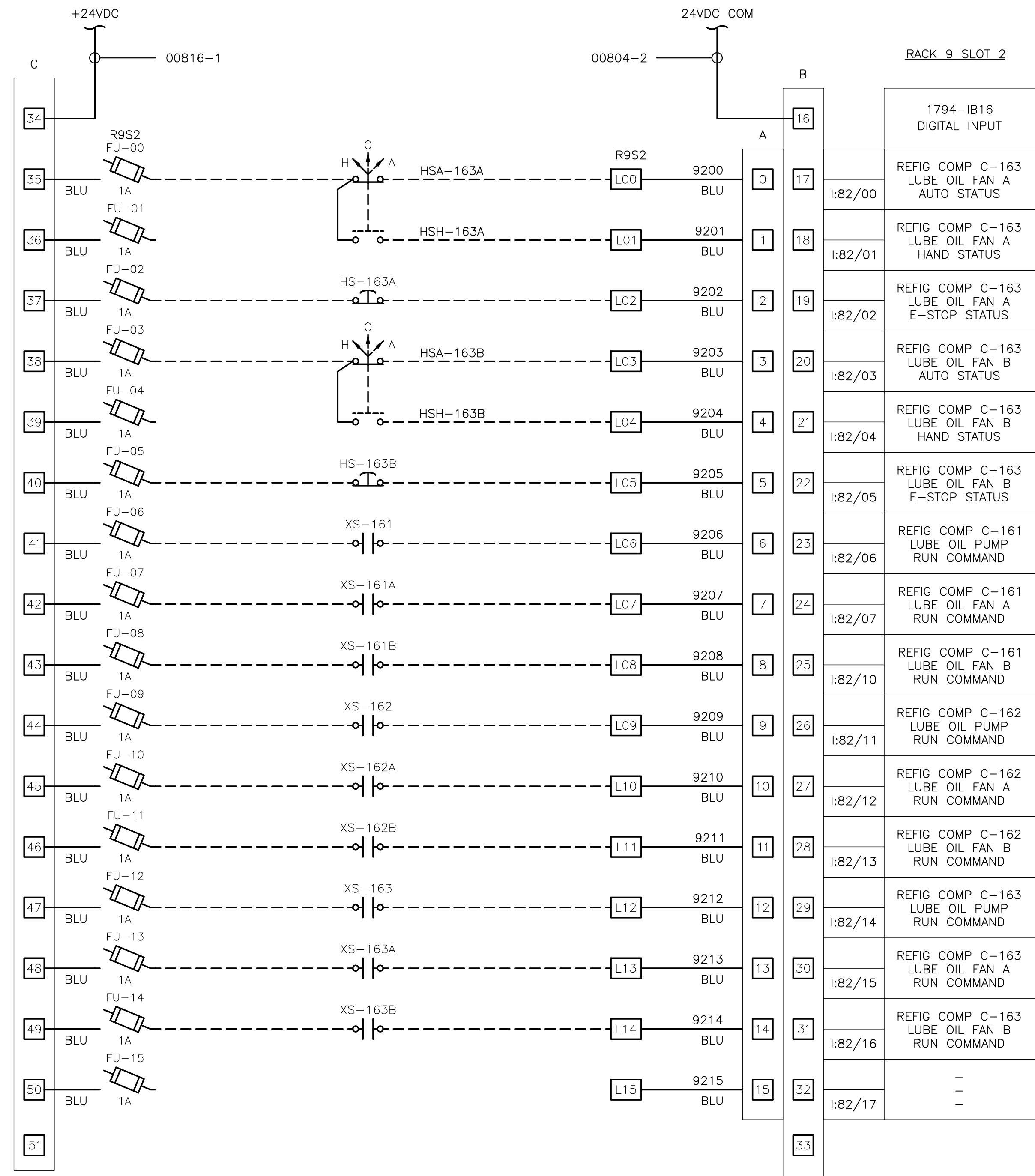
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UTOROGU GAS EXPANSION PROJECT
UTOROGU, NIGERIA
L1901-NPDC
CRYO RIO-09
LOOP DRAWING, RACK 9, SLOT 0 AND 1

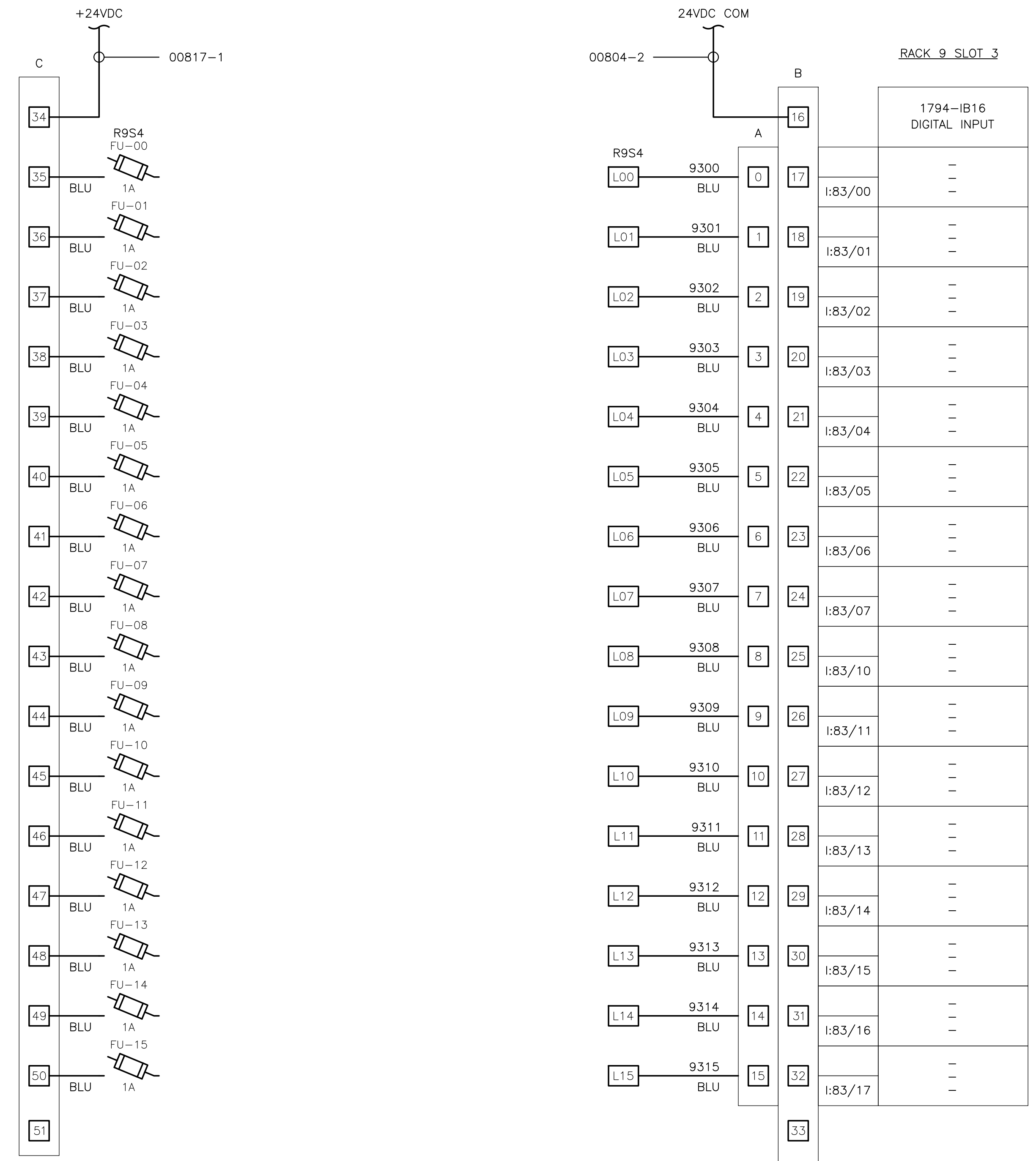
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A. HOGAN	06/08/20	SCALE: NONE	L1901-NPDC-INS-DWG-02019	A

Plotted by: JOSEPH BOND Date: 12/23/2020 12:17 PM Drawing: P:\High Country Sales\Utorogu_Cryo Drawings\Electrical-Instrumentation\L1901-NPDC-INS-DWG-02019.dwg

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		A	ISSUED FOR APPROVAL	12/23/20	JJB	SRB	SCP		

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LONEB PROJECT MANAGER		

LONE TREE ENGINEERING SERVICES
7807 E PEAKVIEW AVE, STE 150
CENTENNIAL, CO 80111, USA

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UTOROGU GAS EXPANSION PROJECT
UTOROGU, NIGERIA
L1901-NPDC
CRYO RIO-09
LOOP DRAWING, RACK 9, SLOT 2 AND 3

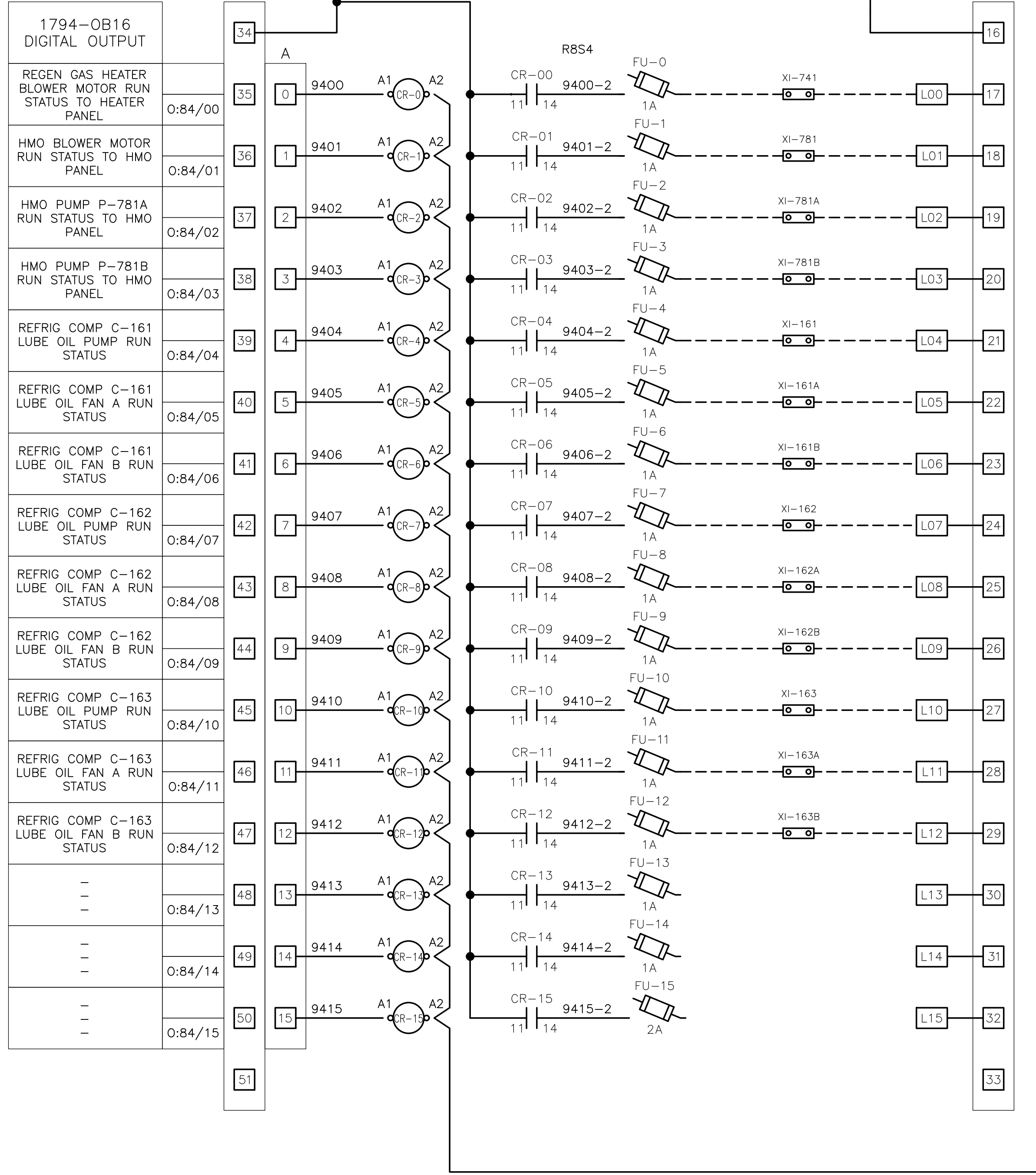
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A. HOGAN	06/08/20	19016-00	L1901-NPDC-INS-DWG-02020	A

SCALE: NONE

Plotted by: JOSEPH BOND Date: 12/23/2020 12:18 PM Drawing: P:\High Country Sales\Utorogu Cryo Drawings\Electrical-Instrumentation\L1901-NPDC-INS-DWG-02020.dwg

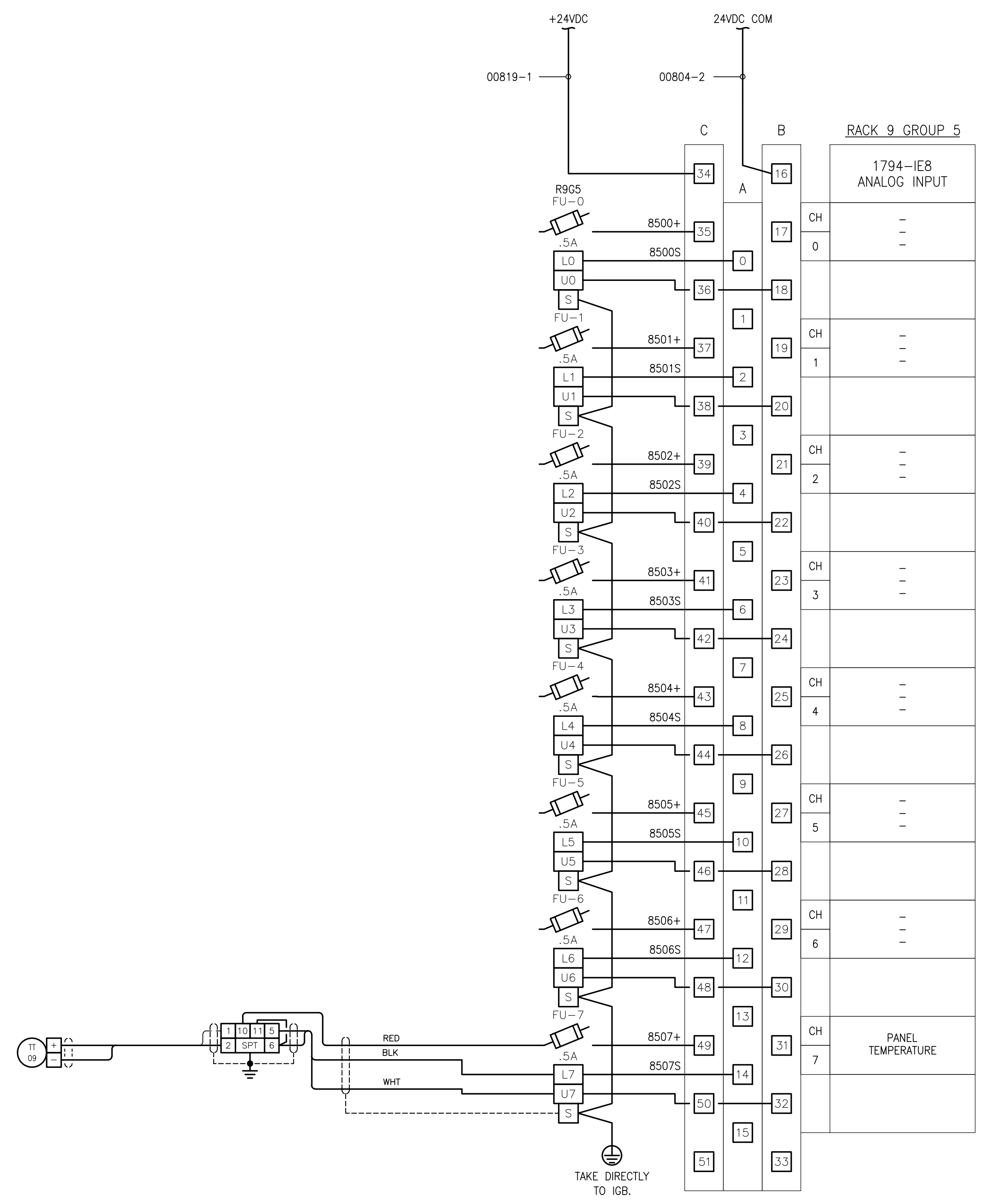
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RACK 9 GROUP 4



NOTES:
1. RELAYS AND TERMINAL ARE LOCATED IN P.S. PANEL. SEE DWG. INS-JBX-00023.

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UTOROGU GAS EXPANSION PROJECT
UTOROGU, NIGERIA
L1901-NPDC
CRYO RIO-09
LOOP DRAWING, RACK 9, SLOT 4 AND 5

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A. HOGAN	06/08/20	SCALE: NONE	L1901-NPDC-INS-DWG-02021	A

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RACK 9, SLOT 6
SPACE

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RACK 9, SLOT 7
SPACE


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	ISSUED FOR APPROVAL							

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UTOROGU, NIGERIA
L1901-NPDC
CRYO RIO-09
LOOP DRAWING, RACK 9, SLOT 6 AND 7

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A. HOGAN	06/08/20	SCALE: NONE	L1901-NPDC-INS-DWG-02022	A