

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	FH	FH	PR	
0.1	UPDATED FOR CONSTRUCTION	8 JUN 2012	FH	FH	PR	
0	ISSUED FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
B	RE-ISSUED FOR APPROVAL	14 MAR 2012	PR	PR		
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

REVISIONS



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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG		
MURPHY OIL VISTA OTSG 25MBTU/HR BMS / BCS CABLE BLOCK DIAGRAM		REV. 1
DWN. BY: FH	DATE: 01OCT 2012	DRAWING NO. 176-101-01
JOB No. 176	SCALE: NONE	



CODE SHEET

VISTA Projects Limited			
VENDOR DRAWING/DOCUMENT SQUAD CHECK			
A	Reviewed without exception. Proceed with fabrication. Issue final drawings/ documents.		
B	Reviewed except as marked and/or noted. Proceed with fabrication and resubmit drawing/document. Shipment will not be released, if any drawings/documents requiring approval, as per purchase order conditions, are at this code.		
C	Not accepted. Revise as marked and resubmit drawing/document for review. Shipment will not be released, if any drawings/documents requiring approval, as per purchase order conditions, are at this code.		
D	Not required for review. Received for information.		
Reviewed only as to general conformity with the design concept and specifications provided. The engineer does not warrant or represent that the information contained on this drawing/document is either accurate or complete. Sole responsibility for correct design, detail and dimensions shall remain with the party submitting the drawing/document.			
SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DE05	PKG-7000	RK	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-103-01

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: PKG-7000 Once through Steam Generator Electrical Layo

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

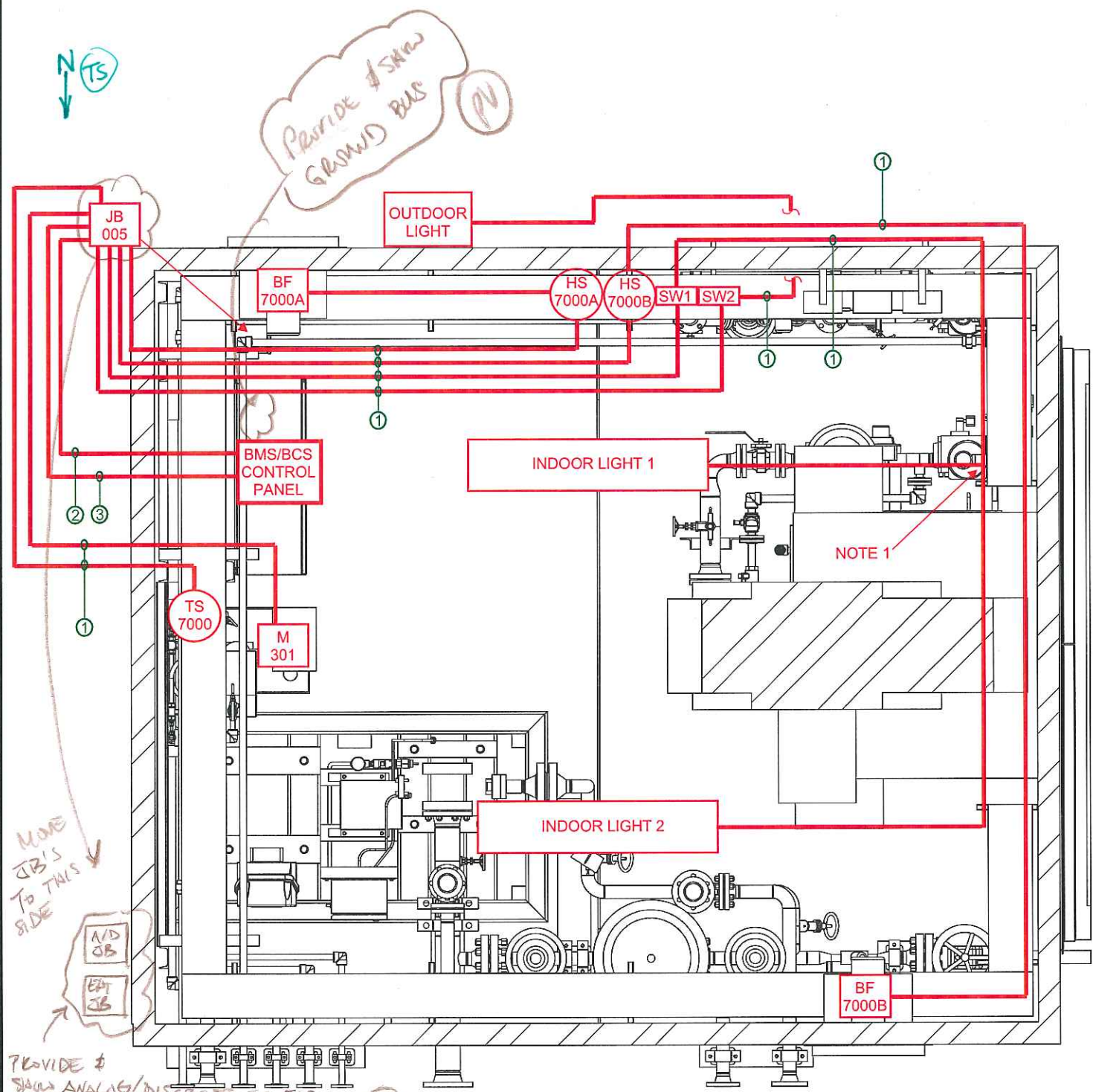
ITEM	VOLTAGE	PHASE	CABLE TYPE
1	120 VAC	1PH	2c #12 TECK90
2	120 VAC	1PH	4c #12 TECK90
3	120 VAC	1PH	12c #14 TECK90

LEGEND

— 120VAC BUILDING ELECTRICAL

ESTIMATED CABLE LENGTHS	
2c #12 TECK90	
ITEM DESCRIPTION	ESTIMATED LENGTH
INDOOR LIGHTS	60FT
OUTDOOR LIGHT	25FT
BF7000A	25FT
BF7000B	50FT
TS7000	15FT
M301	15FT
4c #12 TECK90	
JB-005 TO CP	5FT
12c #12 TECK90	
JB-005 TO CP	5FT

ESTIMATED TOTALS:
 - 2C #12 TECK90 - 190FT
 - 4C #12 TECK90 - 5FT
 - 12C #12 TECK90 - 5FT



PROVIDE #12 GROUND BUS FOR CUSTOMER INTERCONNECTION AND EHT JB WITH EHT RD'S FOR CUSTOMER INTERCONNECTION.

BUILDING PLAN VIEW
 FROM 176-103-01 SHT-05

EHT ISO DRAWINGS REQUIRED FOR REVIEW

NOTES

1. INDOOR BUILDING LIGHTS TO BE WIRED OFF OF ONE SWITCH

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	8-JUNE-2012				




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FOR:	STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD	PROJECT:	1780
DESC:	PKG-7000 ONCE THROUGH STEAM GENERATOR ELECTRICAL LAYOUT BUILDING ELECTRICAL, 120VAC BUILDING	REV:	0
DWN. BY:	WA	DATE:	6/8/2012
CSI JOB NO.	176	SCALE:	1:25
		DRAWING NO.	176-103-01 SHT-01

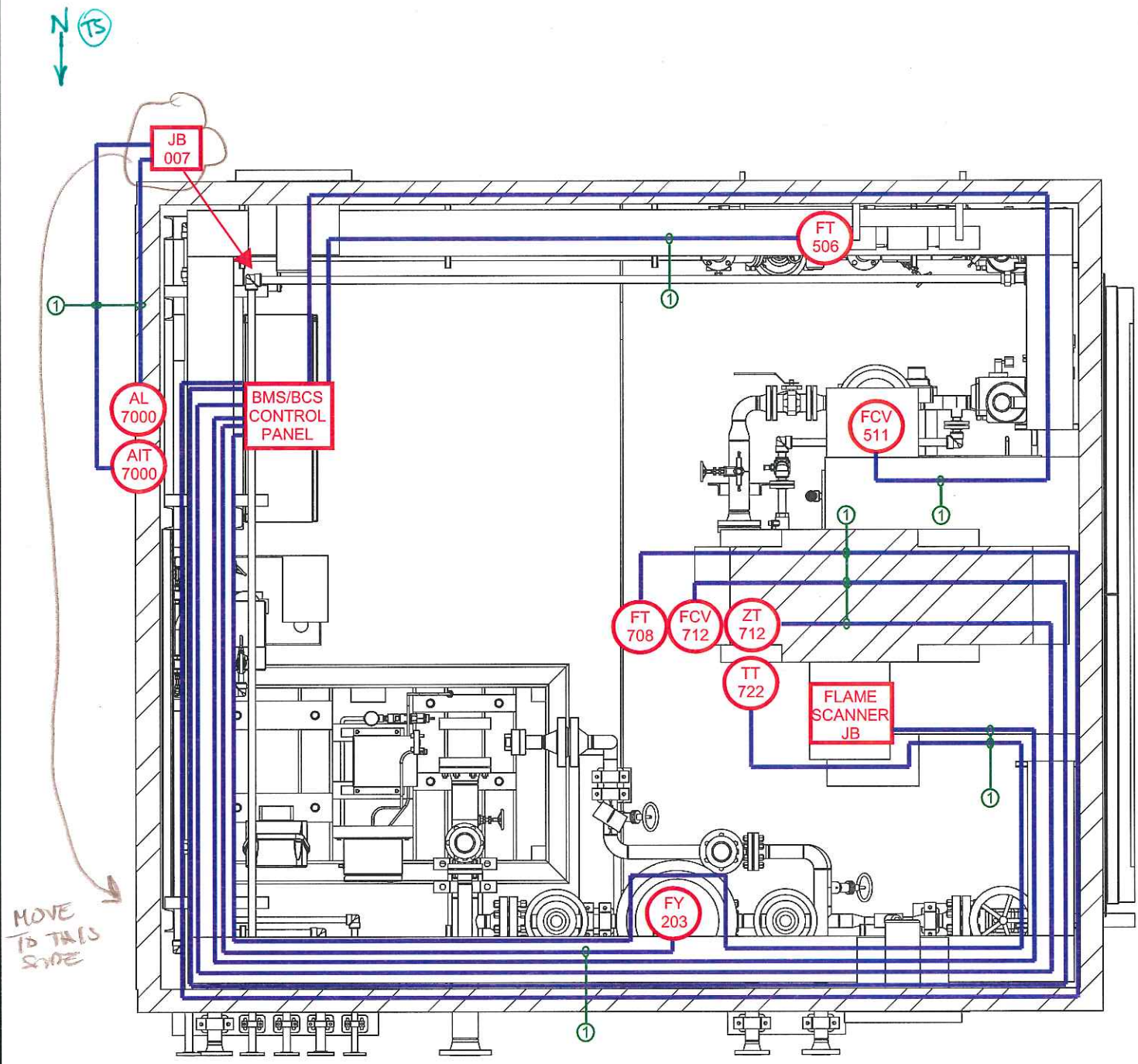
ITEM	VOLTAGE	CABLE TYPE
1	24 VDC	1PR #16 TWSH TECK

LEGEND

— ANALOG

ESTIMATED CABLE LENGTHS	
1PR #16 TWSH TECK	
ITEM DESCRIPTION	ESTIMATED LENGTH
AL7000	15FT
AIT7000	15FT
FT-506	20FT
FCV-511	45FT
FCV-712	40FT
ZT-712	40FT
TT-722	40FT
FT-708	40FT
FY-203	25FT
FLAME SCANNER JB TO CP	40FT

ESTIMATED TOTALS:
- 1PR #16 TWSH TECK - 320FT



BUILDING PLAN VIEW
FROM 176-103-01 SHT-05

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	8-JUNE-2012				
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR ELECTRICAL LAYOUT BUILDING ELECTRICAL, 24VDC ANALOG		REV: 0
DWN. BY: WA	DATE: 6/8/2012	DRAWING NO. 176-103-01 SHT-02
CSI JOB NO. 176	SCALE: 1:25	

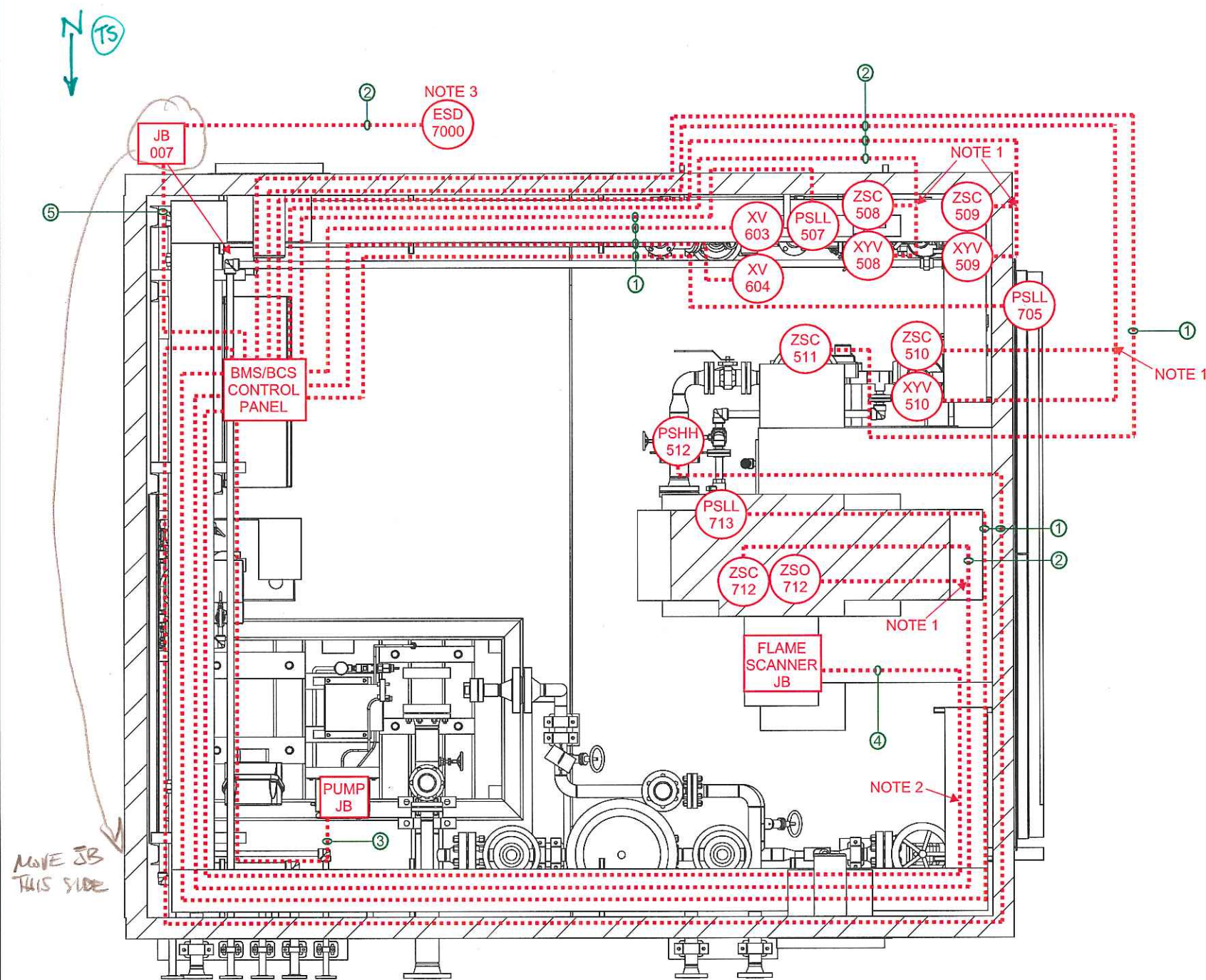
ITEM	VOLTAGE	CABLE TYPE
1	24 VDC	2c #14 TECK90
2	24 VDC	4c #14 TECK90
3	24 VDC	8c #14 TECK90
4	24 VDC	10c #14 TECK90
5	24 VDC	12c #14 TECK90

LEGEND

----- DIGITAL

ESTIMATED CABLE LENGTHS	
2c #14 TECK90	
ITEM DESCRIPTION	ESTIMATED LENGTH
XV-603	30FT
XV-604	30FT
PSLL-507	30FT
PSLL-705	30FT
ZSC-511	40FT
PSHH-512	45FT
PSLL-713	50FT
4c #12 TECK90	
ZSC&XYV-508	35FT
ZSC&XYV-509	35FT
ZSC&XYV-510	40FT
ZSC&ZSO-712	40FT
ESD-7000	15FT
8c #12 TECK90	
PUMP JB TO CP	20FT
10c #12 TECK90	
FLAME SCANNER JB TO CP	40FT
12c #12 TECK90	
JB-007 TO CP	5FT

ESTIMATED TOTALS:
 - 2C #12 TECK90 - 255FT
 - 4C #12 TECK90 - 165FT
 - 8C #12 TECK90 - 20FT
 - 10C #12 TECK90 - 40FT
 - 12C #12 TECK90 - 5FT



BUILDING PLAN VIEW (TS)
 FROM 176-103-01 SHT-05

NOTES

1. WIRE SOLENOID/SWITCH(ES) INTO NEARBY GRJS75A JB
2. CABLE CONTAINS WIRES FOR BOTH POWER AND SIGNALS
3. LOCATED OUTSIDE DOOR

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	8-JUNE-2012				
REVISIONS						



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FOR:	STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT:	1780
DESC:	PKG-7000 ONCE THROUGH STEAM GENERATOR ELECTRICAL LAYOUT BUILDING ELECTRICAL, 24VDC DIGITAL		REV:	0
DWN. BY:	WA	DATE:	6/8/2012	
CSI JOB NO.	176	SCALE:	1:25	
			DRAWING NO. 176-103-01 SHT-03	

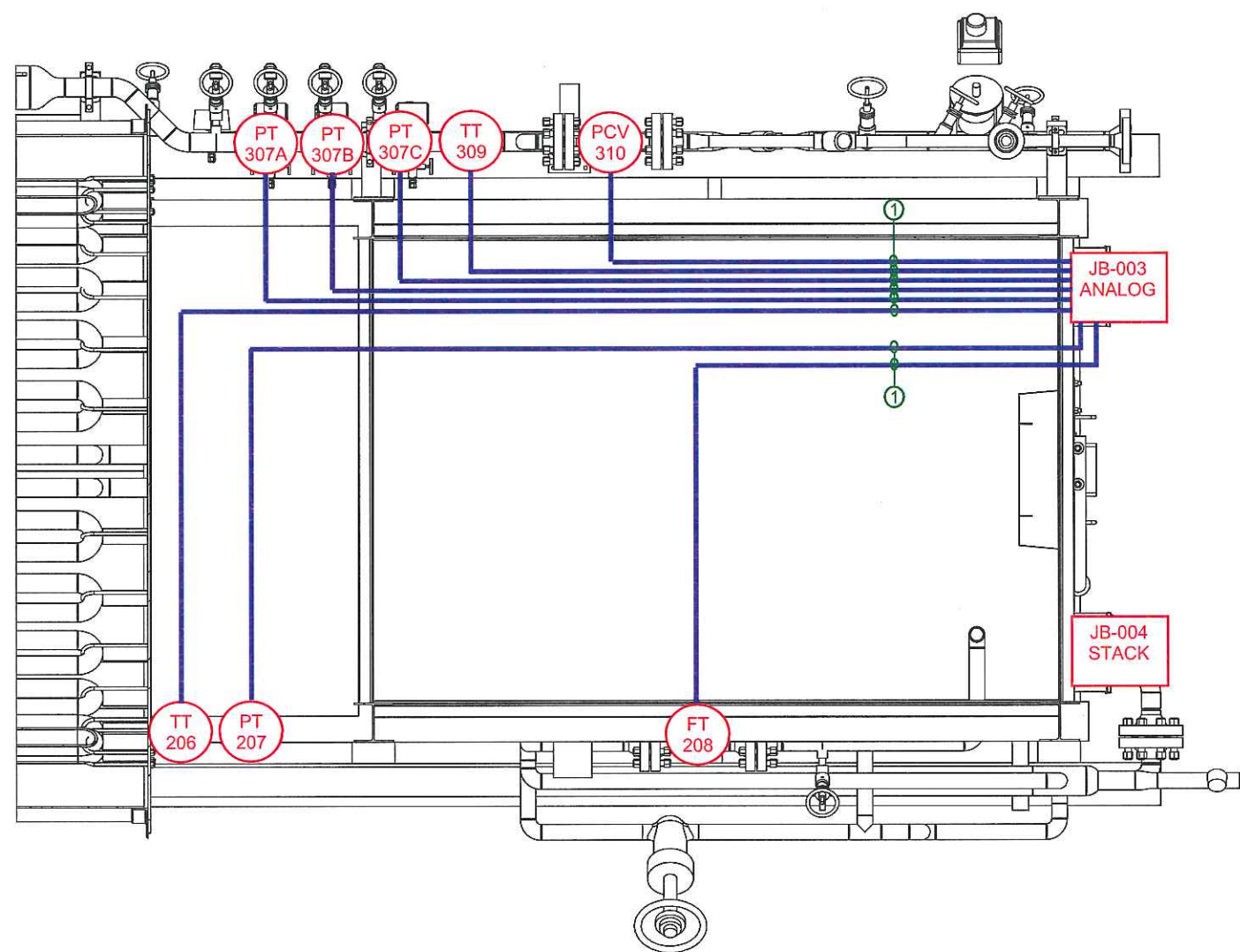
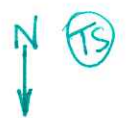
ITEM	VOLTAGE	CABLE TYPE
1	24 VDC	1PR #16 TWSH TECK

LEGEND

— ANALOG

ESTIMATED CABLE LENGTHS	
1PR #16 TWSH TECK	
ITEM DESCRIPTION	ESTIMATED LENGTH
PT-307A	25FT
PT-307B	25FT
PT-307C	25FT
TT-309	25FT
PCV-310	30FT
TT-206	20FT
PT-207	20FT
FT-208	10FT

ESTIMATED TOTALS:
- 1PR #16 TWSH TECK - 180FT



CONVECTION END PLAN VIEW (TS)
FROM 176-103-01 SHT-05

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	8-JUNE-2012				
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR ELECTRICAL LAYOUT CONVECTION END ELECTRICAL		REV: 0
DWN. BY: WA	DATE: 6/8/2012	DRAWING NO. 176-103-01 SHT-04
CSI JOB NO. 176	SCALE: 1:25	

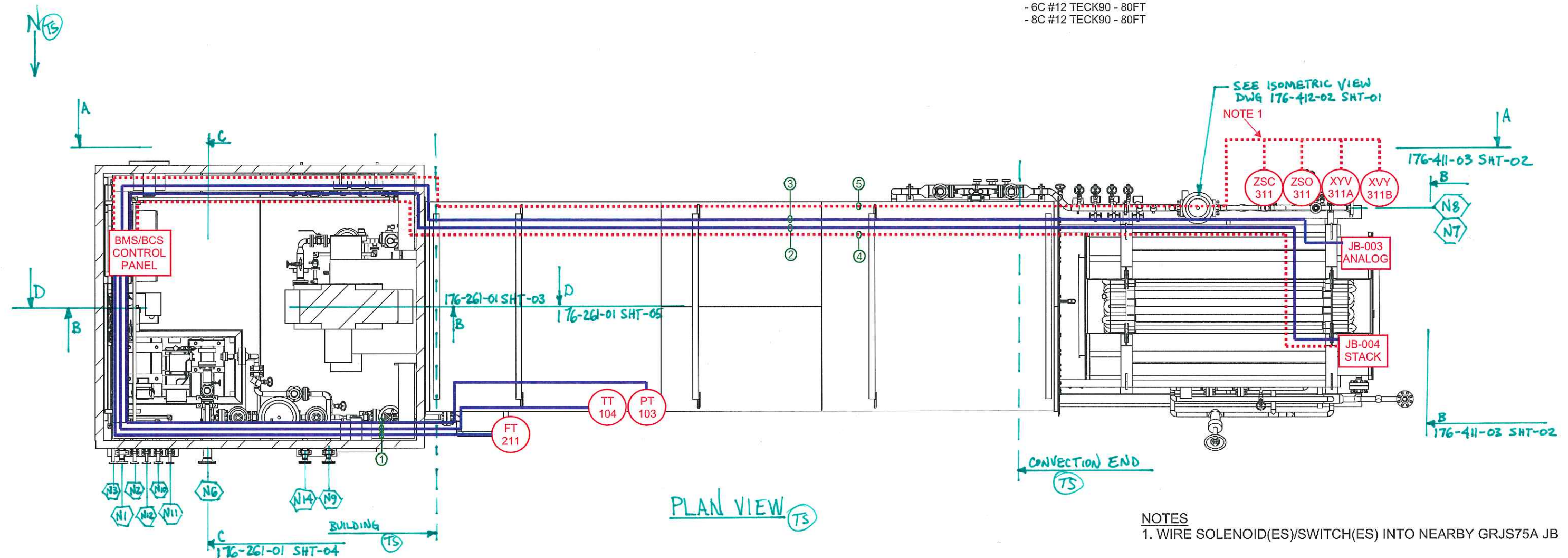
ALL THE SECTIONS SHOWN SHOULD BE ON A PLAN VIEW PIPING DRAWING. THE REFERENCES BACK TO THIS DRAWING SHOULD REFER BACK TO THE PLAN VIEW PIPING DRAWING. (TS)

ESTIMATED CABLE LENGTHS	
1PR #16 TWSH TECK	
ITEM DESCRIPTION	ESTIMATED LENGTH
FT-211	40FT
TT-104	45FT
PT-103	45FT
6PR #16 TWSH TECK	
JB-004 TO CP	80FT
8PR #16 TWSH TECK	
JB-003 TO CP	80FT
6c #12 TECK90	
JB-004 TO CP	80FT
8c #12 TECK90	
JB-003 TO CP	80FT

ITEM	VOLTAGE	CABLE TYPE
1	24 VDC	1PR #16 TWSH TECK
2	24 VDC	6PR #16 TWSH TECK
3	24 VDC	8PR #16 TWSH TECK
4	24 VDC	6c #14 TECK90
5	24 VDC	8c #14 TECK90

LEGEND
 ANALOG
 DIGITAL

ESTIMATED TOTALS:
 - 1PR #16 TWSH TECK - 130FT
 - 6PR #16 TWSH TECK - 80FT
 - 8PR #16 TWSH TECK - 80FT
 - 6C #12 TECK90 - 80FT
 - 8C #12 TECK90 - 80FT



NOTES
 1. WIRE SOLENOID(ES)/SWITCH(ES) INTO NEARBY GRJS75A JB

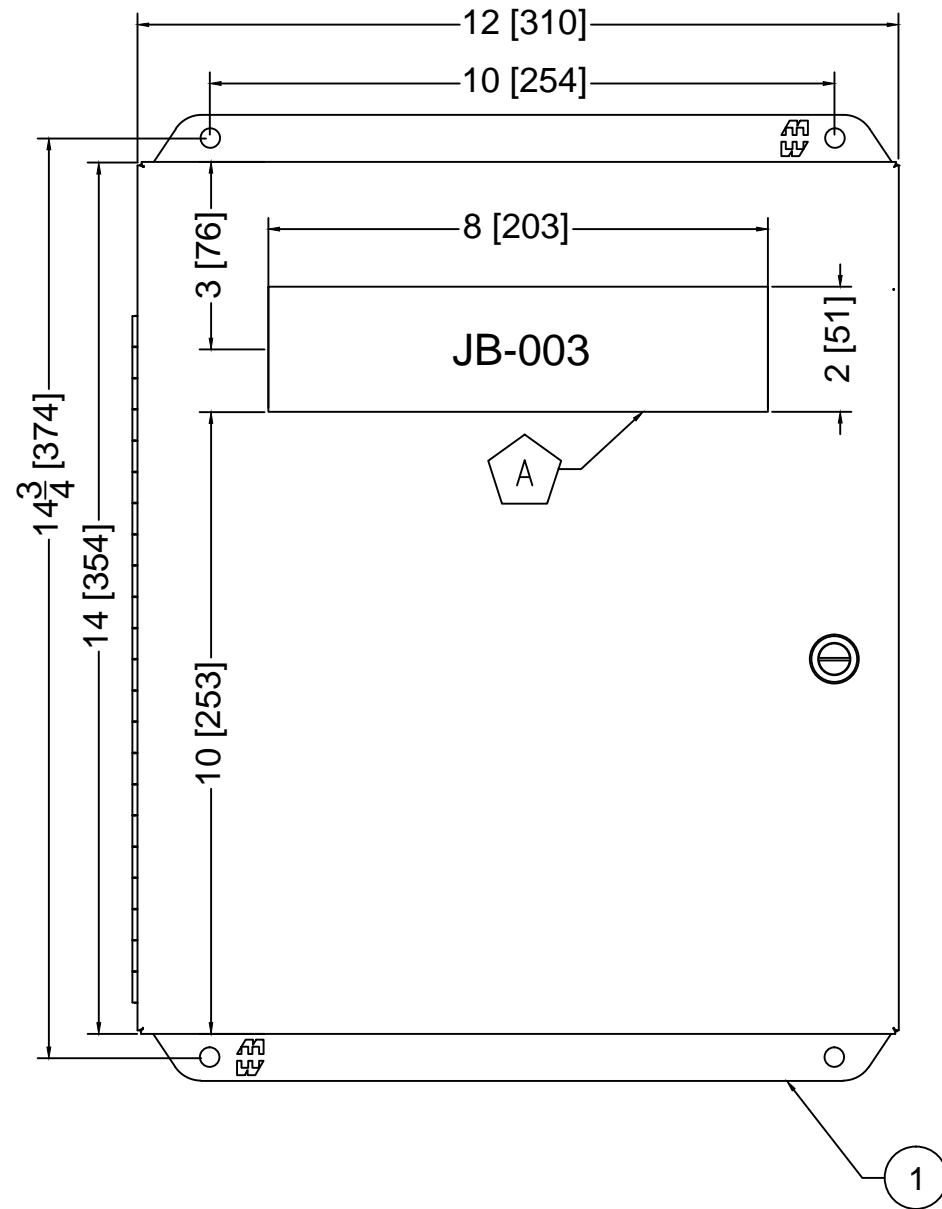
REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	8-JUNE-2012				
REVISIONS						



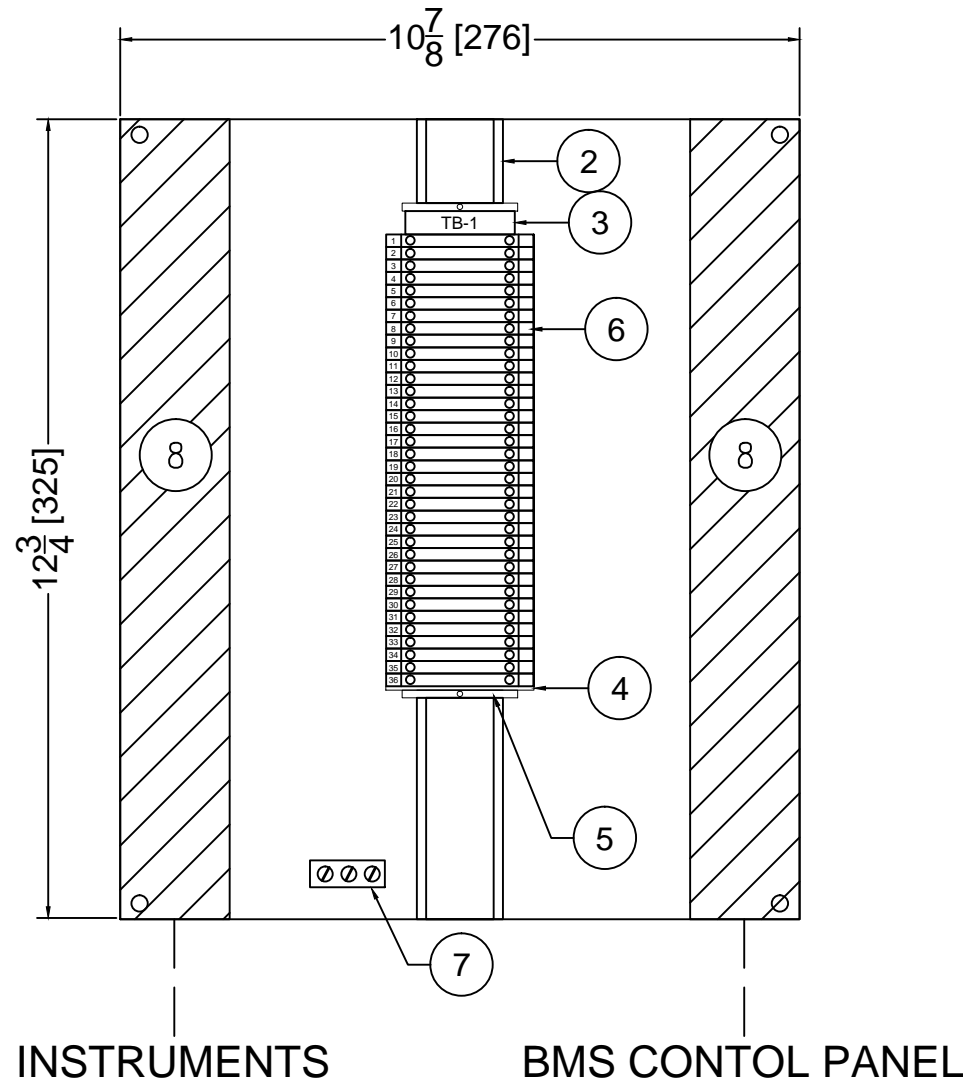
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FOR:	STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD	PROJECT:	1780
DESC:	PKG-7000 ONCE THROUGH STEAM GENERATOR ELECTRICAL LAYOUT HOME RUN AND OTHER INSTRUMENT CABLES	REV:	0
DWN. BY:	WA	DATE:	6/8/2012
CSI JOB NO.	176	SCALE:	1:50
		DRAWING NO.	176-103-01 SHT-05

FRONT VIEW



INNER PANEL VIEW



BILL OF MATERIALS

ITEM	CAT#	QTY	DESCRIPTION
1	EJ14126	1	Enclosure, Eclipse Jr. Series, Light Gray Steel, 14"H X 12"W X 6"D, Type 3R/4/12/13, 1/4 Turn Latch, Includes Galvanized Inner Panel
2	514500000	0.5	Din Rail, Weidmuller 35x7.5 (TS35), Galvanized (meters)
3	1856740000	1	Terminal Marker, Weidmuller DEK 5/8 MC Neutral Add: ESO 5 S WHITE (1631920000), STR 5 S. F.SCHT 5 S (1631940000)
4	1050000000	1	Weidmuller WAP END PLATES
5	0383560000	2	Weidmuller EW 35 ENDBRACKETS
6	1020000000	36	Weidmuller WDU 2.5 FEEDTHROUGH TERMINAL
7	NA30	1	Ground Post, #14-4 CMC
8	PANF1.5X3WH6	1	Wire Duct, Panduit, 1.5"W x 3"H, White, Thin Fingered, 2ft Add: PAN1.5WH6

LAMCOID LIST

ITEM	COLOR	QTY	DESCRIPTION	TEXT SIZE	DIMENSIONS
A	BLACK ON WHITE	1	JB-003	1/2"	8"x2"

Notes:

1. Dimensions are shown in INCHES [MM].
2. Panel door to be bonded to panel body with GREEN #14AWG (or larger).
3. Quantity of 1 panel.
4. Refer to 175-136-01 for wiring diagram.

PANEL DATA

MODEL	JB-4-LG-36-141206-001
SERIAL NUMBER	176-135-01
CONTROL POWER	24VDC
AREA CLASSIFICATION	Class 1, Div. 2 Groups C,D, T3
ENCLOSURE RATING	CSA / UL 508 Type 3R/4/12/13
DESIGN TEMPERATURE	-40°C TO 85°C (UNHEATED)
DUTY	CONTINUOUS
DESIGN CODE	CSA 22.1, 22.2, NO. 0, 0.4, 14, 213
MANUFACTURED DATE	

Note: This equipment is suitable to be installed in a CLASS 1, ZONE 2, GRII A T2B location.

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0.1	UPDATED FOR CONSTRUCTION	8 JUN 2012	FH	FH	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR		
A	ISSUE FOR APPROVAL	14 MAR 2012	PR	PR		

REVISIONS



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ENG. STAMP AREA

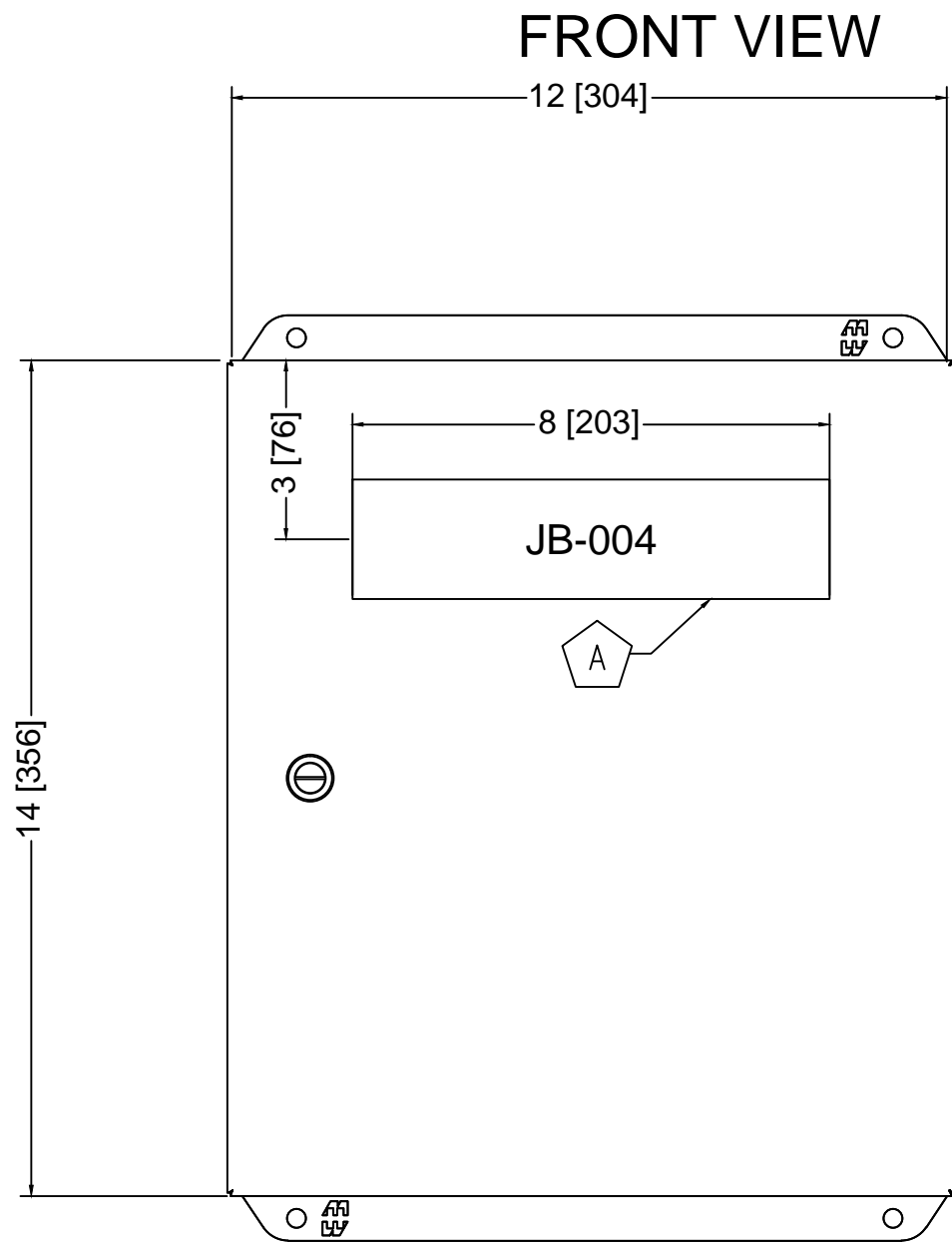
PERMIT TO PRACTICE P08884

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG

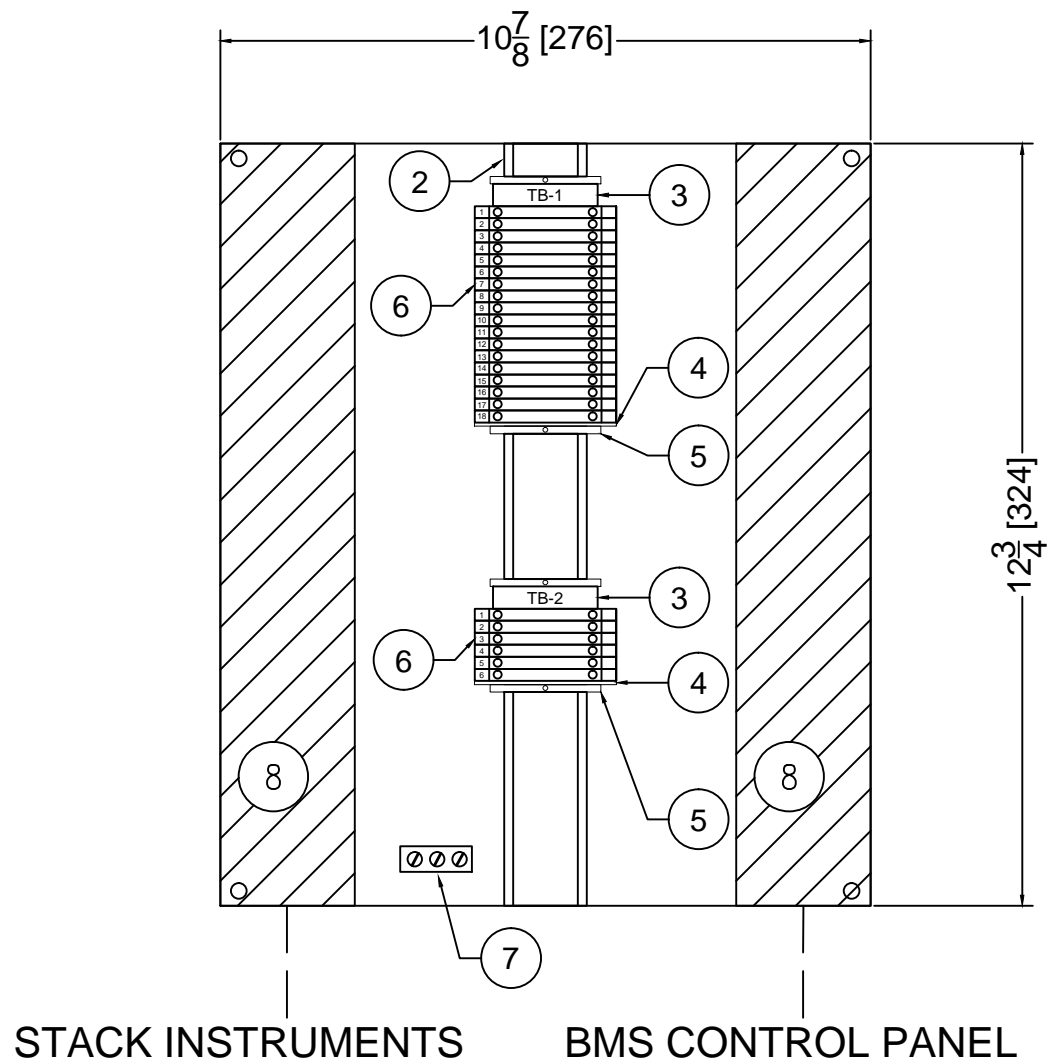
ANALOG JUNCTION BOX JB-003
JB PANEL LAYOUT

REV. 1

DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-135-01
JOB No. 176	SCALE: NONE	



INNER PANEL VIEW



BILL OF MATERIALS

ITEM	CAT#	QTY	DESCRIPTION
1	EJ14126	1	Enclosure, Eclipse Jr. Series, Light Gray Steel, 14"H X 12"W X 6"D, Type 3R/4/12/13, 1/4 Turn Latch, Includes Galvanized Inner Panel
2	514500000	0.32	Din Rail, Weidmuller 35x7.5 (TS35), Galvanized (meters)
3	1631930000	2	Terminal Marker, Weidmuller SCHAT 5 S, 44.5mm x 9.5mm Add: ESO 5 S WHITE (1631920000), STR 5 S. F.SCHAT 5 S (1631940000)
4	1050000000	2	Weidmuller WAP END PLATES
5	0383560000	4	Weidmuller EW 35 ENDBRACKETS
6	1020000000	24	Weidmuller WDU 2.5 FEEDTHROUGH TERMINAL
7	NA30	1	Ground Post, Burndy, #14 -4 CMC
8	PANF2X3WH6	1	Wire Duct, Panduit, 2"W x 3"H, White, Thin Fingred, 2ft Add: PANC1.5WH6

LAMCOID LIST

ITEM	COLOR	QTY	DESCRIPTION	TEXT SIZE	DIMENSIONS
A	BLACK ON WHITE	1	JB-004	1/2"	8"x2"

Notes:

1. Dimensions are shown in INCHES [MM].
2. Panel door to be bonded to panel body with GREEN #14AWG (or larger).
3. Quantity of 1 panel.
4. Refer to 176-136-02 for wiring diagram.
5. All stack junction box wiring is by customer in the field.

PANEL DATA

MODEL	JB-4-LG-24-141206-001
SERIAL NUMBER	176-135-02
CONTROL POWER	24VDC
AREA CLASSIFICATION	Class 1, Div. 2, Groups C,D, T3
ENCLOSURE RATING	CSA / UL 508 Type 3R/4/12/13
DESIGN TEMPERATURE	-40°C TO 85°C (UNHEATED)
DUTY	CONTINUOUS
DESIGN CODE	CSA 22.1, 22.2, NO. 0, 0.4, 14, 213
MANUFACTURED DATE	

Note: This equipment is suitable to be installed in a CLASS 1, ZONE 2, GRII A T2B location.

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0.1	UPDATED FOR CONSTRUCTION	8 JUN 2012	FH	FH	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR		
A	ISSUE FOR APPROVAL	14 MAR 2012	PR	PR		

R E V I S I O N S



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ENG. STAMP AREA

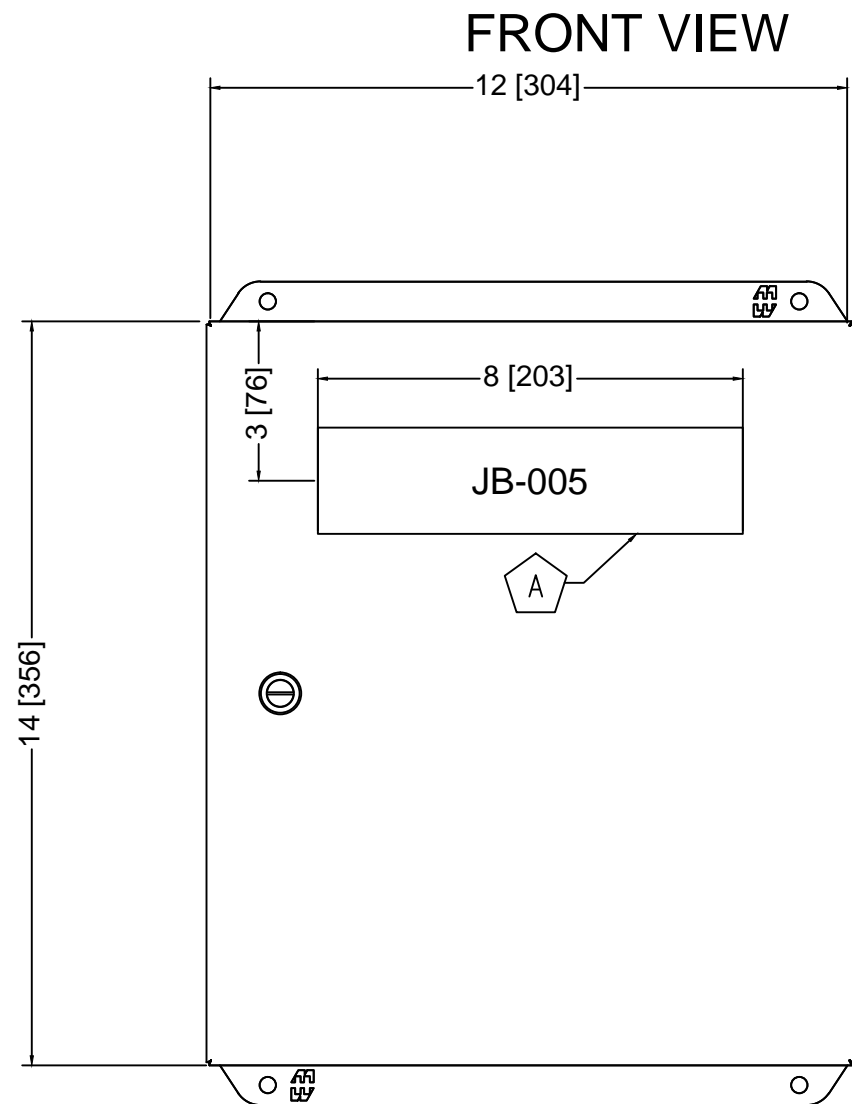
PERMIT TO PRACTICE P08884

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG

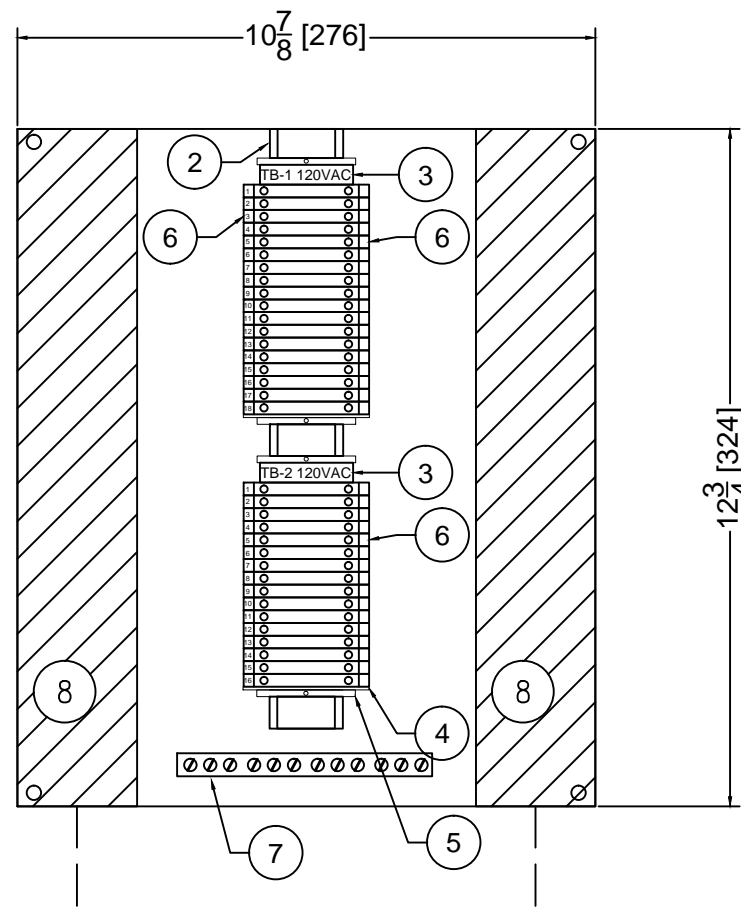
STACK JUNCTION BOX JB-004
JB PANEL LAYOUT

REV.
1

DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-135-02
JOB No. 176	SCALE: NONE	



INNER PANEL VIEW



TO CONTROL PANEL

MCC-100

BILL OF MATERIALS

ITEM	CAT#	QTY	DESCRIPTION
1	EJ14126	1	Enclosure, Eclipse Jr. Series, Light Gray Steel, 14"H X 12"W X 6"D, Type 3R/4/12/13, 1/4 Turn Latch, Includes Galvanized Inner Panel
2	514500000	0.32	Din Rail, Weidmuller 35x7.5 (TS35), Galvanized (meters)
3	1631930000	2	Terminal Marker, Weidmuller SCHAT 5 S, 44.5mm x 9.5mm Add: ESO 5 S WHITE (1631920000), STR 5 S. F.SCHAT 5 S (1631940000)
4	1050000000	2	Weidmuller WAP END PLATES
5	0383560000	4	Weidmuller EW 35 ENDBRACKETS
6	1020100000	34	Weidmuller WDU 4 FEED THROUGH TERMINAL
7	NA30	1	Ground Post, Burndy, #14 -4 CMC
8	PANF2X3WH6	1	Wire Duct, Panduit, 2"W x 3"H, White, Thin Fingered, 2ft Add: PANC1.5WH6

LAMCOID LIST

ITEM	COLOR	QTY	DESCRIPTION	TEXT SIZE	DIMENSIONS
A	BLACK ON WHITE	1	JB-005	1/2"	8"x2"

Notes:

1. Dimensions are shown in INCHES [MM].
2. Panel door to be bonded to panel body with GREEN #14AWG (or larger).
3. Quantity of 1 panel.
4. Refer to 176-136-03 for wiring diagram.

PANEL DATA

MODEL	JB-4-LG-30-141206-001
SERIAL NUMBER	176-135-03
PRIMARY INCOMING POWER	120VAC, 6x15A
AREA CLASSIFICATION	Class 1, Div. 2, Groups C,D, T3
ENCLOSURE RATING	CSA / UL 508 Type 3R/4/12/13
DESIGN TEMPERATURE	-40°C TO 85°C (UNHEATED)
DUTY	CONTINUOUS
DESIGN CODE	CSA 22.1, 22.2, NO. 0, 0.4, 14, 213

Note: This equipment is suitable to be installed in a CLASS 1, ZONE 2, GRII A T2B location.

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0.1	UPDATED FOR CONSTRUCTION	8 JUN 2012	FH	FH	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR		
A	ISSUE FOR APPROVAL	14 MAR 2012	PR	PR		

R E V I S I O N S

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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

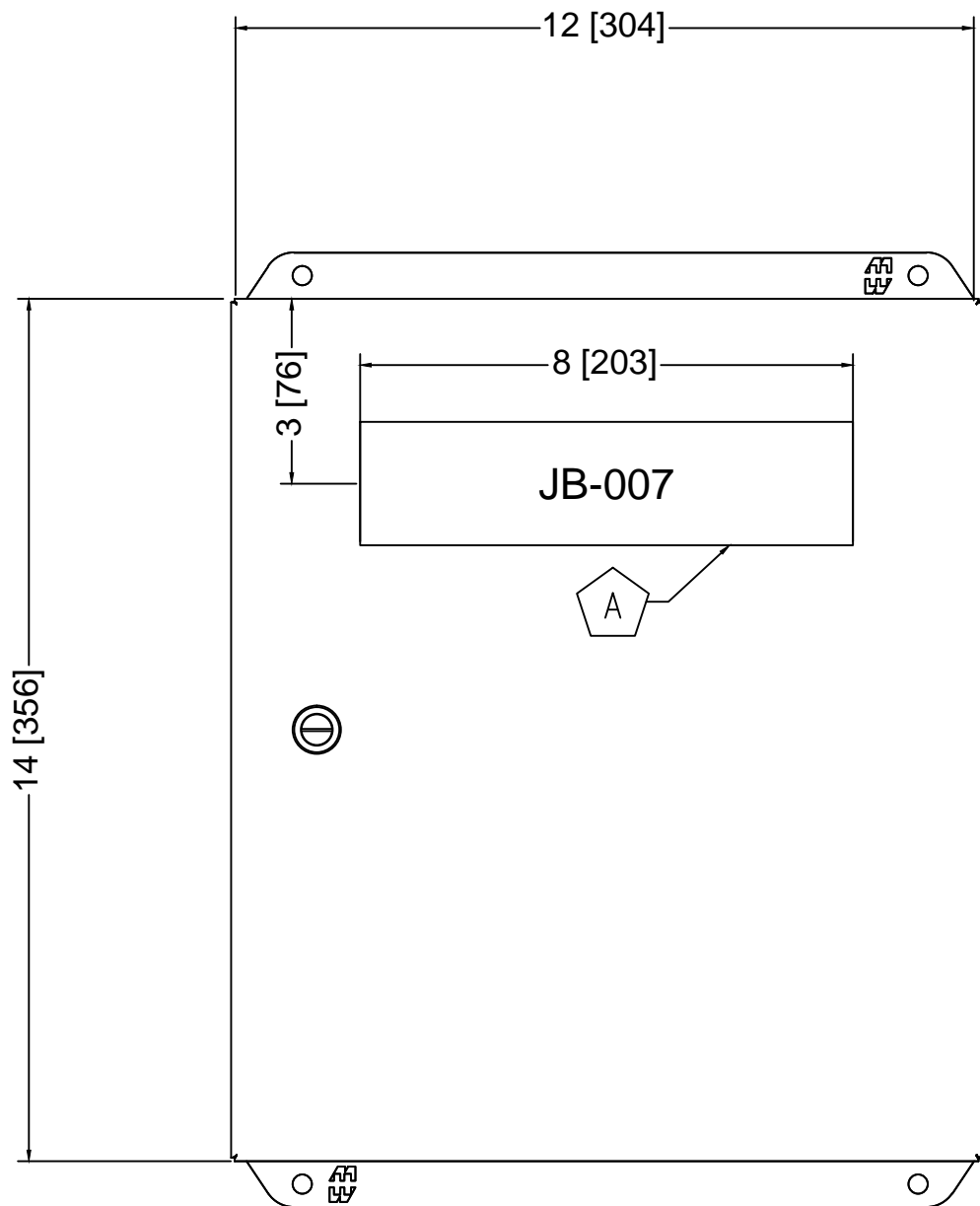
FOR: **STRUTHERS WELLS / MURPHY OIL VISTA OTSG**

**BUILDING JUNCTION BOX JB-005
JB PANEL LAYOUT**

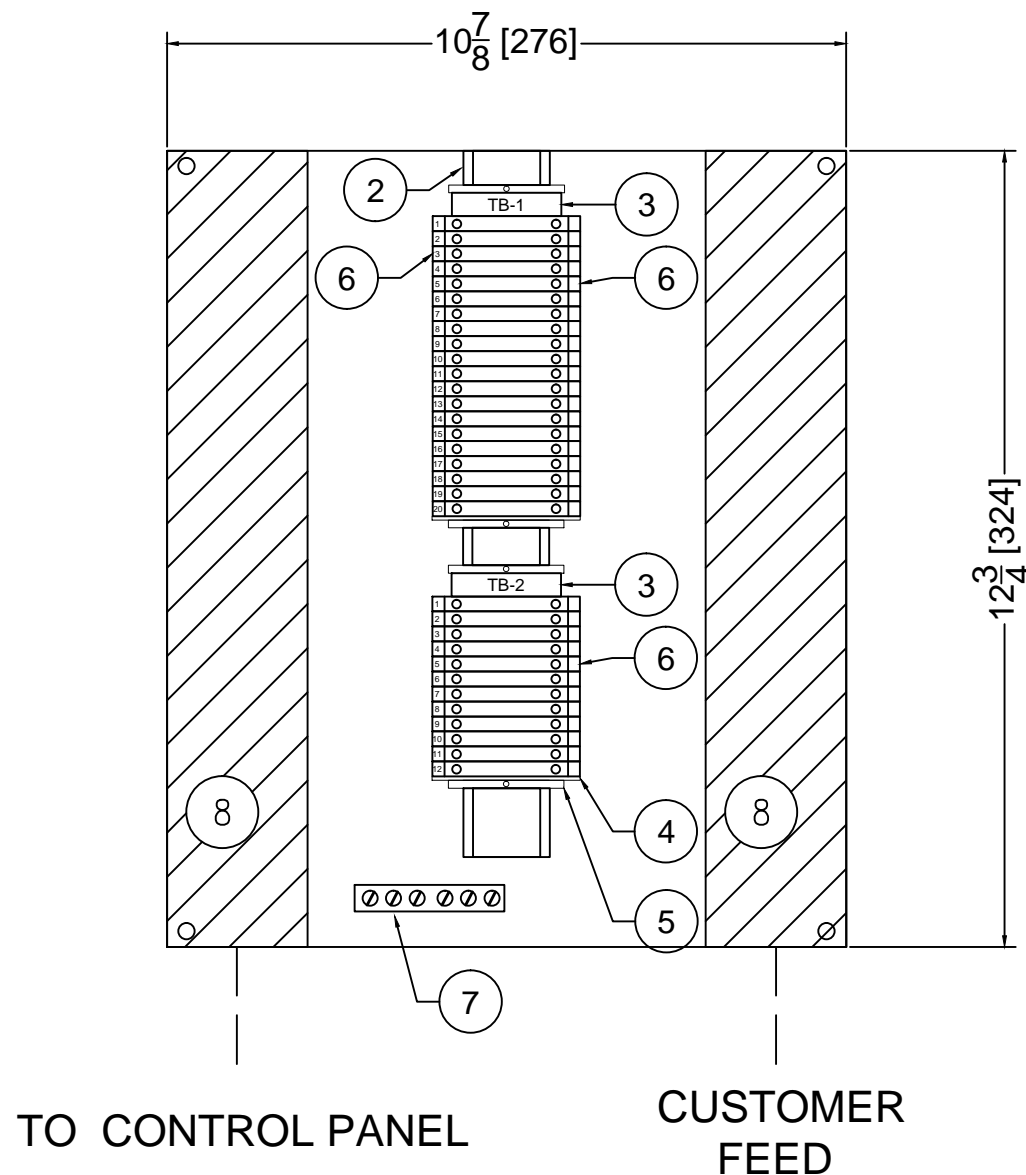
REV. 1

DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-135-03
JOB No. 176	SCALE: NONE	

FRONT VIEW



INNER PANEL VIEW



BILL OF MATERIALS

ITEM	CAT#	QTY	DESCRIPTION
1	EJ14126	1	Enclosure, Eclipse Jr. Series, Light Gray Steel, 14"H X 12"W X 6"D, Type 3R/4/12/13, 1/4 Turn Latch, Includes Galvanized Inner Panel
2	514500000	0.5	Din Rail, Weidmuller 35x7.5 (TS35), Galvanized (meters)
3	1856740000	2	Terminal Marker, Weidmuller DEK 5/8 MC Neutral Add: ESO 5 S WHITE (1631920000), STR 5 S. F.SCHT 5 S (1631940000)
4	1050000000	2	Weidmuller WAP END PLATES
5	0383560000	4	Weidmuller EW 35 ENDBRACKETS
6	1020000000	42	Weidmuller WDU 2.5 FEEDTHROUGH TERMINAL
7	NA30	1	Ground Post, #14 -4 CMC
8	PANF1.5X3WH6	1	Wire Duct, Panduit, 1.5"W x 3"H, White, Thin Fingered, 2ft Add: PANF1.5WH6

LAMCOID LIST

ITEM	COLOR	QTY	DESCRIPTION	TEXT SIZE	DIMENSIONS
A	BLACK ON WHITE	1	JB-003	1/2"	8"x2"

Notes:

1. Dimensions are shown in INCHES [MM].
2. Panel door to be bonded to panel body with GREEN #14AWG (or larger).
3. Quantity of 1 panel.
4. Refer to 175-136-01 for wiring diagram.

PANEL DATA

MODEL	JB-4-LG-36-141206-001
SERIAL NUMBER	176-135-01
CONTROL POWER	24VDC
AREA CLASSIFICATION	Class 1, Div. 2 Groups C,D, T3
ENCLOSURE RATING	CSA / UL 508 Type 3R/4/12/13
DESIGN TEMPERATURE	-40°C TO 85°C (UNHEATED)
DUTY	CONTINUOUS
DESIGN CODE	CSA 22.1, 22.2, NO. 0, 0.4, 14, 213
MANUFACTURED DATE	

Note: This equipment is suitable to be installed in a CLASS 1, ZONE 2, GRII A T2B location.

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG

ANALOG JUNCTION BOX JB-007
JB PANEL LAYOUT

REV.
1

DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-135-04
JOB No. 176	SCALE: NONE	



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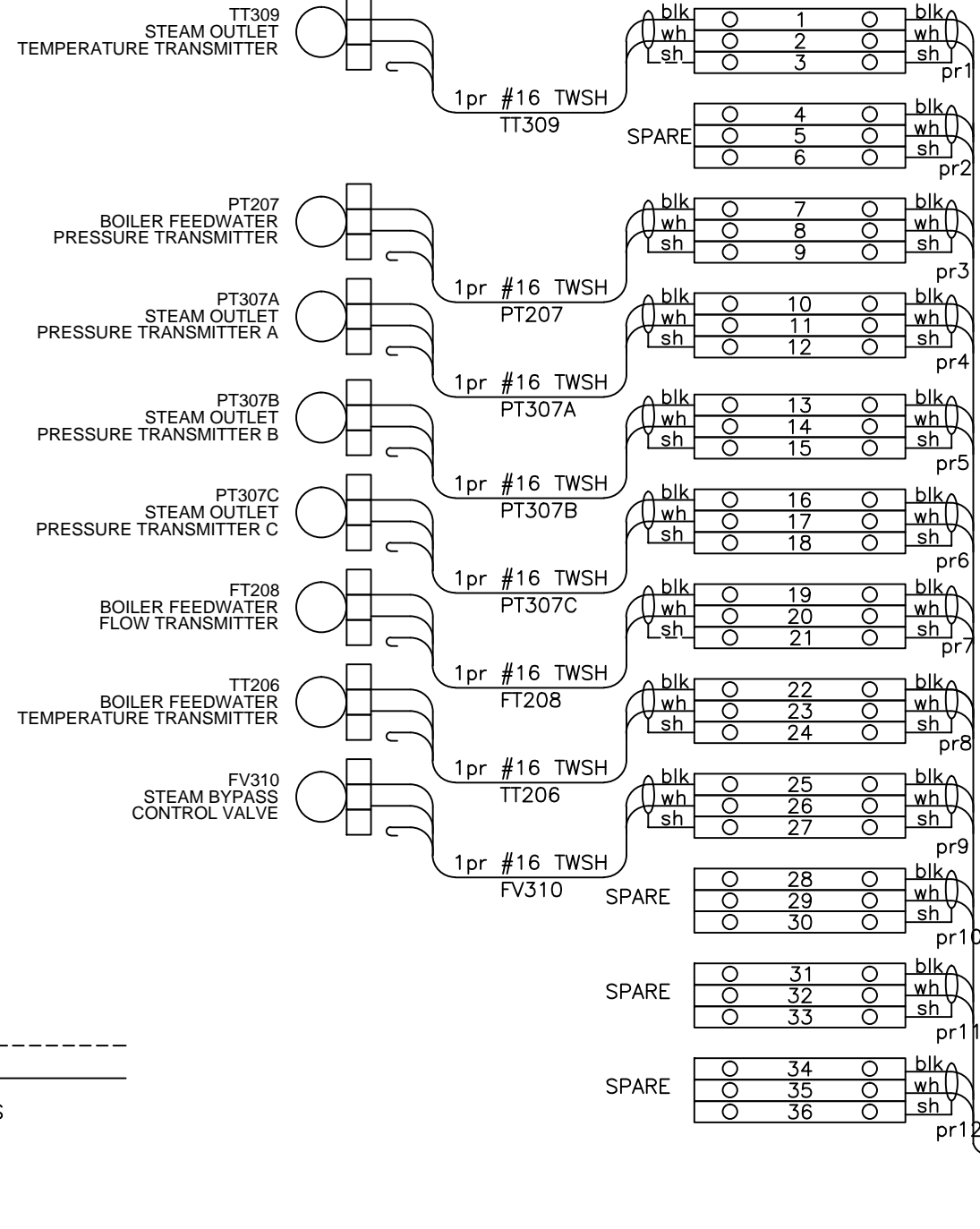
ENG. STAMP AREA

PERMIT TO PRACTICE P08884

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0.1	UPDATED FOR CONSTRUCTION	08 JUN 2012	FH	FH	PR	

REVISIONS

JB-003
TB-1



NOTES:

- CUSTOMER WIRING -----
- CSI SHOP WIRING _____
- BEND BACK AND TAPE ALL SHIELDS

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0.2	UPDATED FOR CONSTRUCTION	03 JUL 2012	PR	PR		
0.1	UPDATED FOR CONSTRUCTION	11 JUN 2012	FH	FH	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR		

REVISIONS



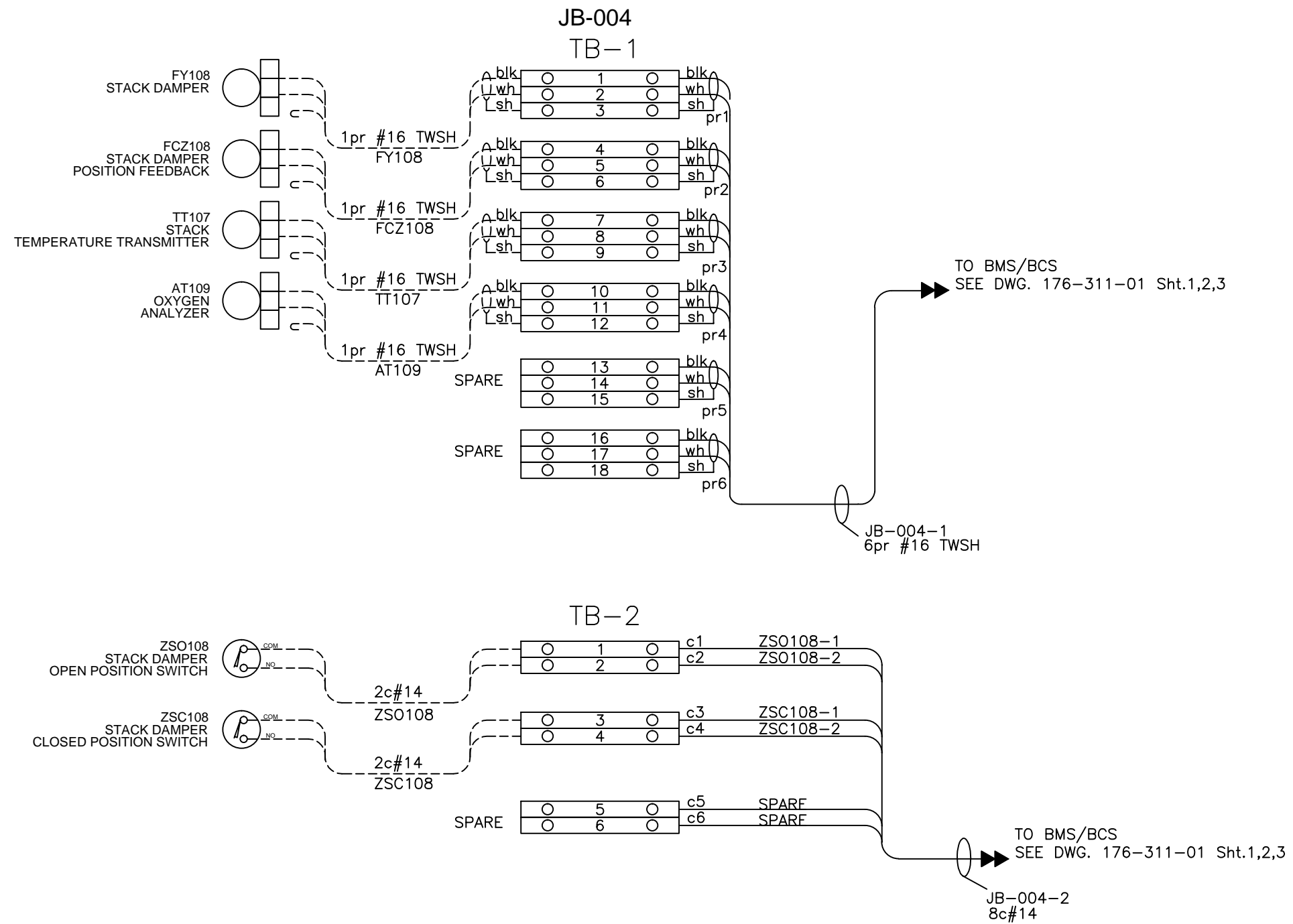
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG		
JB-003 ANALOG JUNCTION BOX WIRING		REV. 1
DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-136-01 1/5
JOB No. 176	SCALE: NONE	



NOTES:
 CUSTOMER WIRING -----
 CSI SHOP WIRING _____
 BEND BACK AND TAPE ALL SHIELDS

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0.2	UPDATED FOR CONSTRUCTION	03 JUL 2012	PR	PR		
0.1	UPDATED FOR CONSTRUCTION	11 JUN 2012	FH	FH	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR		

REVISIONS



Combustion Solutions Inc.

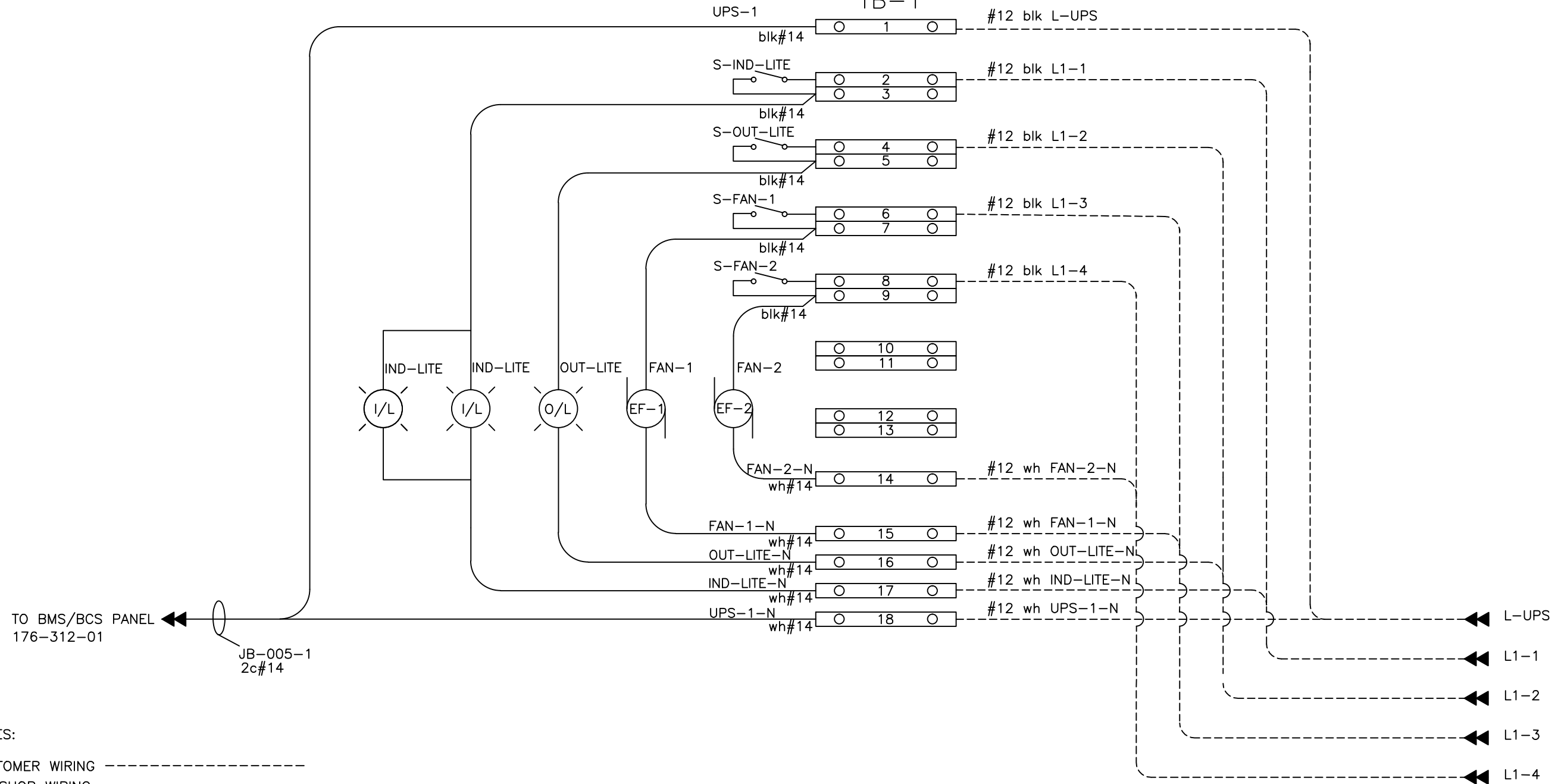
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG		
JB-004		REV. 1
STACK JUNCTION BOX WIRING		
DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-136-01 2/5
JOB No. 176	SCALE: NONE	

JB-005
TB-1



NOTES:

CUSTOMER WIRING - - - - -
CSI SHOP WIRING _____

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0.2	UPDATED FOR CONSTRUCTION	03 JUL 2012	PR	PR		
0.1	UPDATED FOR CONSTRUCTION	11 JUN 2012	FH	FH	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR		

REVISIONS



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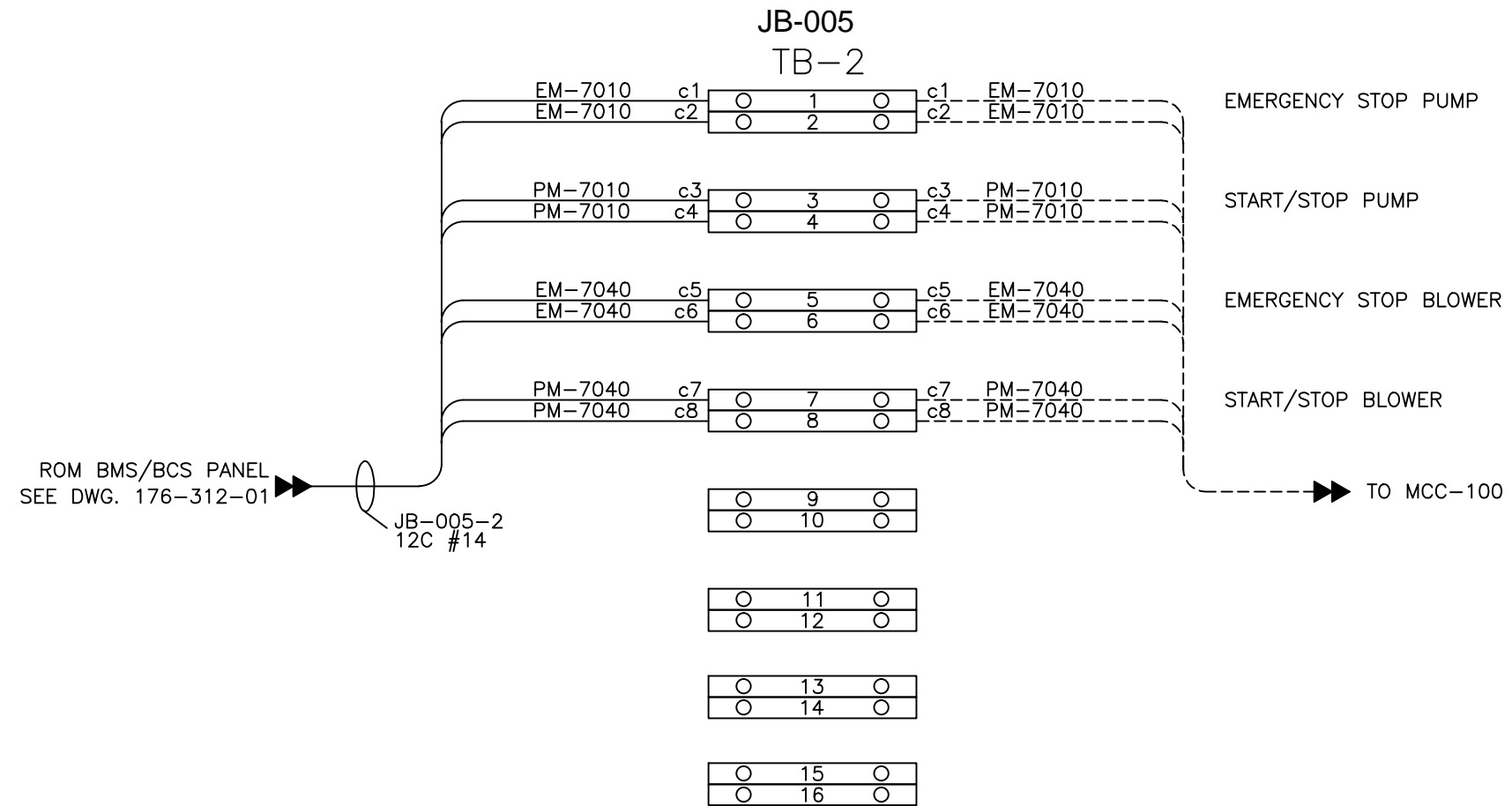
ENG. STAMP AREA

PERMIT TO PRACTICE P08884

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG

JB-004
STACK JUNCTION BOX WIRING

DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-136-01 3/5	REV. 1
JOB No. 176	SCALE: NONE		



NOTES:

CUSTOMER WIRING -----
CSI SHOP WIRING _____

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0.2	UPDATED FOR CONSTRUCTION	03 JUL 2012	PR	PR		
0.1	UPDATED FOR CONSTRUCTION	11 JUN 2012	FH	FH	PR	
0	ISSUE FOR CONSTRUCTION	8 JUN 2012	FH	FH	PR	

R E V I S I O N S



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ENG. STAMP AREA

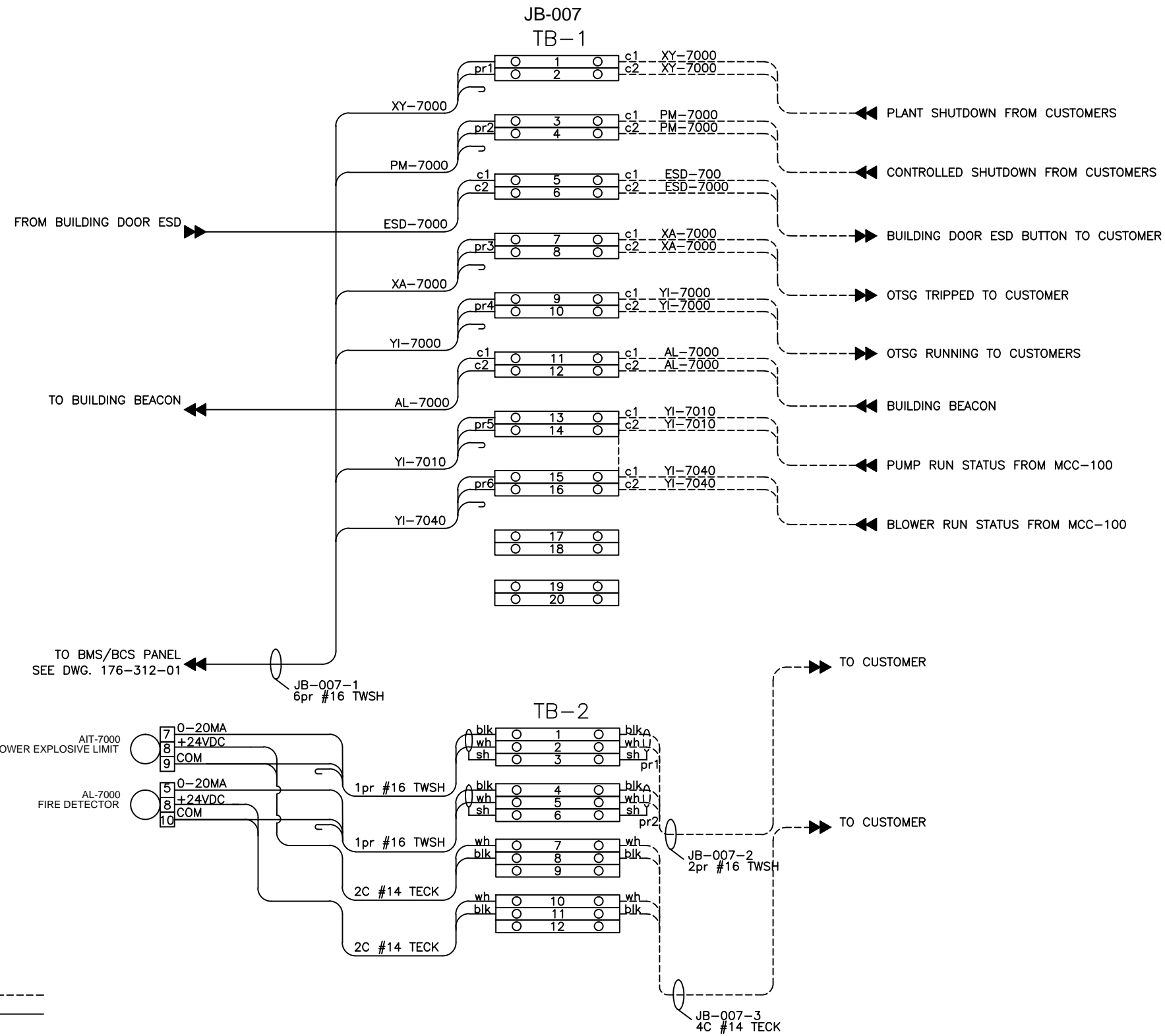
PERMIT TO PRACTICE P08884

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG

JB-005-2
120VAC JUNCTION BOX WIRING

REV. 1

DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-136-01 4/5
JOB No. 176	SCALE: NONE	



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0.2	UPDATED FOR CONSTRUCTION	03 JUL 2012	PR	PR		
0.1	UPDATED FOR CONSTRUCTION	11 JUN 2012	FH	FH	PR	
0	ISSUE FOR CONSTRUCTION	8 JUN 2012	FH	FH	PR	

REVISIONS



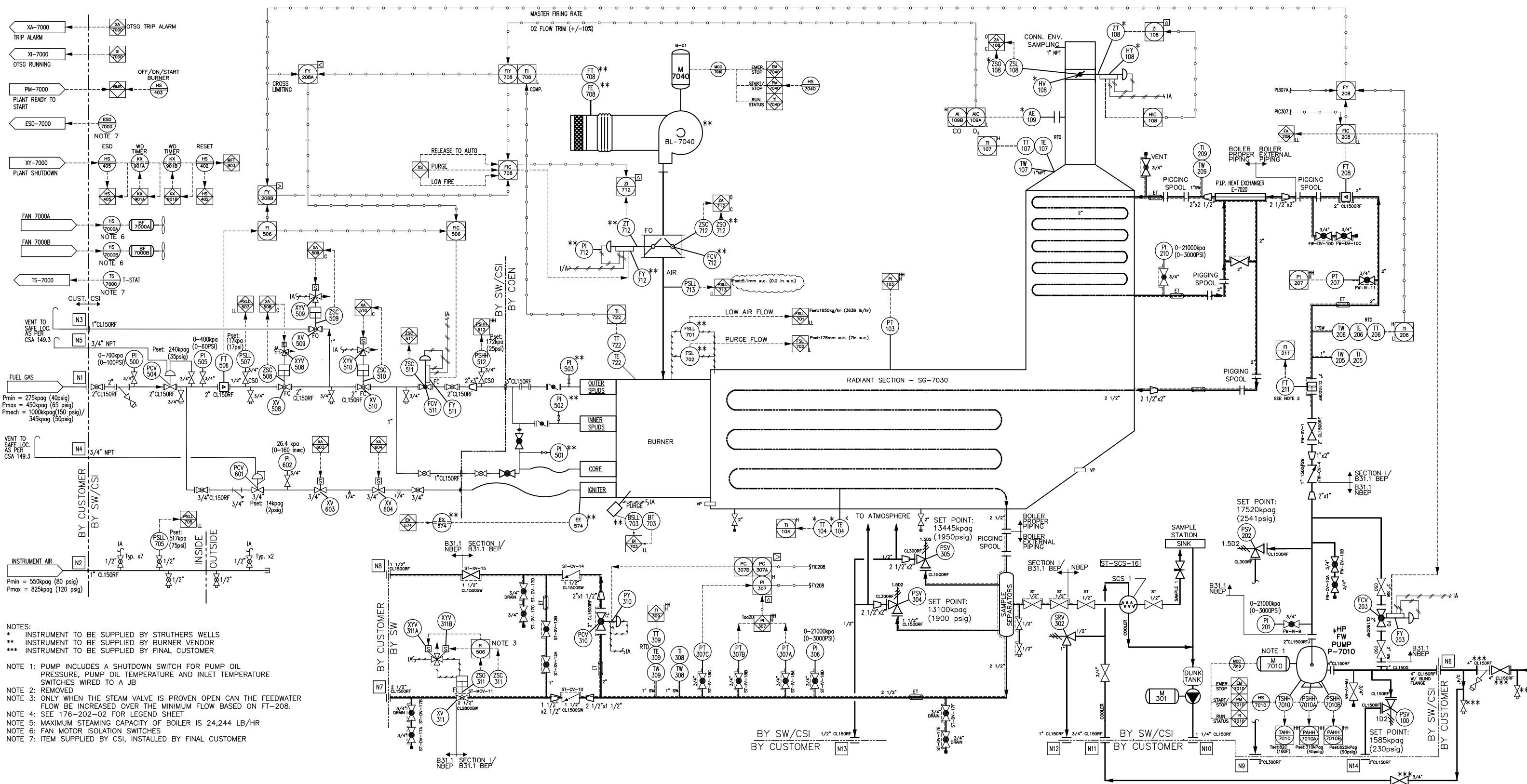
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG		
JB-007 ANALOG JUNCTION BOX WIRING		REV. 1
DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-136-01 5/5
JOB No. 176	SCALE: NONE	



NOTES:
 * INSTRUMENT TO BE SUPPLIED BY STRUTHERS WELLS
 ** INSTRUMENT TO BE SUPPLIED BY BURNER VENDOR
 *** INSTRUMENT TO BE SUPPLIED BY FINAL CUSTOMER

NOTE 1: PUMP INCLUDES A SHUTDOWN SWITCH FOR PUMP OIL PRESSURE, PUMP OIL TEMPERATURE AND INLET TEMPERATURE SWITCHES WIRED TO A JB

NOTE 2: REMOVED

NOTE 3: ONLY WHEN THE STEAM VALVE IS PROVEN OPEN CAN THE FEEDWATER FLOW BE INCREASED OVER THE MINIMUM FLOW BASED ON FT-208.

NOTE 4: SEE 176-202-02 FOR LEGEND SHEET

NOTE 5: MAXIMUM STEAMING CAPACITY OF BOILER IS 24,244 LB/HR

NOTE 6: FAN MOTOR ISOLATION SWITCHES

NOTE 7: ITEM SUPPLIED BY CSI, INSTALLED BY FINAL CUSTOMER

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
4	AS BUILT	Sept 26th, 2012	WA	-	BV	
3.1	REVISED FOR CONSTRUCTION - CODE BOUNDARY	July 10th, 2012	WA	-	JS	
3	REVISED FOR CONSTRUCTION - CODE BOUNDARY	May 30th, 2012	WA	-		
2	REVISED FOR CONSTRUCTION	May 22nd, 2012	WA	-		
1	FOR CONSTRUCTION	April 16th, 2012	WA	-	SC	

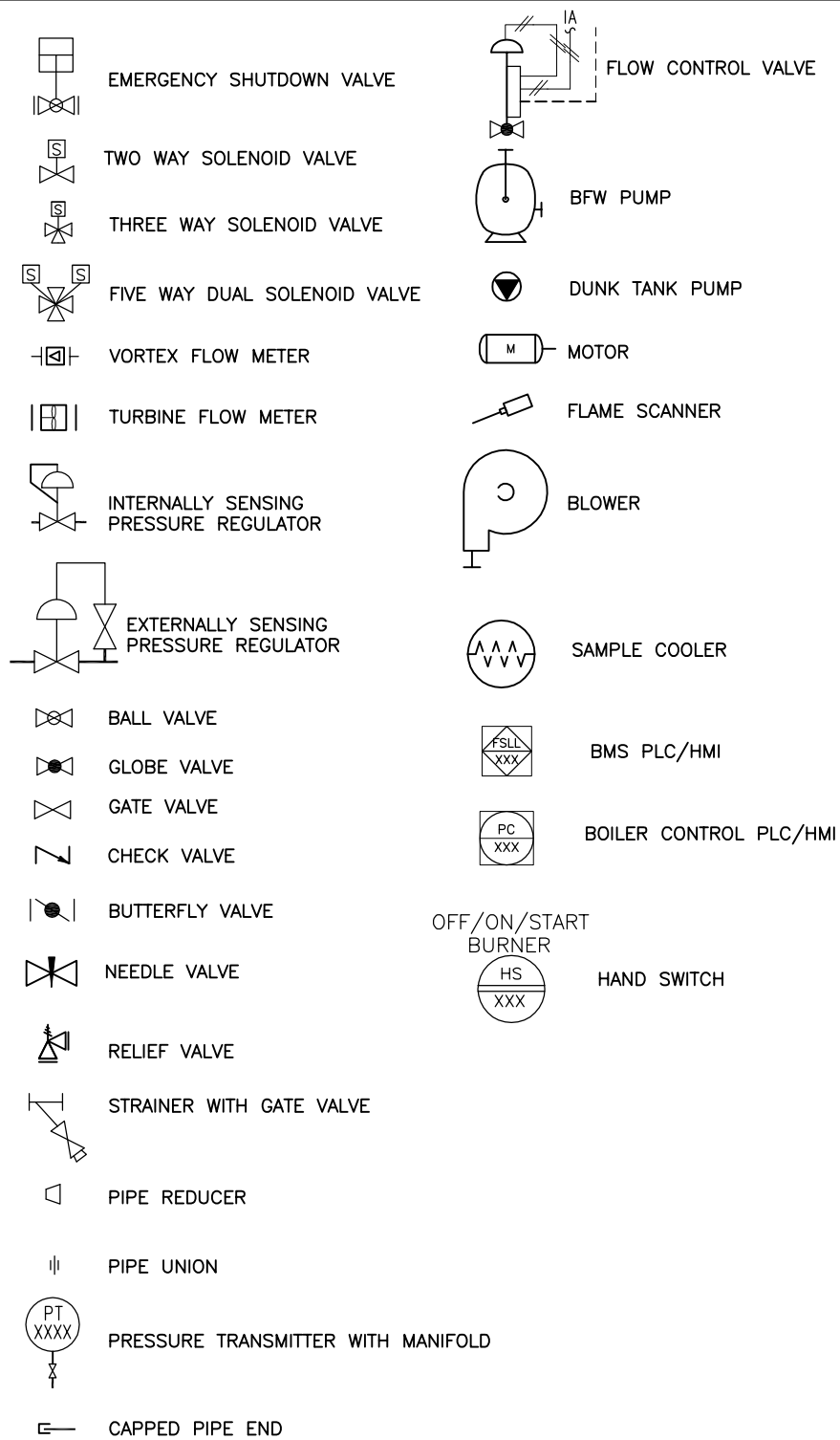
REVISIONS

CSI COMBUSTION SOLUTIONS INC.

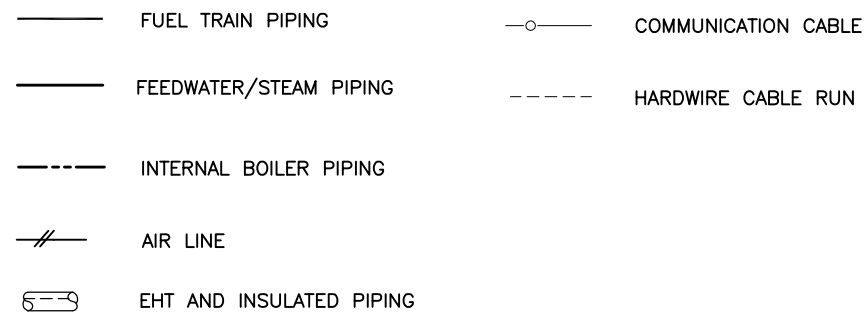
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FOR: MURPHY OIL CANADA	
PIPING & INSTRUMENTATION DIAGRAM MURPHY OIL VISTA OTSG 25MBTU/hr PKG-7000	
DWN. BY: WA	DATE: 26 SEPT 2012
JOB No. 176	SCALE: NTS
DRAWING NO. 176-202-01	REV. 4

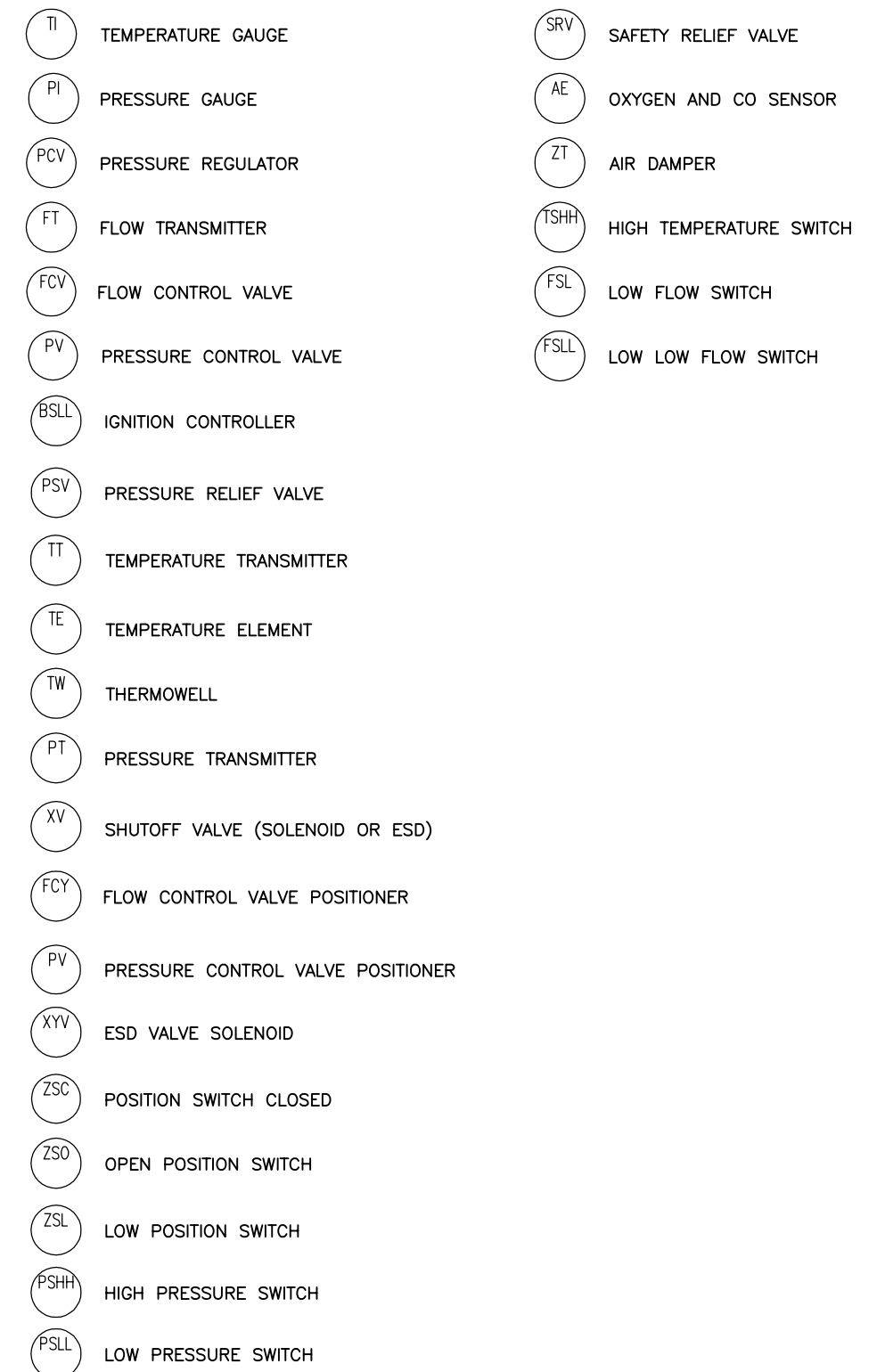
SCHEMATIC SYMBOLS



LAYOUT (PIPING & WIRING)



TAG FORMAT(PIPING & WIRING)



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	SPET 26TH, 2012	WA	-		
0	ISSUE FOR CONSTRUCTION	MAY 22nd, 2012	WA	-	JS	JN

REVISIONS

CSI COMBUSTION SOLUTIONS INC.

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FOR: MURPHY OIL CANADA			
PIPING & INSTRUMENTATION DIAGRAM MURPHY OIL VISTA OTSG 25MBTU/hr PKG-7000			
DWN. BY: WA	DATE: 26 SEPT 2012	DRAWING NO.	REV.
JOB No. 176	SCALE: NTS	176-202-02	1



CODE SHEET

VISTA Projects Limited			
VENDOR DRAWING/DOCUMENT SQUAD CHECK			
A	Reviewed without exception. Proceed with fabrication. Issue final drawings/ documents.		
B	Reviewed except as marked and/or noted. Proceed with fabrication and resubmit drawing/document. Shipment will not be released, if any drawings/documents requiring approval, as per purchase order conditions, are at this code.		
C	Not accepted. Revise as marked and resubmit drawing/document for review. Shipment will not be released, if any drawings/documents requiring approval, as per purchase order conditions, are at this code.		
D	Not required for review. Received for information.		
Reviewed only as to general conformity with the design concept and specifications provided. The engineer does not warrant or represent that the information contained on this drawing/document is either accurate or complete. Sole responsibility for correct design, detail and dimensions shall remain with the party submitting the drawing/document.			
SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DM02	PKG-700		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

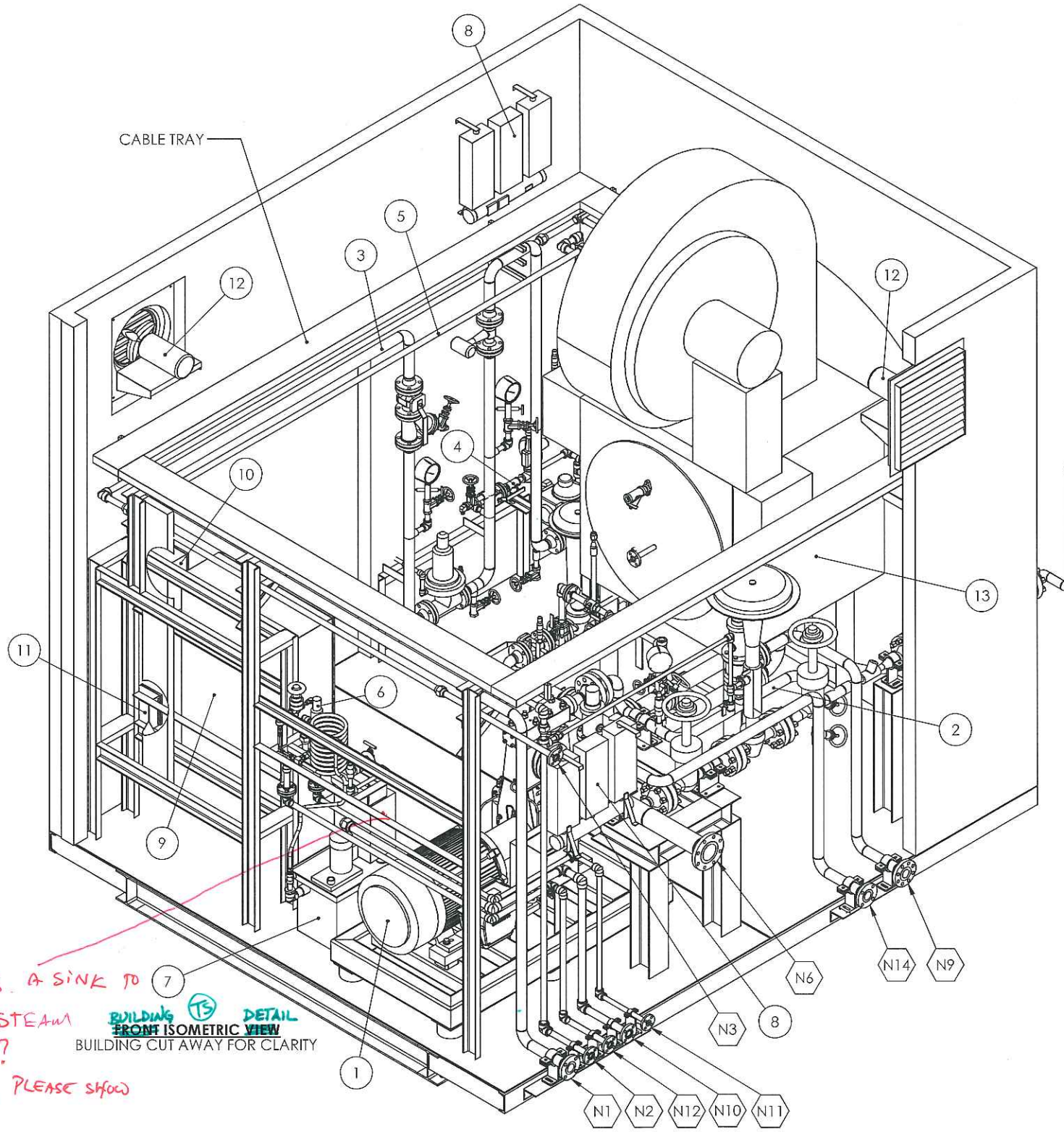
VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-261-01

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Building Layout

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00



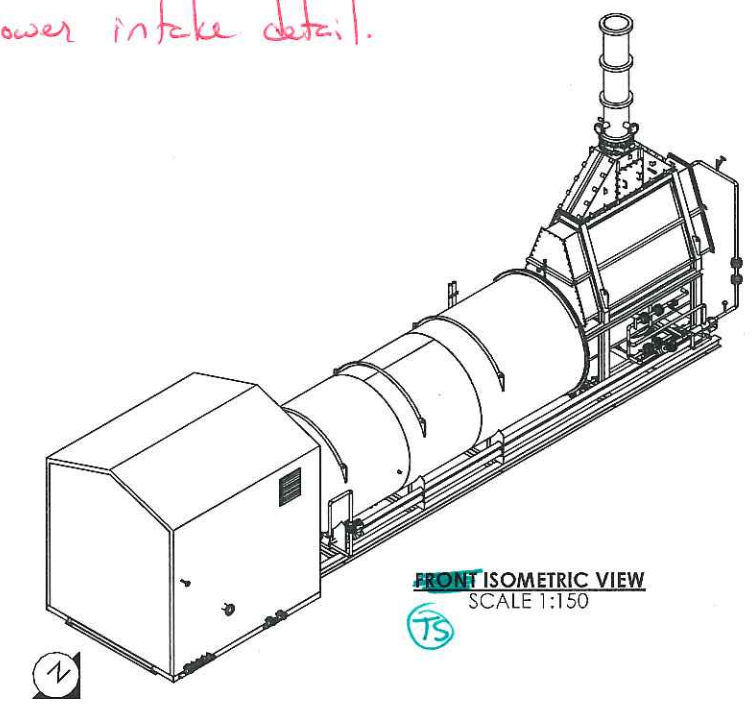
ITEM	MANUFACTURER	PART #	DESCRIPTION	QTY
1	HAMMELMANN	HDP-127	BOILER FEEDWATER PUMP AND MOTOR, 480VAC 3 PHASE	1
2	CSI	-	FEEDWATER ASSEMBLY, SEE DWG 176-412-01	1
3	CSI	-	FUEL GAS ASSEMBLY, SEE DWG 176-413-01	1
4	CSI	-	PILOT GAS ASSEMBLY, SEE DWG 176-414-01	1
5	CSI	-	INSTRUMENT AIR ASSEMBLY, SEE DWG 176-416-01	1
6	CSI	-	SAMPLE COOLING STATION ASSEMBLY, SEE 176-402-01	1
7	SERFILCO	CPS14-E01-SC	WATER COLLECTION TANK, C/W PUMP, HIGH LEVEL SWITCH	1
8	NORSEMAN	XB3-4300T2D	3000W BUILDING HEATER, 480 VAC 3 PHASE	2
9	CSI	-	OTSG CONTROL PANEL, 48" X 36" X 12" NEMA 4, 12 ENCLOSURE, SEE CSI DWG 176-310-01	1
10	CSI	-	BUILDING JUNCTION BOX, 14" X 12" X 6", NEMA 4, 12 ENCLOSURE, SEE CSI DWG 176-135-03	2
11	STRUTHERS WELLS / TEI	-	HEAT TRACING JUNCTION BOX, CURRENTLY SHOWN AS 8" X 6" X 3" ENCLOSURE, SIZE TO BE CONFIRMED	1
12	RUFFNECK	EFX16A	BUILDING EXHAUST FAN, 120VAC SINGLE PHASE, C/W BACKDRAFT PREVENTOR, ON/OFF DISCONNECT	2
13	COEN	-	BOILER BURNER	1

** Will require min. 80 kPag discharge pressure from drain tank pump. Please change to "E03" pump*

NOTES:

- FOR NOZZLE LIST SEE SHT-02
- BUILDING TO COME WITH OUTDOOR LIGHT CONTROLLED BY PLANT PHOTOCCELL
- BUILDING TO COME WITH TWO INDOOR LIGHTS, ONE WITH BATTERY BACKUP, CONTROLLED BY LOCAL ON/OFF SWITCH
- BUILDING DOORS TO OPEN OUTWARDS
- N4 AND N5 TO BE PIPED THROUGH NEARBY WALL WITH THE OUTLET TOWARDS THE GROUND AS PER CSA B149.3
- NOZZLE N3 TO BE PIPED TO SAFE LOCATION FOR VENTING AS PER CSA B149.3
- NOZZLES N9 AND N14 TO BE PIPED TO SAFE LOCATION WITH NO VALVES BETWEEN THE NOZZLES AND ATMOSPHERE

** Show Blower intake detail.*



'Is this a sink to drain steam samples? If not, please show sink

BUILDING DETAIL FRONT ISOMETRIC VIEW
BUILDING CUT AWAY FOR CLARITY

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	29-MAY-12	WA	WA	JS	JS
A	FOR APPROVAL	30-MARCH-12	WA	WA	JN	

REVISIONS

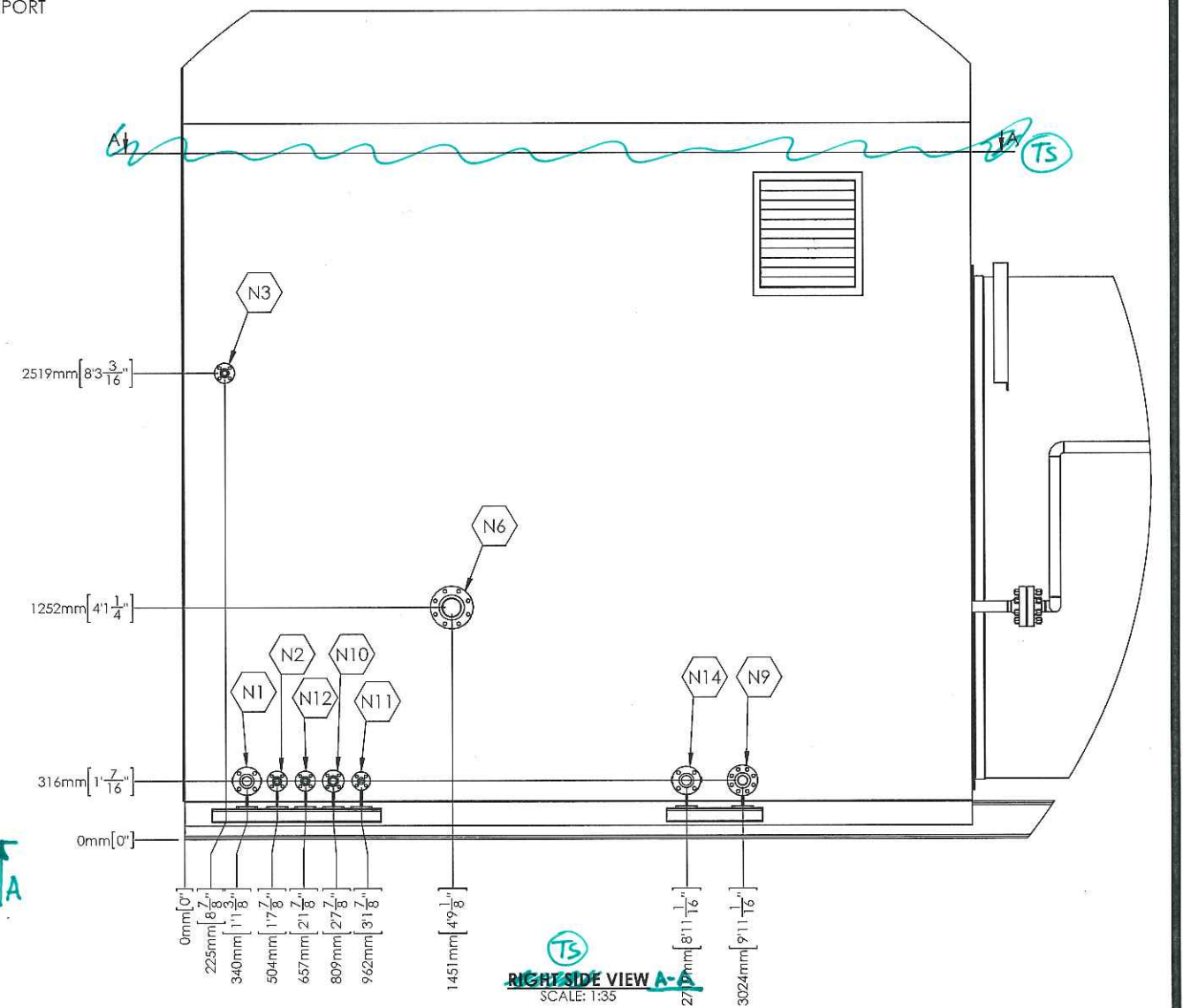
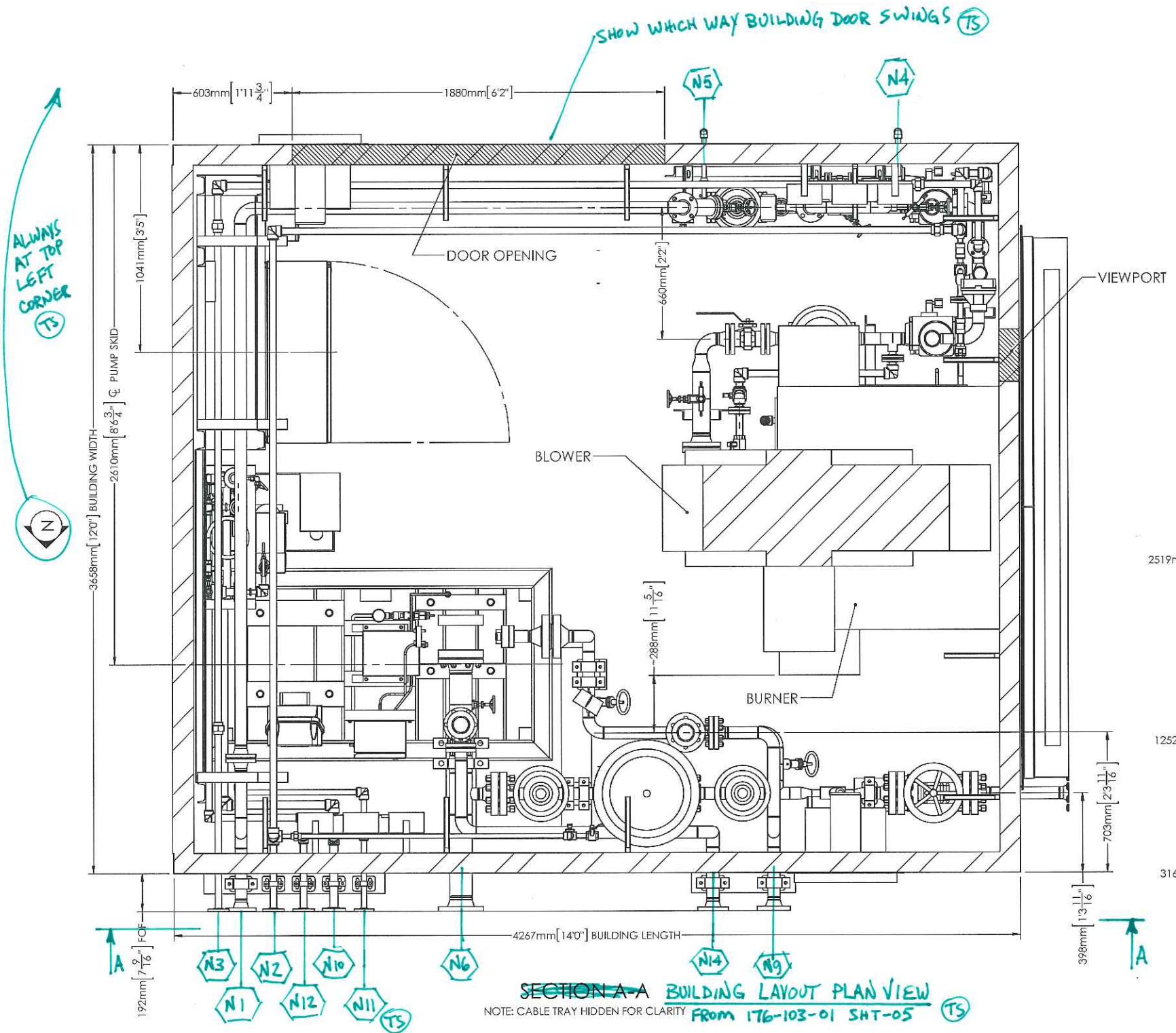


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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR BUILDING LAYOUT 1 OF 5		REV: 0
DWN. BY: WA	DATE: 5/29/2012	DRAWING NO. 176-261-01 SHT-01
CSI JOB NO. 176	SCALE: 1:30	

- NOTES:**
1. DIMENSIONS ARE FROM FRONT/EDGE OF SKID
 2. FLANGE DIMENSIONS TO FACE OF FLANGE
 3. DOORS OPEN OUTWARDS
 4. DOOR DIMENSIONS ARE APPROXIMATE

NOZZLE#	LINE SIZE	DESCRIPTION
N1	2" CL150RF	FUEL GAS INLET
N2	1" CL150RF	INSTRUMENT AIR INLET
N3	1" CL150RF	FUEL GAS VENT OUTLET
N4	3/4" PIPE	PILOT REGULATOR VENT OUTLET
N5	3/4" PIPE	FUEL GAS REGULATOR VENT OUTLET
N6	4" CL150RF	FEEDWATER INLET
N9	2" CL300RF	FEEDWATER PSV-202 OUTLET
N10	1 1/4" CL150RF	DUNK TANK OUTLET
N11	3/4" CL150RF	COOLING WATER INLET
N12	1" CL150RF	SAMPLE STATION PSV-302 OUTLET
N14	2" CL150RF	FEEDWATER PSV-100 OUTLET



SECTION A-A BUILDING LAYOUT PLAN VIEW
 NOTE: CABLE TRAY HIDDEN FOR CLARITY FROM 176-103-01 SHT-05

RIGHT SIDE VIEW A-A
 SCALE: 1:35

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	29-MAY-12	WA	WA	JS	JS
A	FOR APPROVAL	30-MARCH-12	WA	WA	JN	

REVISIONS

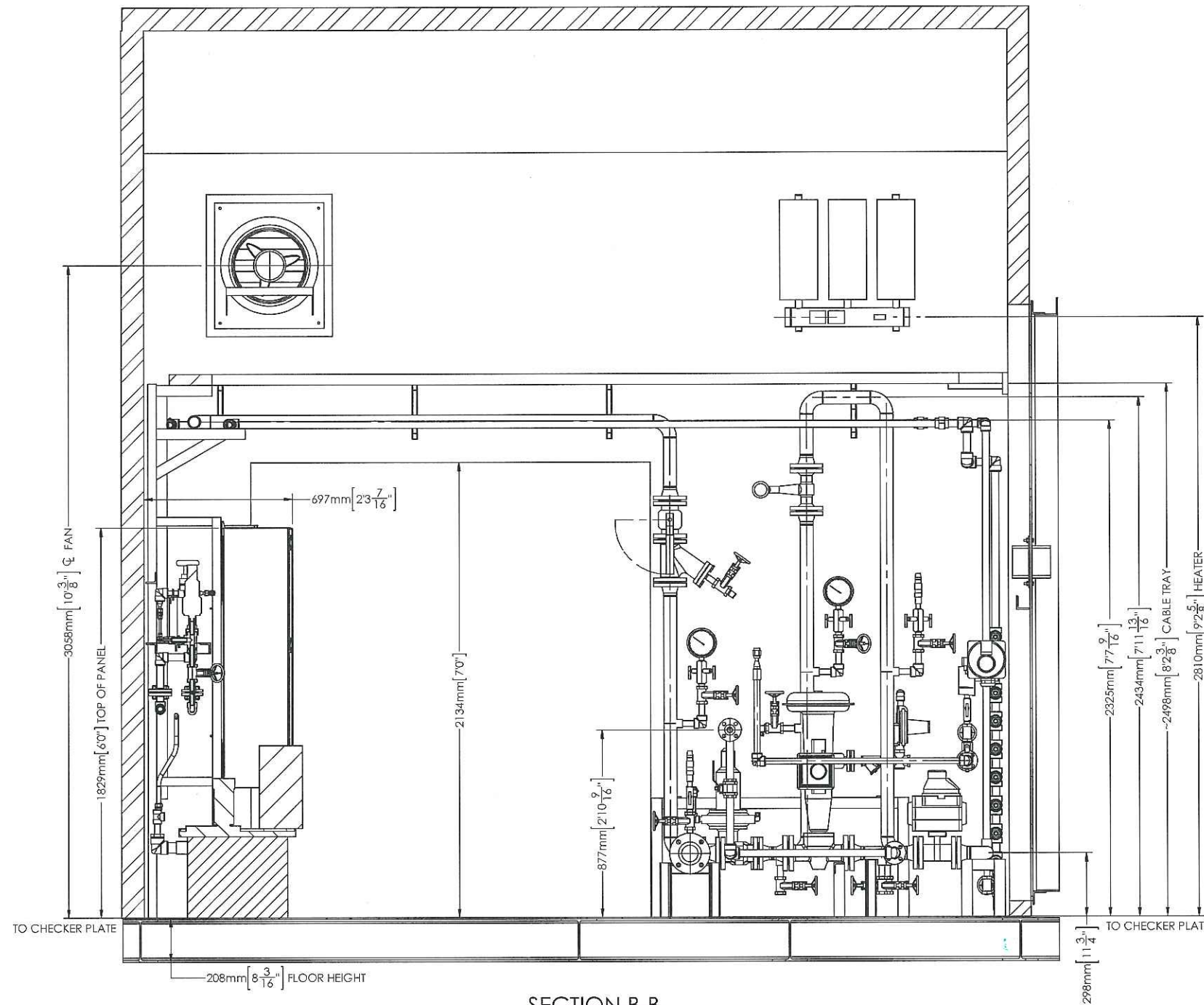


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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR BUILDING LAYOUT 2 OF 5		REV: 0
DWN. BY: WA	DATE: 5/29/2012	DRAWING NO. 176-261-01 SHT-02
CSI JOB NO. 176	SCALE: 1:25	

NOTES:

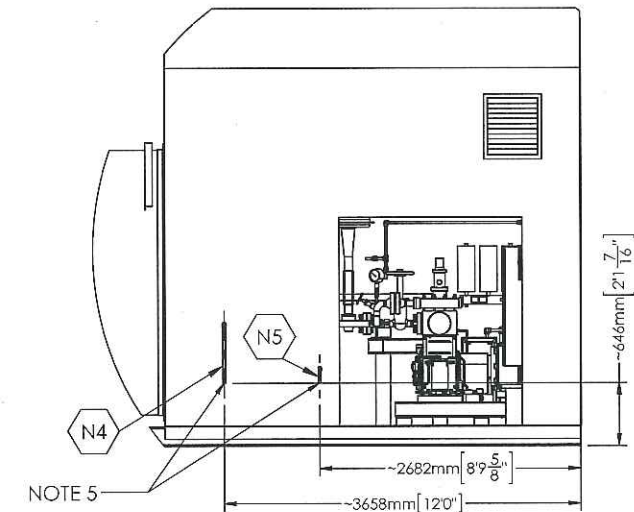
1. DIMENSIONS ARE FROM FRONT/FLOOR OF SKID
2. FLANGE DIMENSIONS TO FACE OF FLANGE
3. SEE SHT-02 FOR NOZZLE LIST
4. DOOR DIMENSIONS ARE APPROXIMATE
5. END USER TO ENSURE REGULATOR VENTS ARE TO SAFE LOCATION



SECTION B-B

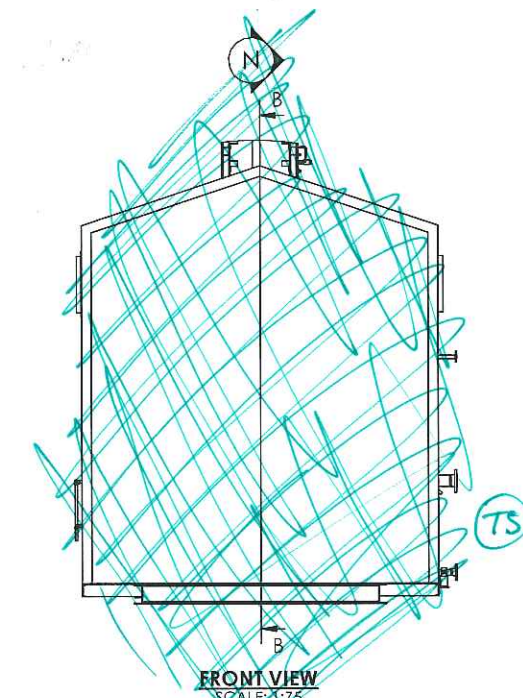
NOTE: BURNER AND BLOWER ASSEMBLY HIDDEN FOR CLARITY

From 176-103-01 SHT-05 (TS)



LEFT SIDE VIEW C-C
SCALE: 1:75

From 176-103-01 SHT-05 (TS)



FRONT VIEW
SCALE: 1:75

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	29-MAY-12	WA	WA	JS	JS
A	FOR APPROVAL	30-MARCH-12	WA	WA	JN	

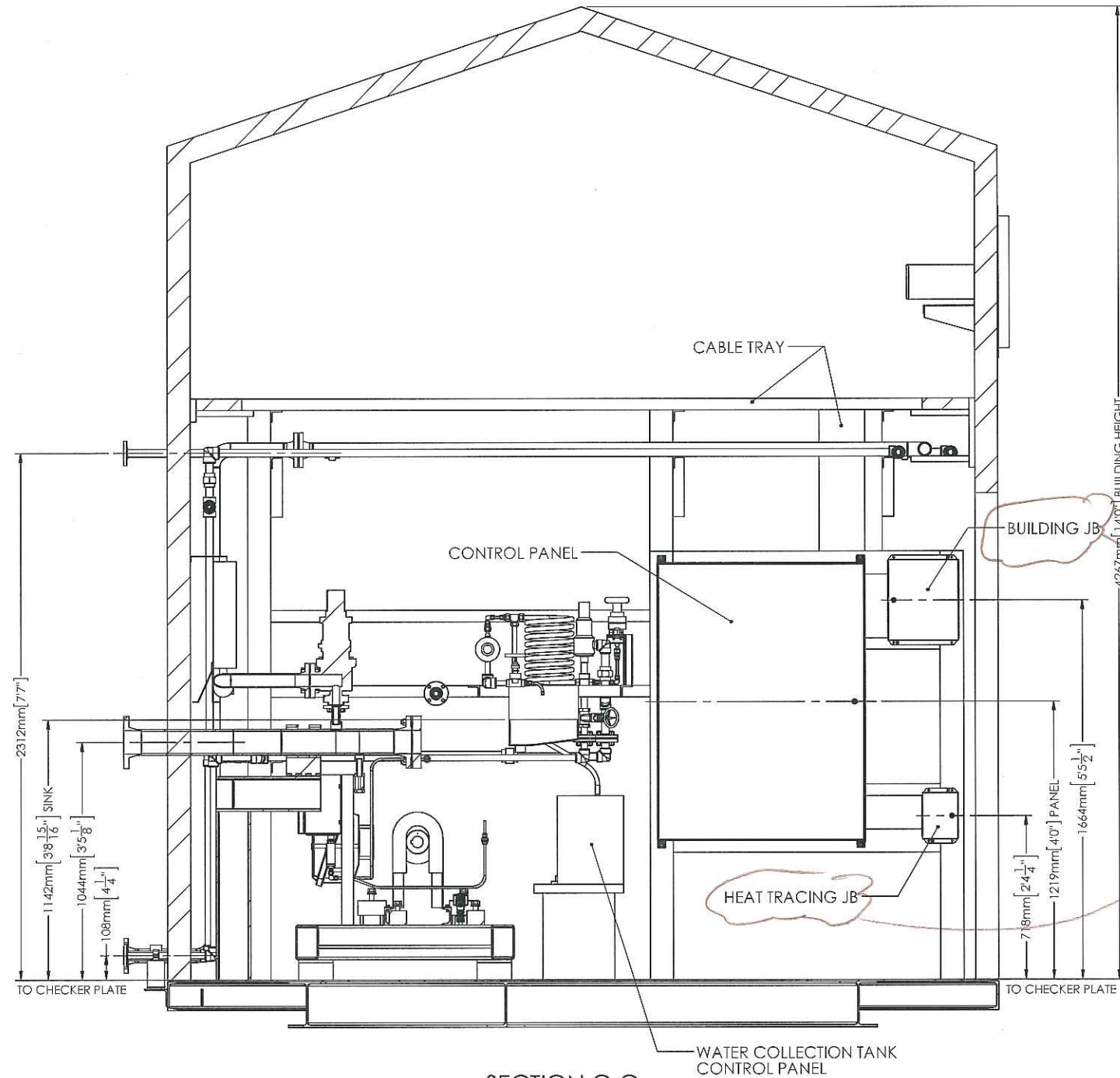
REVISIONS



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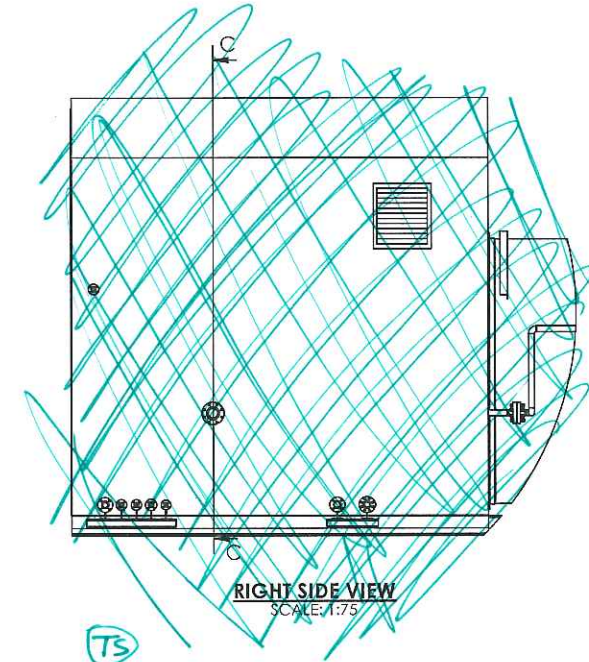
FOR:	STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT:	1780
DESC:	PKG-7000 ONCE THROUGH STEAM GENERATOR BUILDING LAYOUT 3 OF 5		REV:	0
DWN. BY:	WA	DATE:	5/29/2012	DRAWING NO.
CSI JOB NO.	176	SCALE:	1:25	176-261-01 SHT-03

- NOTES:**
1. DIMENSIONS ARE FROM FRONT/FLOOR OF SKID
 2. FLANGE DIMENSIONS TO FACE OF FLANGE
 3. SEE SHT-02 FOR NOZZLE LIST



PROVIDE TAGS THAT
CORRELATE TO DWG NO.
176-103-01 SHT-01

(P)



SECTION C-C
FROM 176-103-01 SHT-05 TS

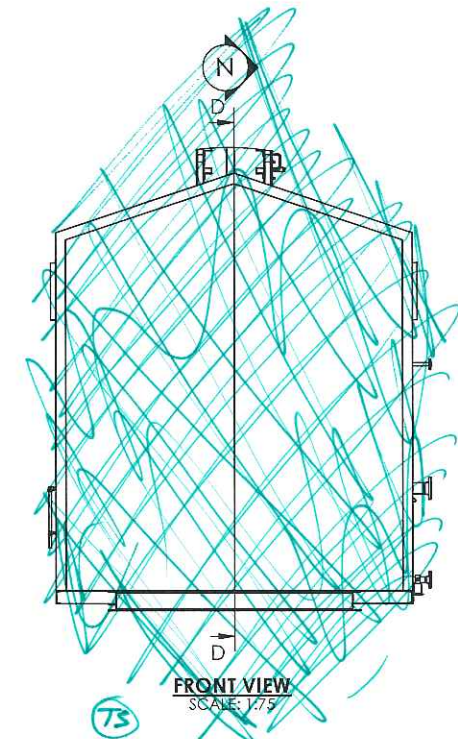
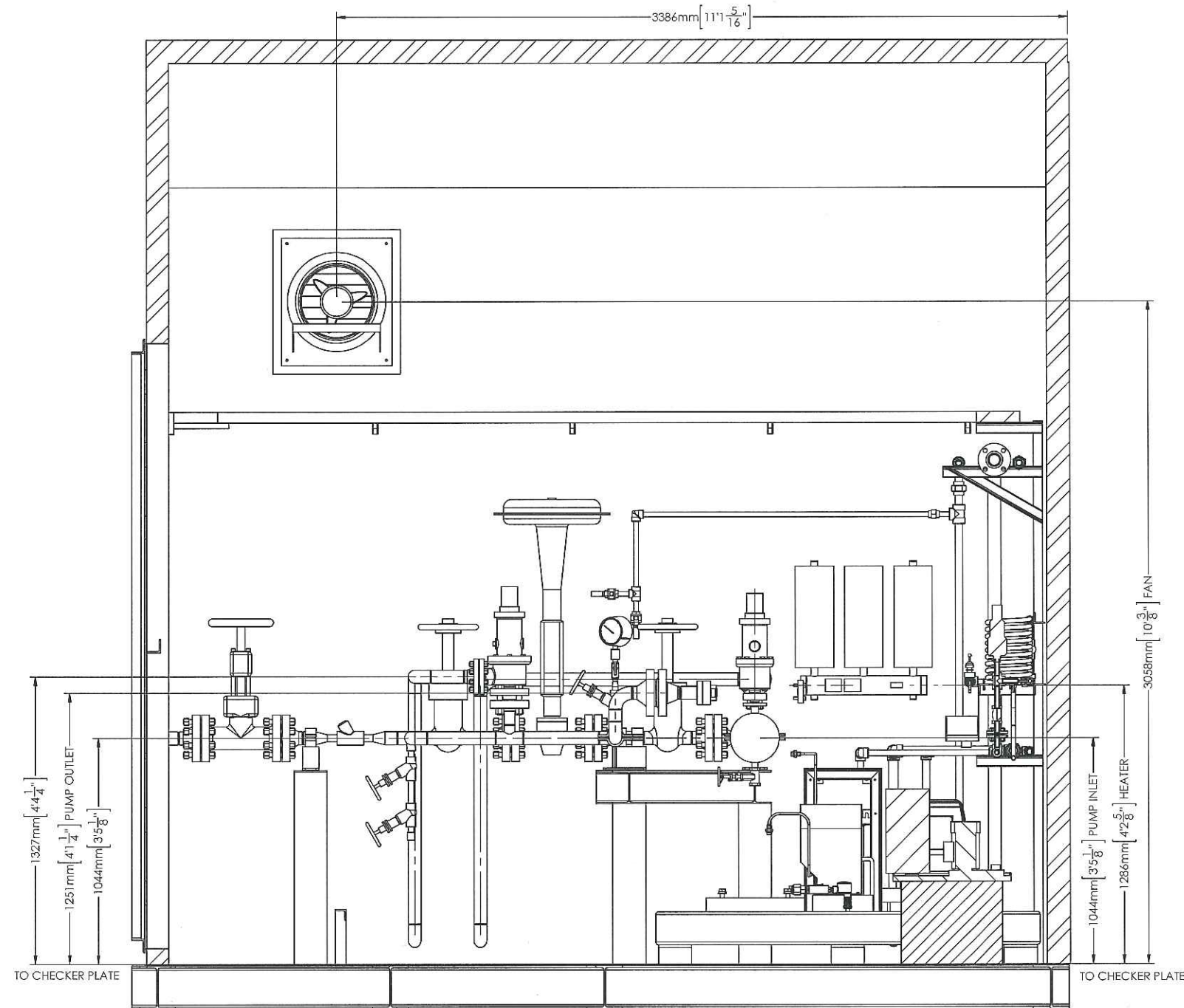
REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	29-MAY-12	WA	WA	JS	JS
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR BUILDING LAYOUT 4 OF 5		REV: 0
DWN. BY: WA	DATE: 5/29/2012	DRAWING NO. 176-261-01 SHT-04
CSI JOB NO. 176	SCALE: 1:25	

- NOTES:**
1. DIMENSIONS ARE FROM FRONT/FLOOR OF SKID
 2. FLANGE DIMENSIONS TO FACE OF FLANGE
 3. SEE SHT-02 FOR NOZZLE LIST



SECTION D-D

NOTE: BURNER AND BLOWER ASSEMBLY HIDDEN FOR CLARITY

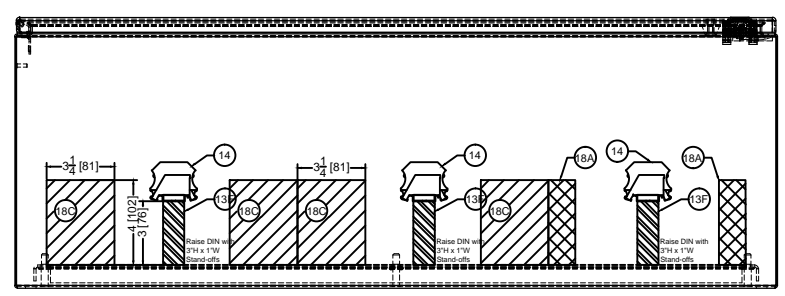
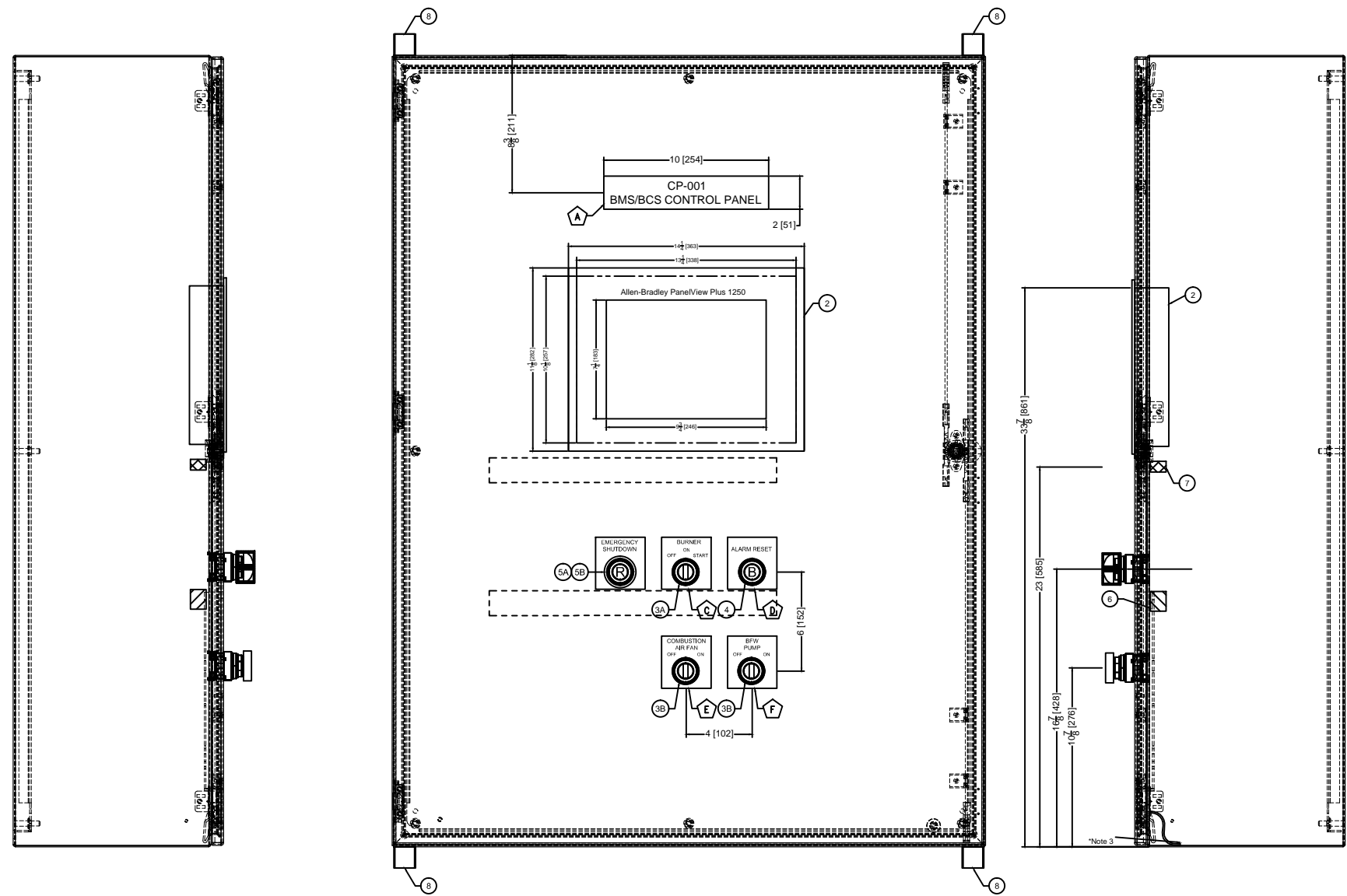
From 176-103-01 SHT-05 (TS)

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	29-MAY-12	WA	WA	JS	JS
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR BUILDING LAYOUT 5 OF 5		REV: 0
DWN. BY: WA	DATE: 5/29/2012	DRAWING NO. 176-261-01 SHT-05
CSI JOB NO. 176	SCALE: 1:25	



BILL OF MATERIALS			
ITEM	CAT#	QTY	DESCRIPTION
1A	CSD483612LG	1	Hoffman Enclosure, 48"x36"x12", CONCEPT, NEMA Type 4, 12
1B	CP4836	1	Enclosure Inner Panel, Hoffman, 48" x 36"
2	2711P-T12C4D1	1	HMI, Allen Bradley, PanelView Plus1250, Standard Communications (Ethernet), 24VDC
3A	800G-SR3	1	3 Position Selector Switch, Left Side Maintained, Right Side Spring Return
3B	800G-SM2	2	2 Position Selector Switch
4	800H-AR2D1P	2	Pushbutton, Momentary, Flush Head, Black, 1NO Sealed Contact, CI 1 Div2 Gr ABCDFG
5A	800H-FRXT6A4	1	AB Pushbutton, Type 4X, Push-Pull Twist, Red, 4 NC Normal Contacts
5B	800T-N310	1	AB Pushbutton Protective Ring, for 800H-FRX
6	F1X1WH6	18"	Panduit, 1"x1" (WxH), White, 24VDC (6ft/unit) w/ Cover
7	F.5X1LG6	18"	Panduit, 0.5"x1" (WxH), Grey, 120VAC (6ft/unit) w/ Cover
8	CMFK	1	Hoffman Mounting Bracket Kit (qty 4)

LAMCOID LIST					
ITEM	COLOR	QTY	DESCRIPTION	TEXT SIZE	DIMENSIONS
A	BLACK ON WHITE	1	CP-001 BMS/BCS CONTROL PANEL	1/2"	10" x 2"
B	BLACK ON WHITE	1	EMERGENCY SHUTDOWN	1/4"	3" x 3-1/8"
C	BLACK ON WHITE	1	BURNER OFF ON START	1/4"	3" x 3-1/8"
D	BLACK ON WHITE	1	ALARM RESET	1/4"	3" x 3-1/8"
E	BLACK ON WHITE	1	COMBUSTION AIR FAN ON OFF	1/4"	3" x 3-1/8"
F	BLACK ON WHITE	1	BFW PUMP ON OFF	1/4"	3" x 3-1/8"

Notes:
 1. Dimensions are shown in INCHES [MM].
 2. Customer to connect to earth ground.
 3. Panel door to be bonded to enclosure with GREEN #14AWG (or larger).
 4. Refer to 176-311-01 for wiring diagrams.

Warnings:
 1. Explosion Hazard - Substitution of components may impair suitability for Class 1 Zone 2.
 2. All Fuses to be non-incendive ceramic fuses
 3. More than one voltage present
 4. Explosion Hazard - Batteries must only be changed in an area know to be Non-Hazardous
 5. Disconnect supply before servicing

PANEL DATA	
MODEL	CP-4X-LG-2AB-483612-002
SERIAL/DRAWING NUMBER	176-310-01
INCOMING POWER	120VAC/60Hz/1Ph, 10A
CONTROL POWER	24VDC
EQUIPMENT CLASSIFICATION	CLASS 1, DIV 2, GR C, D, T3C
ENCLOSURE RATING	TYPE 4, 12
DESIGN TEMPERATURE	0C TO 40C (Unheated)
DUTY	CONTINUOUS
DESIGN CODE	CSA 22.1, 22.2, NO.0, 0.4, 14, 213
MANUFACTURE DATE	

Note: This equipment is suitable to be installed in a CLASS 1, ZONE 2, GR IIA, T2B location

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUED FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
B	RE-ISSUED FOR APPROVAL	14 MAR 2012	PR	PR		
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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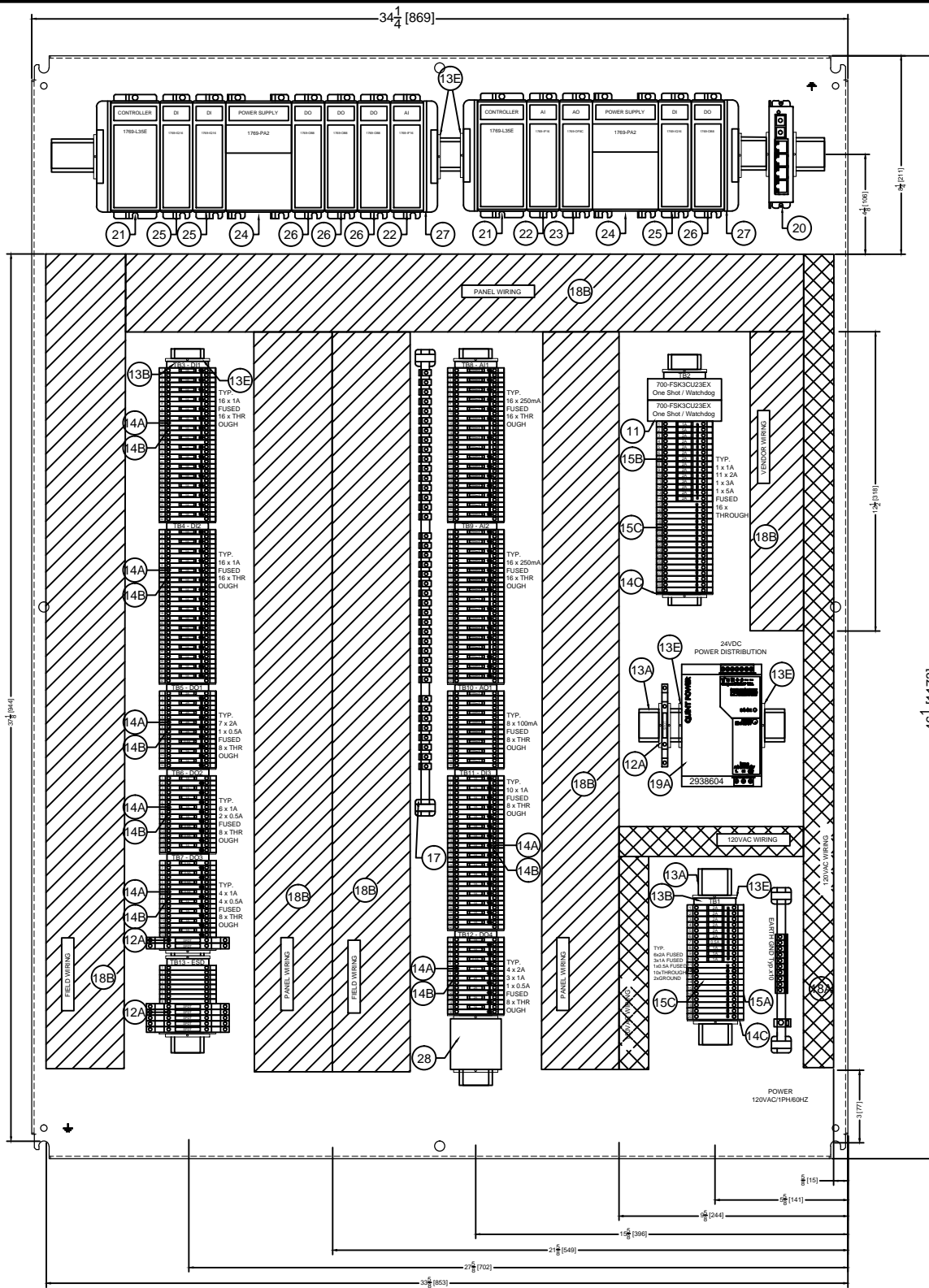
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

FOR: **STRUTHERS WELLS / MURPHY OIL VISTA OTSG**

CP-001		REV. 1
BMS/BCS CONTROL PANEL LAYOUT		
DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-310-01 1/2
JOB No. 176	SCALE: NONE	



BILL OF MATERIALS			
ITEM	CAT #	QTY	DESCRIPTION
11	700-FSK3CU23EX	2	Allen-Bradley One-Shot / Watchdog Timer, 24VDC, C1D2
12A	700-HLT1Z24EX	8	Allen-Bradley Interposing Relay, 24VDC Coil, C1D2
12B	700-HLT1U1EX	0	Allen-Bradley Interposing Relay, 120VAC Coil, C1D2
13A	514500000	3	Weidmuller DIN RAIL 35x7.5 (TS35), Galvanized (1m/unit)
13B	1631930000	10	Weidmuller SCHAT 5 S LABEL HOLDER, 44.5mm x 9.5mm, Beige
13C	1631920000	10	Weidmuller ESO 5 S WHITE LABEL, 7mm
13D	1631940000	10	Weidmuller STR 5 S F.SCHT 5 s LABEL COVER, 7mm, Clear
13E	0383560000	18	Weidmuller EW 35 ENDBRACKETS
13F	3"X1"	6	Standoffs, 3"Hx1"W EMT Conduit
14A	8731700000	128	Weidmuller WTR 2.5 Fuse Holder SIHA3/G20 10-36VAC/DC LED
14B	1020000000	136	Weidmuller WDU 2.5 FEEDTHROUGH TERMINAL
14C	1050000000	10	Weidmuller WAP END PLATES
14D	1693890000	7	Weidmuller Cross-Connect, ZQV 2.5N/50 GE, Yellow, For WDU/WTR 2.5
14E	1609860000	2	Weidmuller Terminal Markers, WS 12/5, White, For WDU/WTR 2.5 (Multiples of 144)
15A	7914390000	10	Weidmuller WTR 4/SI LD 150V FUSED TERMINAL
15B	7914370000	15	Weidmuller WTR 4/SI LD 36V FUSED TERMINAL
15C	1020100000	25	Weidmuller WDU 4 FEED THROUGH TERMINAL
15E	1909020000	2	Weidmuller Cross-Connect, ZQV 4N/20, Yellow, For WDU/WTR 4, (Qty. 20)
15F	1609900000	1	Weidmuller Terminal Markers, WS 12/6, White, For WDU/WTR 4 (Multiples of 120)
16A	GDA-1A	75	GDA-1A 5X20mm X 1A CERAMIC FUSE, FAST ACTING (10 SPARE)
16B	GDA-2A	38	GDA-2A 5X20mm X 2A CERAMIC FUSE, FAST ACTING (10 SPARE)
16C	GDA-5A	1	GDA-5A 5X20mm X 5A CERAMIC FUSE, FAST ACTING
16D	GDA-250mA	42	GDA-250mA 5X20mm X 250mA CERAMIC FUSE, FAST ACTING (10 SPARE)
16E	GDA-100mA	10	GDA-100mA 5X20mm X 100mA CERAMIC FUSE, FAST ACTING (2 SPARE)
16F	GDA-3A	1	GDA-3A 5X20mm X 3A CERAMIC FUSE, FAST ACTING
17A	0345900000	2	Weidmuller BUSBAR 3x10mmX1m, S SCH
17B	0299860000	5	Weidmuller BUSBAR SUPPORT, SH 1
17C	1261300000	1	Weidmuller CLAMPING YOKE, GROUND, ZB10
17D	0316500000	50	Weidmuller CLAMPING YOKE, GROUND, ZB4
18A	F1X4LG6	2	Panduit, 1"x4" (WxH), Grey, 120VAC (6ft/unit) w/ Cover
18B	F3X4WH6	3	Panduit, 3"x4" (WxH), White, 24VDC (6ft/unit) w/ Cover
19A	2938604	1	Phoenix Contact Power Supply, 120VAC/24VDC, 10A, C1D2
19B	2938963	0	Phoenix Contact Redundancy Module, Diode
20	SLX-5ES-1	1	SixNET SLX-5ES-1 Ethernet Switch, C1D2, 5-Port, RJ45
21	1769-L35E	2	Allen-Bradley 1769-L35E COMPACTLOGIX CPU, 750k, ETHERNET, SERIAL
22	1769-IF16C	2	Allen-Bradley 1769-IF16C 16CH 16BIT ANALOG INPUT MODULE
23	1769-OF8C	1	Allen-Bradley 1769-OF8C 8CH ANALOG OUTPUT MODULE
24	1769-PA2	2	Allen-Bradley 1769-PA2 120VAC/24VDC, 2A, POWER SUPPLY
25	1769-IQ16	3	Allen-Bradley 1769-IQ16 16CH, 24VDC, DIGITAL INPUT MODULE
26	1769-OB8	4	Allen-Bradley 1769-OB8 8CH, 24VDC, DIGITAL OUTPUT MODULE
27	1769-ECR	2	Allen-Bradley 1769-ECR RIGHT END CAP
28	7914076990	1	Weidmuller SPARE FUSE BOX

Notes:

- Dimensions are shown in INCHES [MM].
- Refer to 175-311-01 for wiring diagrams.
- All conduit/cable entries to be bottom or side only.
- DIN rails shall be raised by 3" by using 2"H x 1"W stand-offs.
- Warning Labels:
 - Substitution of components may impair suitability for Class1, Div2.
 - Do not replace components or disconnect equipment unless power has been switched off.
 - More than one voltage present
 - Provide fuse ratings

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUED FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
B	RE-ISSUED FOR APPROVAL	13 MAR 2012	PR	PR		
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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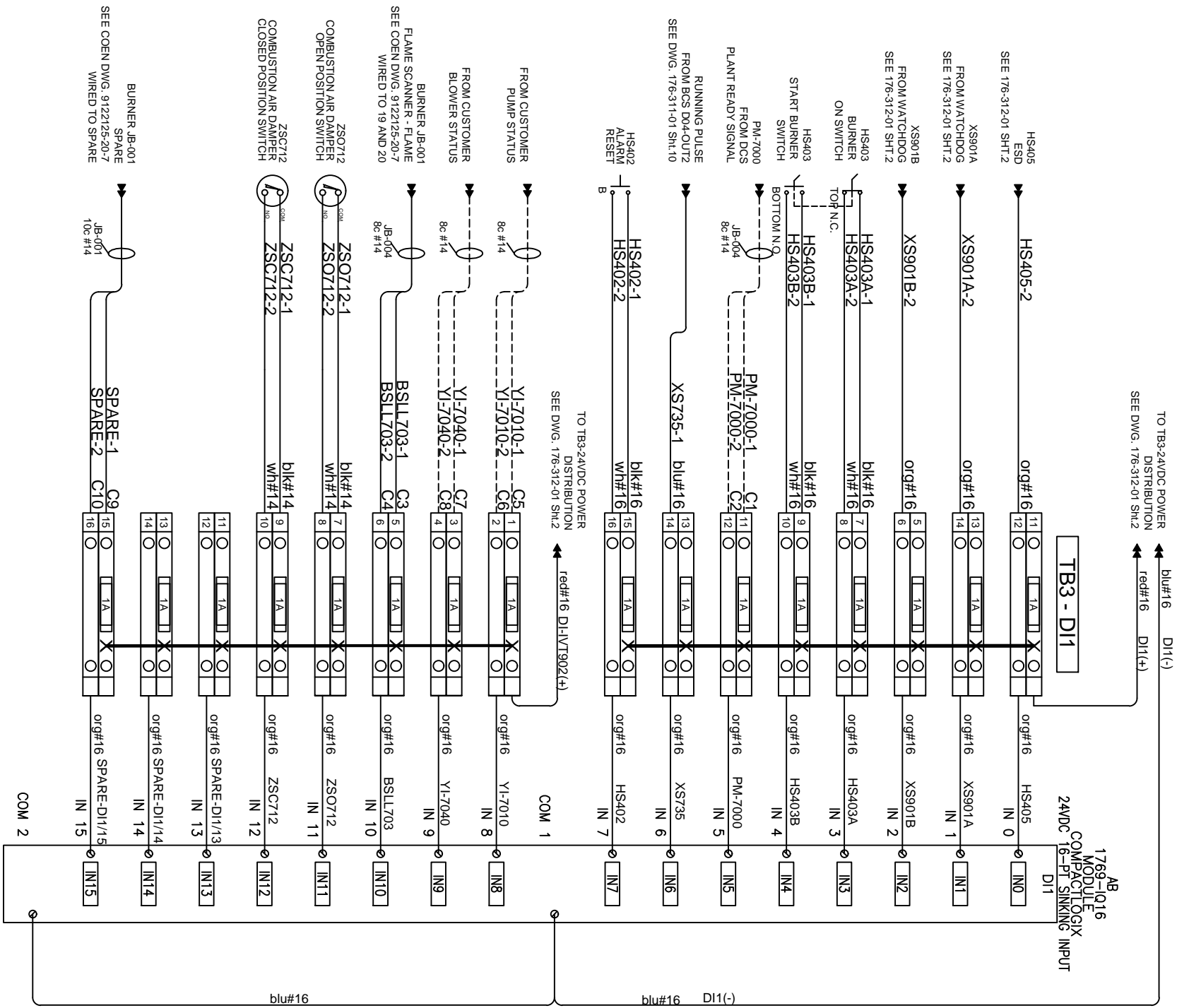
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

FOR: STRUTHERS WELLS / MURPHY OIL VISTA OTSG		
CP-001 BMS/BCS CONTROL PANEL LAYOUT		REV. 1
DWN. BY: PR	DATE: 01OCT2012	DRAWING NO. 176-310-01 2/2
JOB No. 176	SCALE: NONE	



Notes:
 ----- SHOP WIRING
 ----- CUSTOMER WIRING

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCR2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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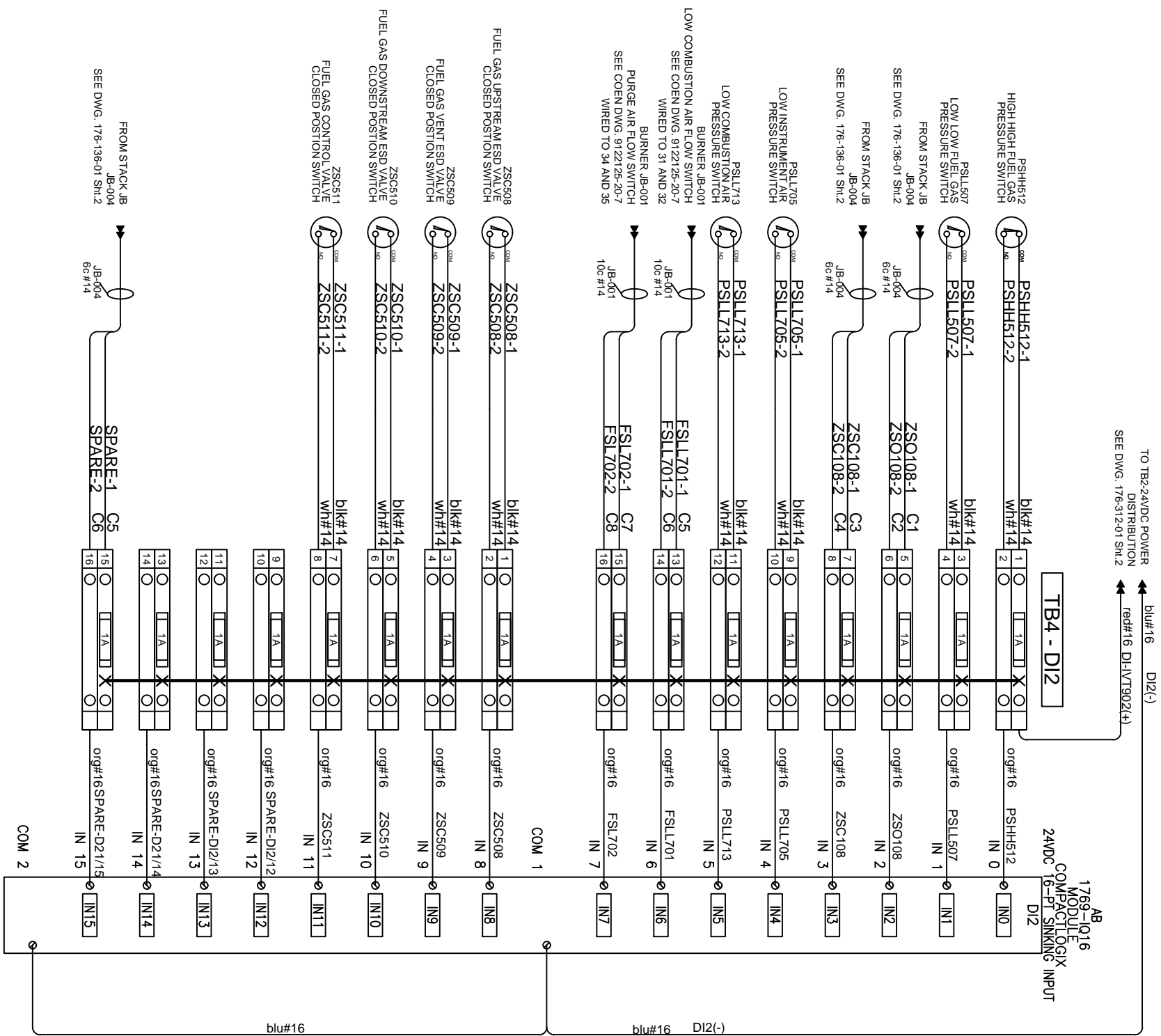
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ENG. STAMP AREA
 PERMIT TO PRACTICE P08884

END USER:	CUST. STRUTHERS WELLS	
PROJECT TITLE:	MURPHY OIL VISTA OTSG 25MBTU/HR	
END USER PROJECT NO:	HEATER TAG NO:	
DRAWING DESCRIPTION:	CONTROL PANEL CP-001 WIRING DIAGRAMS	
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO: 176-311-01 1/10
JOB NO: 176	SCALE: NONE	

REV: 1



Notes:
 ----- SHOP WIRING
 ----- CUSTOMER WIRING

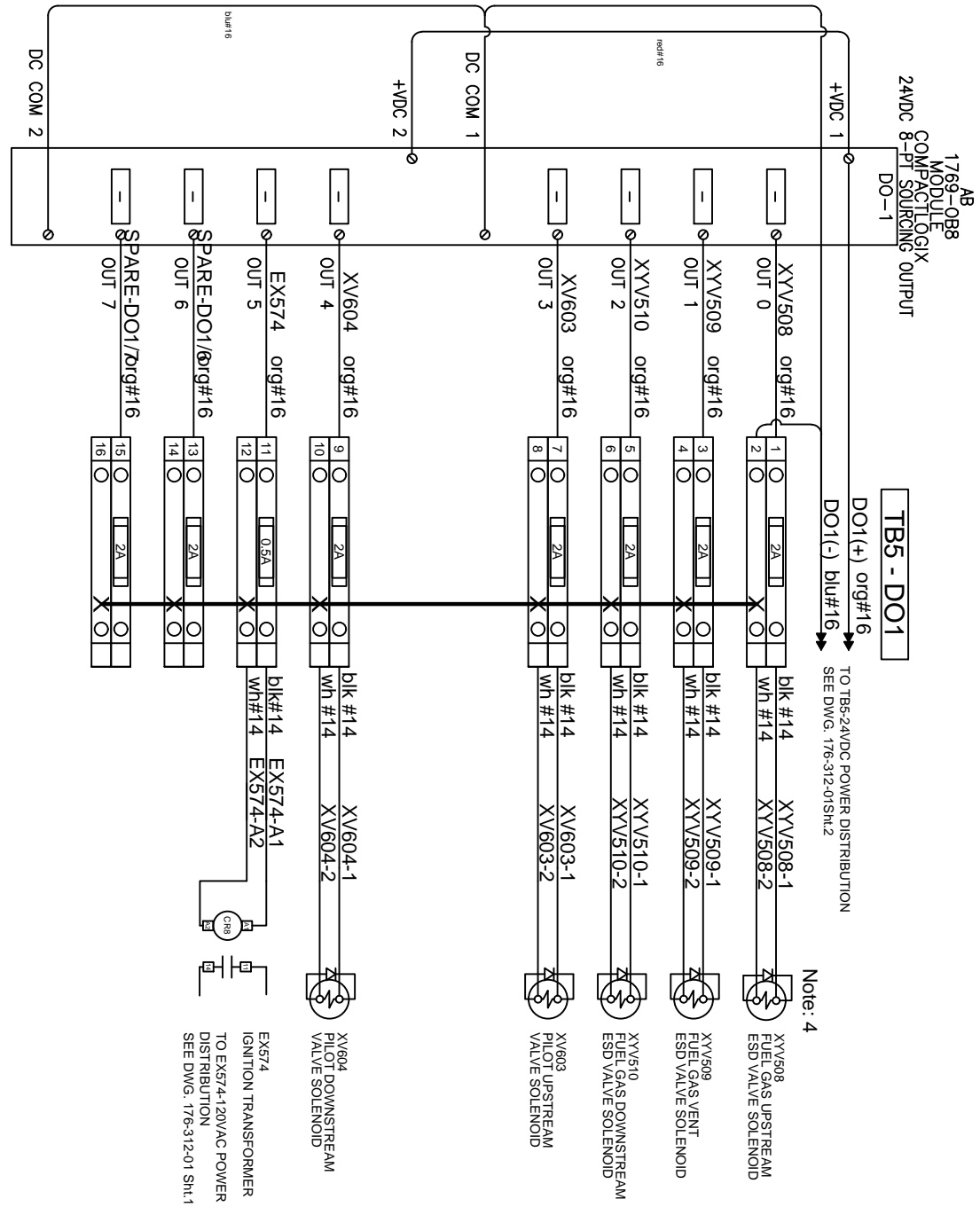
REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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ENG. STAMP AREA		END USER: MURPHY OIL VISTA OTSG 25MBTU/HR	CUST. STRUTHERS WELLS
DRAWING DESCRIPTION: CONTROL PANEL CP-001 WIRING DIAGRAMS		HEATER TAG NO:	CUST. PO NO:
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO: 176-311-01 2/10	
JOB NO: 176	SCALE: NONE	REV: 1	
PERMIT TO PRACTICE P08884			



Notes:
 ----- SHOP WIRING
 ----- CUSTOMER WIRING
 ----- Install diode 1N4007 across solenoid terminals

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAy 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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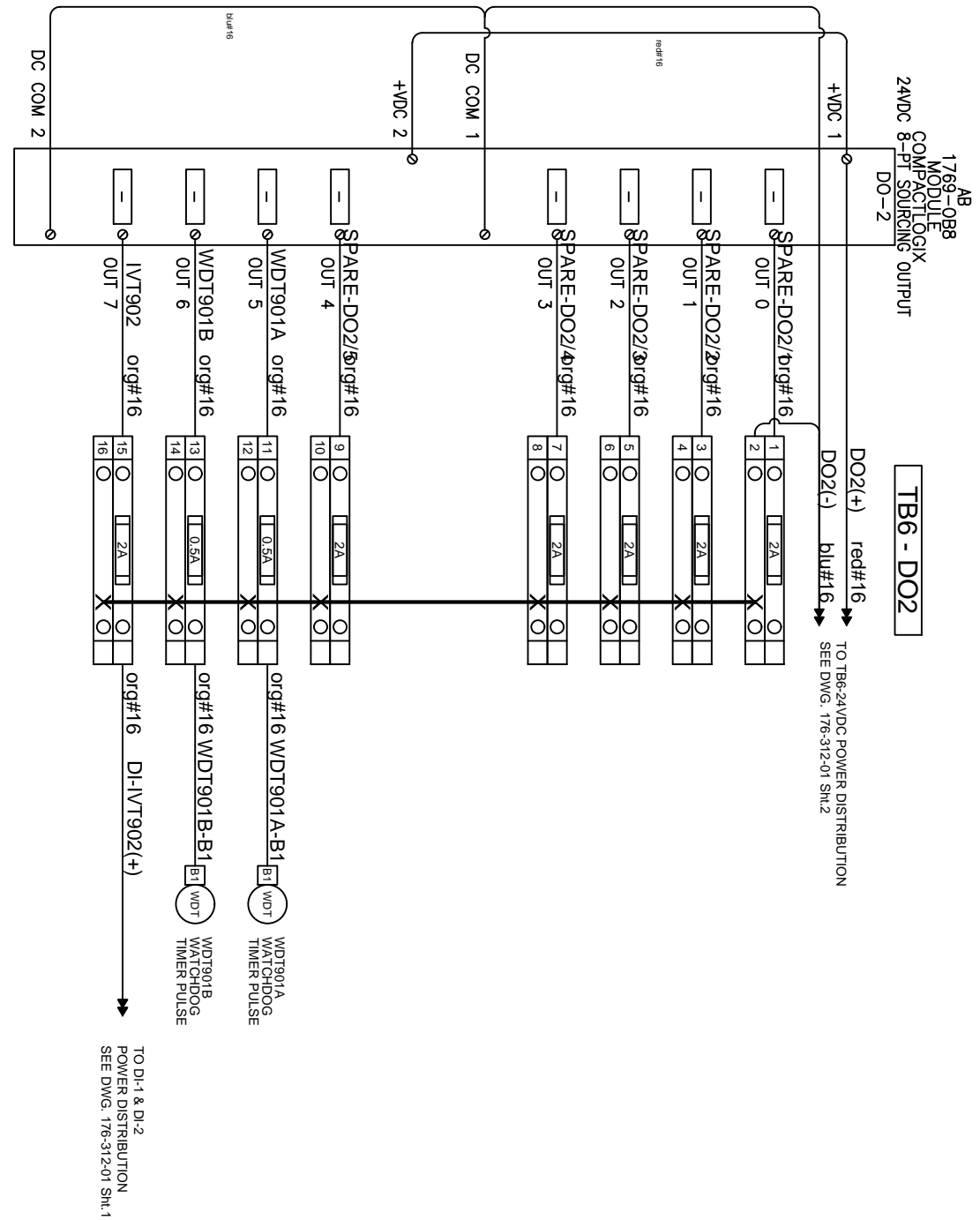


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ENG. STAMP AREA		END USER:	CUST. STRUTHERS WELLS
PROJECT TITLE:		MURPHY OIL VISTA OTSG 25MBTU/HR	
END USER PROJECT NO:	HEATER TAG NO:		
DRAWING DESCRIPTION:		CONTROL PANEL CP-001 WIRING DIAGRAMS	
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO: 176-311-01 3/10	
JOB NO: 176	SCALE: NONE	REV: 1	

PERMIT TO PRACTICE P08884



Notes:
 ----- SHOP WIRING
 ----- CUSTOMER WIRING

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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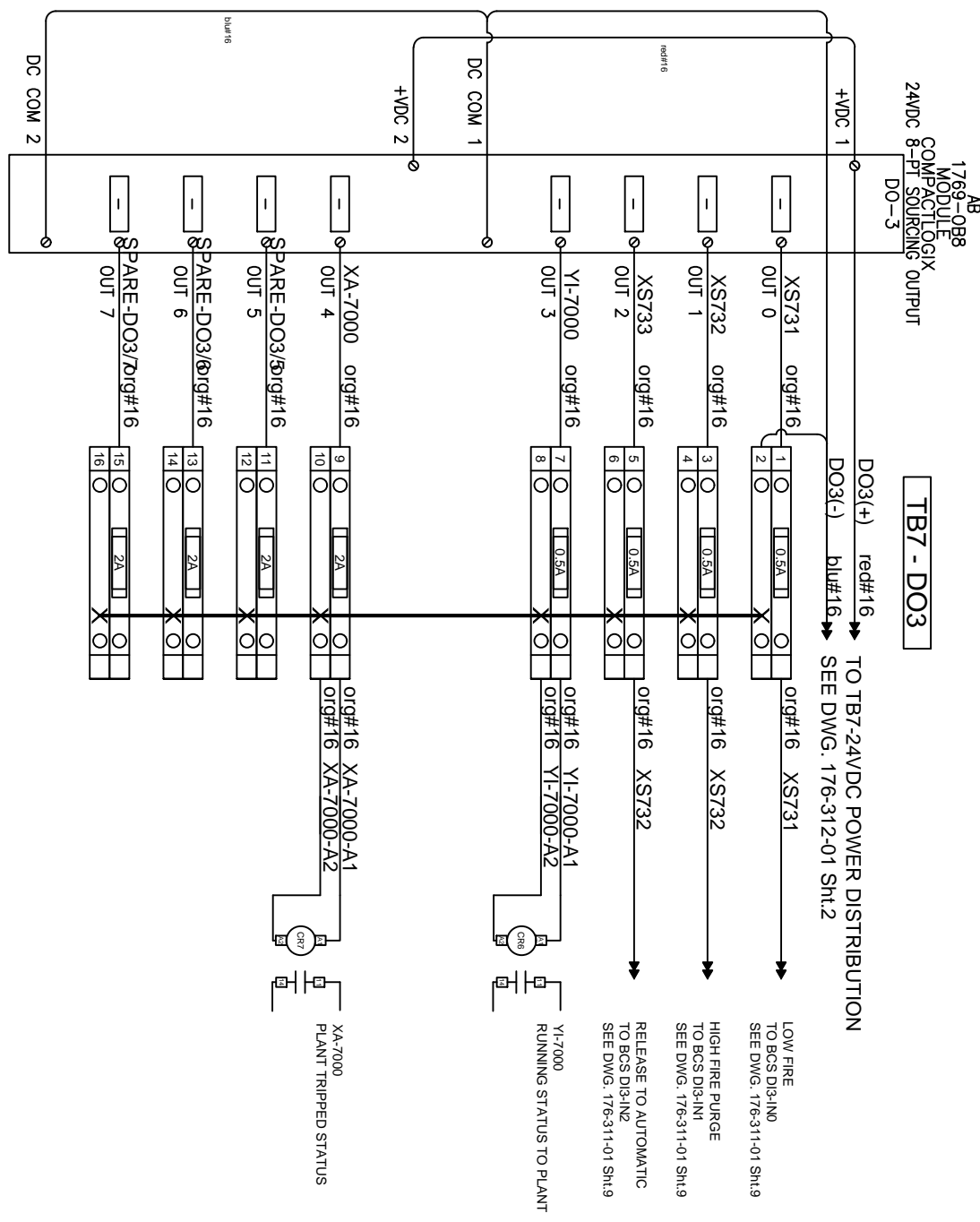
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

END USER:	STRUTHERS WELLS	
PROJECT TITLE:	MURPHY OIL VISTA OTSG 25MBTU/HR	
END USER PROJECT NO:	HEATER TAG NO:	
DRAWING DESCRIPTION:	CONTROL PANEL CP-001 WIRING DIAGRAMS	
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO: 176-311-01 4/10
JOB NO: 176	SCALE: NONE	

REV: 1



Notes:
 _____ SHOP WIRING
 _____ CUSTOMER WIRING

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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ENG. STAMP AREA

END USER: _____

PROJECT TITLE: **MURPHY OIL VISTA OTSG 25MBTU/HR**

END USER PROJECT NO: _____ HEATER TAG NO: _____

DRAWING DESCRIPTION: **CONTROL PANEL CP-001 WIRING DIAGRAMS**

DRAWN BY: **PR** DATE: **01OCT2012** DRAWING NO: _____

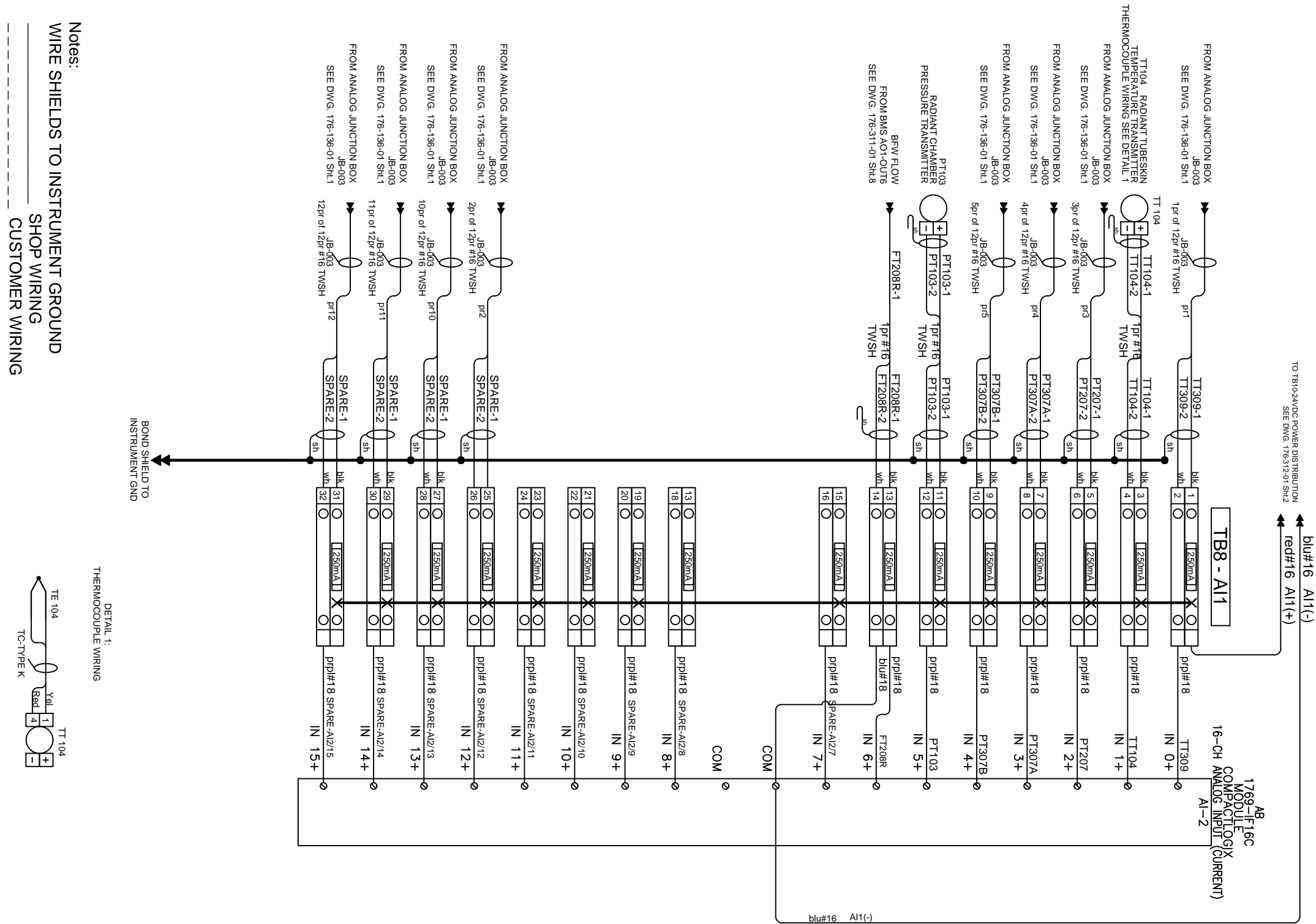
JOB NO: **176** SCALE: **NONE** **176-311-01 5/10**

CUST. **STRUTHERS WELLS**

CUST. PO NO: _____

REV: **1**

PERMIT TO PRACTICE P08884



CUST. **STRUTHERS WELLS**

CUST. PO NO:

END USER:
PROJECT TITLE: **MURPHY OIL VISTA OTSG 25MBTU/HR**

END USER PROJECT NO: HEATER TAG NO:

DRAWING DESCRIPTION: **CONTROL PANEL CP-001 WIRING DIAGRAMS** REV: **1**

DRAWN BY: **PR** DATE: **01OCT2012** DRAWING NO: **176-311-01 6/10**
JOB NO: **176** SCALE: **NONE**

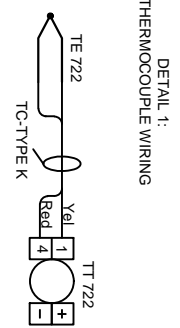
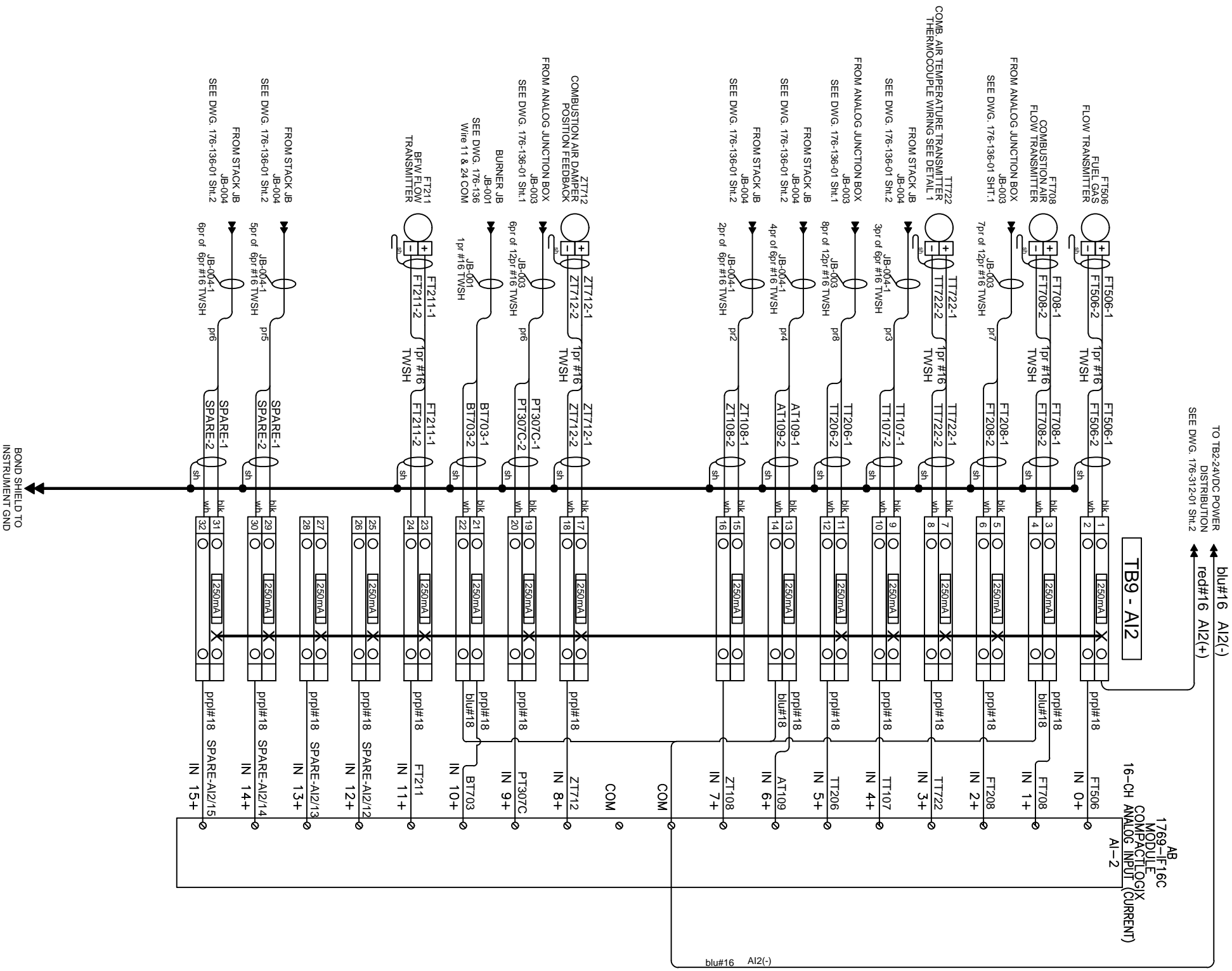
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REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		
REVISIONS						



Notes:
 WIRE SHIELDS TO INSTRUMENT GROUND
 SHOP WIRING
 CUSTOMER WIRING

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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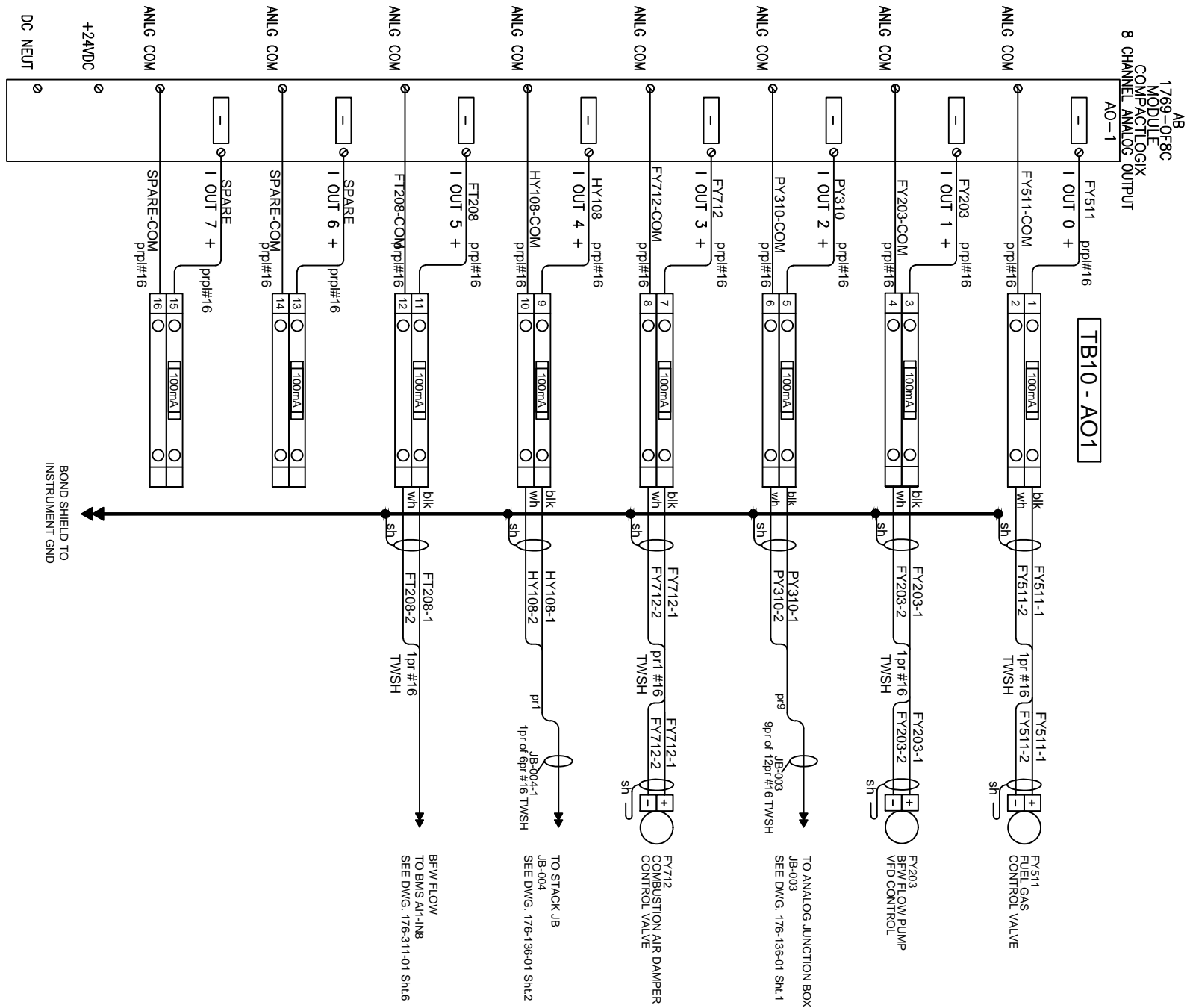
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

END USER:	STRUTHERS WELLS	
PROJECT TITLE:	MURPHY OIL VISTA OTSG 25MBTU/HR	
END USER PROJECT NO:	HEATER TAG NO:	
DRAWING DESCRIPTION:	CONTROL PANEL CP-001 WIRING DIAGRAMS	
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO: 176-311-01 7/10
JOB NO: 176	SCALE: NONE	



Notes:
 WIRE SHIELDS TO INSTRUMENT GROUND
 SHOP WIRING
 CUSTOMER WIRING

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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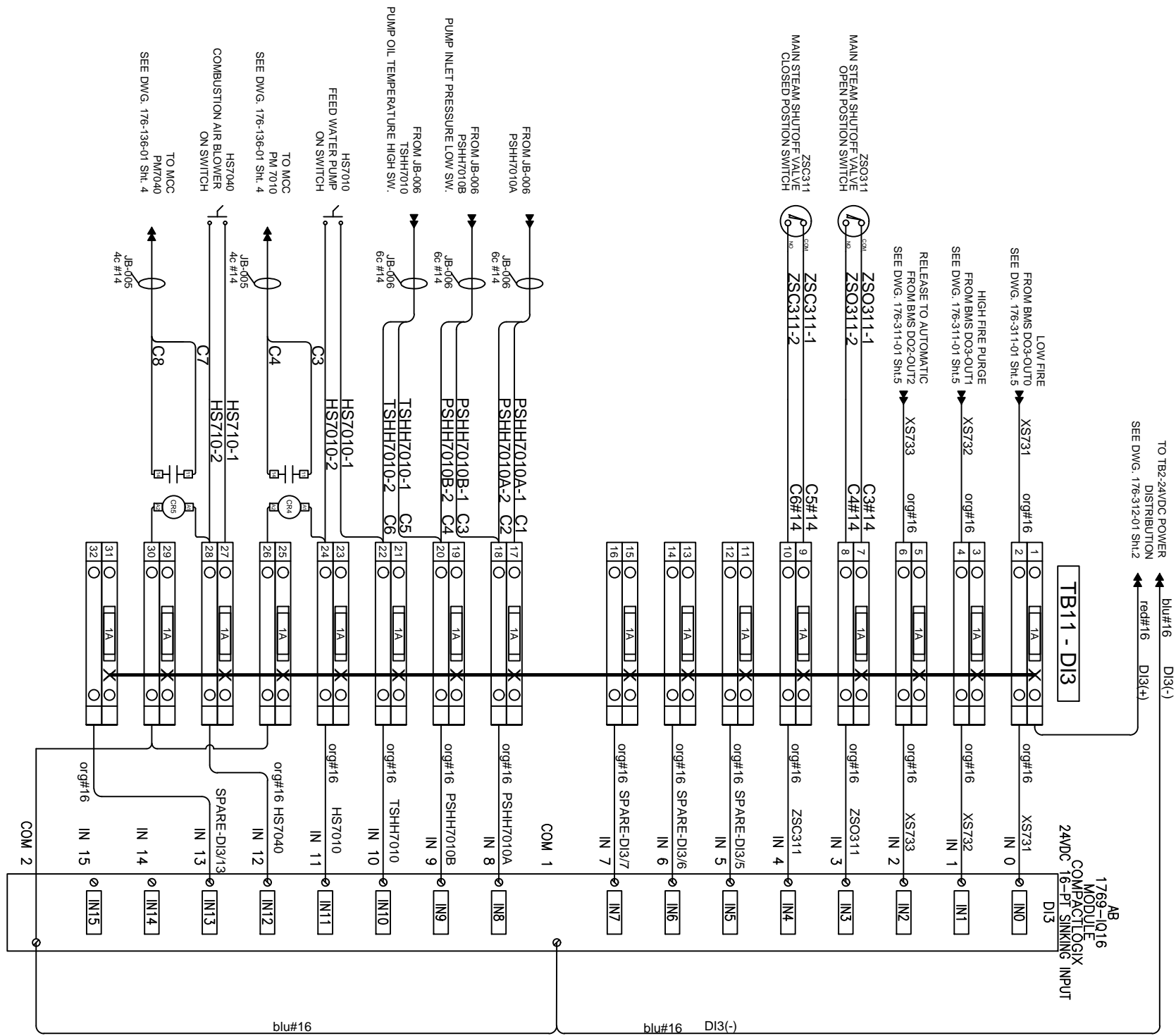
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ENG. STAMP AREA

END USER:	STRUTHERS WELLS	
PROJECT TITLE:	MURPHY OIL VISTA OTSG 25MBTU/HR	
END USER PROJECT NO:	HEATER TAG NO:	
DRAWING DESCRIPTION:	CONTROL PANEL CP-001 WIRING DIAGRAMS	
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO:
JOB NO: 176	SCALE: NONE	176-311-01 8/10

REV: **1**

PERMIT TO PRACTICE P08884



Notes:
 ----- SHOP WIRING
 ----- CUSTOMER WIRING

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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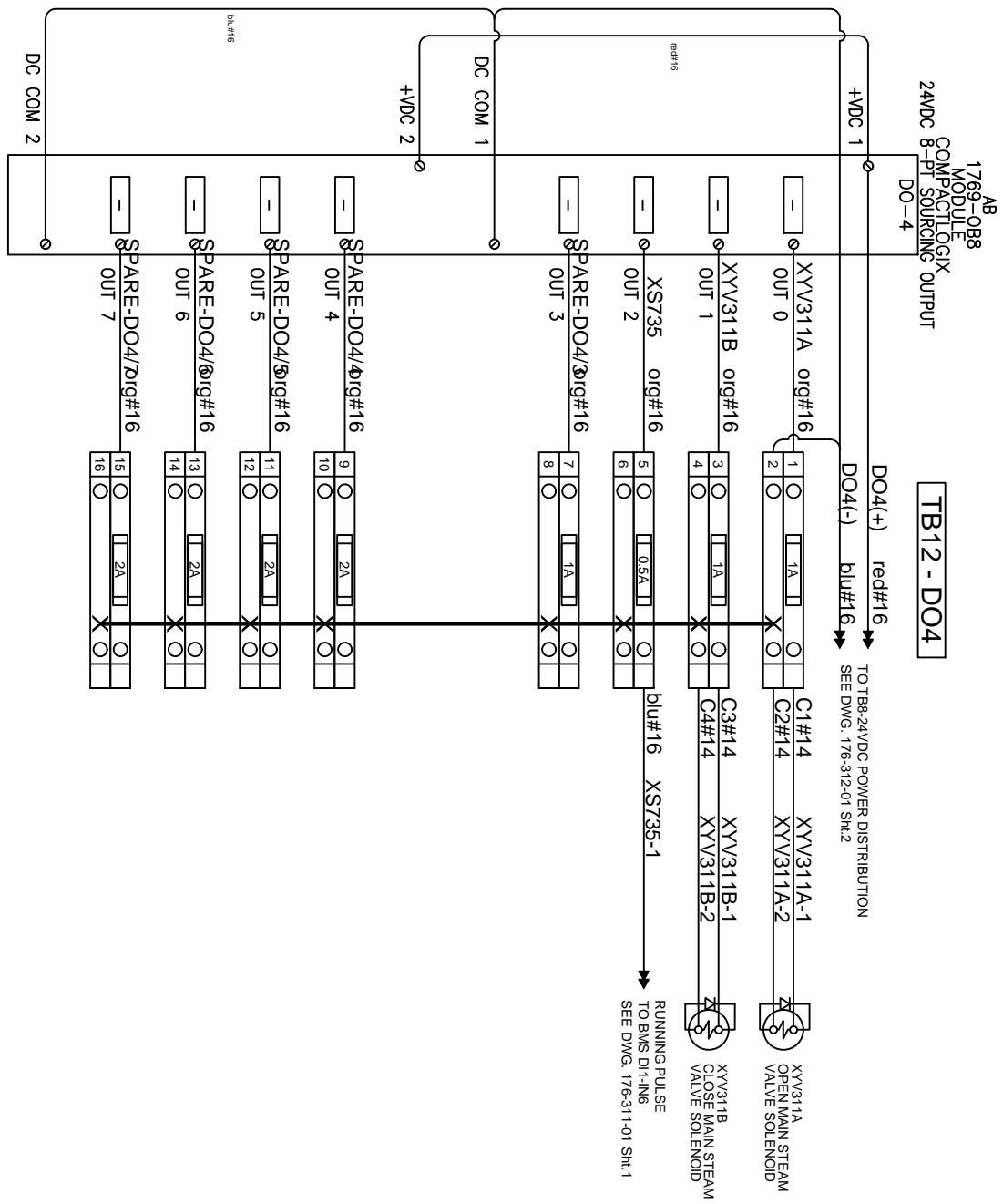
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

END USER:	STRUTHERS WELLS	
PROJECT TITLE:	MURPHY OIL VISTA OTSG 25MBTU/HR	
END USER PROJECT NO:	HEATER TAG NO:	REV: 1
DRAWING DESCRIPTION:	CONTROL PANEL CP-001 WIRING DIAGRAMS	
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO: 176-311-01 9/10
JOB NO: 176	SCALE: NONE	



Notes:

----- SHOP WIRING
 ----- CUSTOMER WIRING
 ----- Install diode 1N4007 across solenoid terminals

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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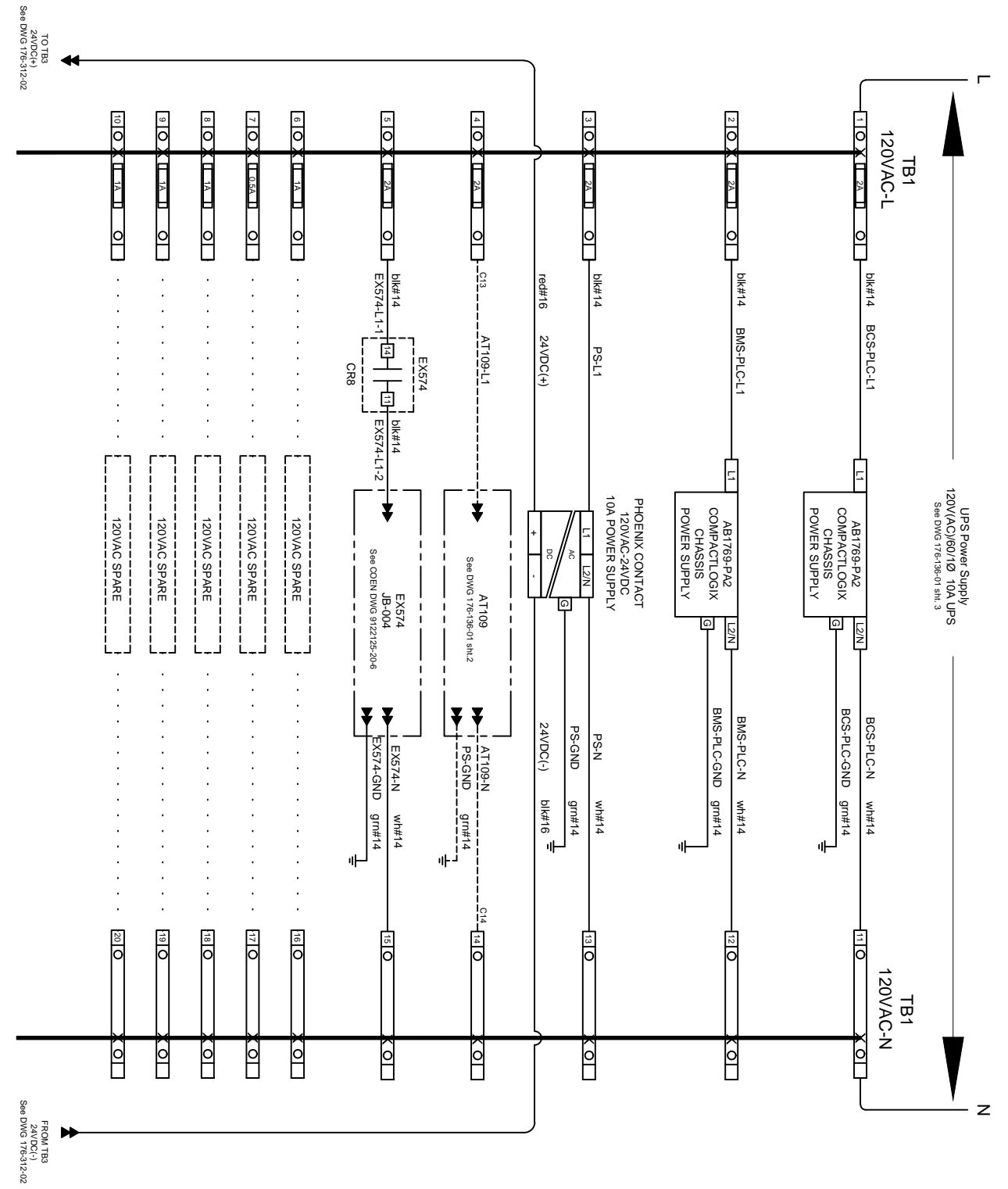
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

END USER:	STRUTHERS WELLS	
PROJECT TITLE:	MURPHY OIL VISTA OTSG 25MBTU/HR	
END USER PROJECT NO:	HEATER TAG NO:	
DRAWING DESCRIPTION:	CONTROL PANEL CP-001 WIRING DIAGRAMS	
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO: 176-311-01 10/10
JOB NO: 176	SCALE: NONE	

REV: 1



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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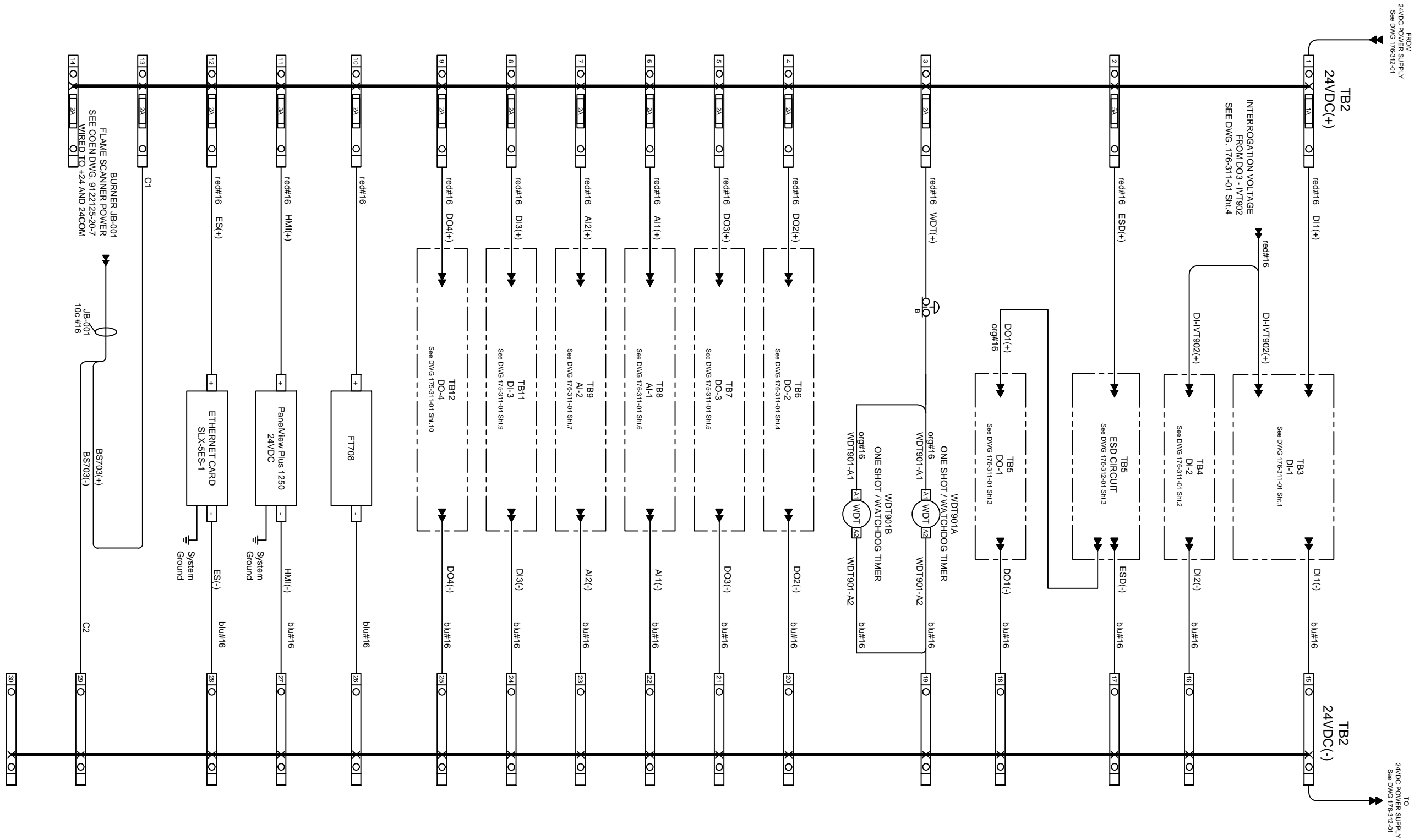
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

END USER:	PROJECT TITLE:		CUST.:
	MURPHY OIL VISTA OTSG 25MBTU/HR		STRUTHERS WELLS
END USER PROJECT NO:	HEATER TAG NO:	CUST. PO NO:	
DRAWING DESCRIPTION:	CONTROL PANEL 0401-B-001-CP 120VAC POWER DISTRIBUTION		REV:
			1
DRAWN BY:	DATE:	DRAWING NO:	
PR	01OCT2012	176-312-01 1/3	
JOB NO:	SCALE:		
176	NONE		



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	
A	ISSUE FOR APPROVAL	06 MAR 2012	PR	PR		

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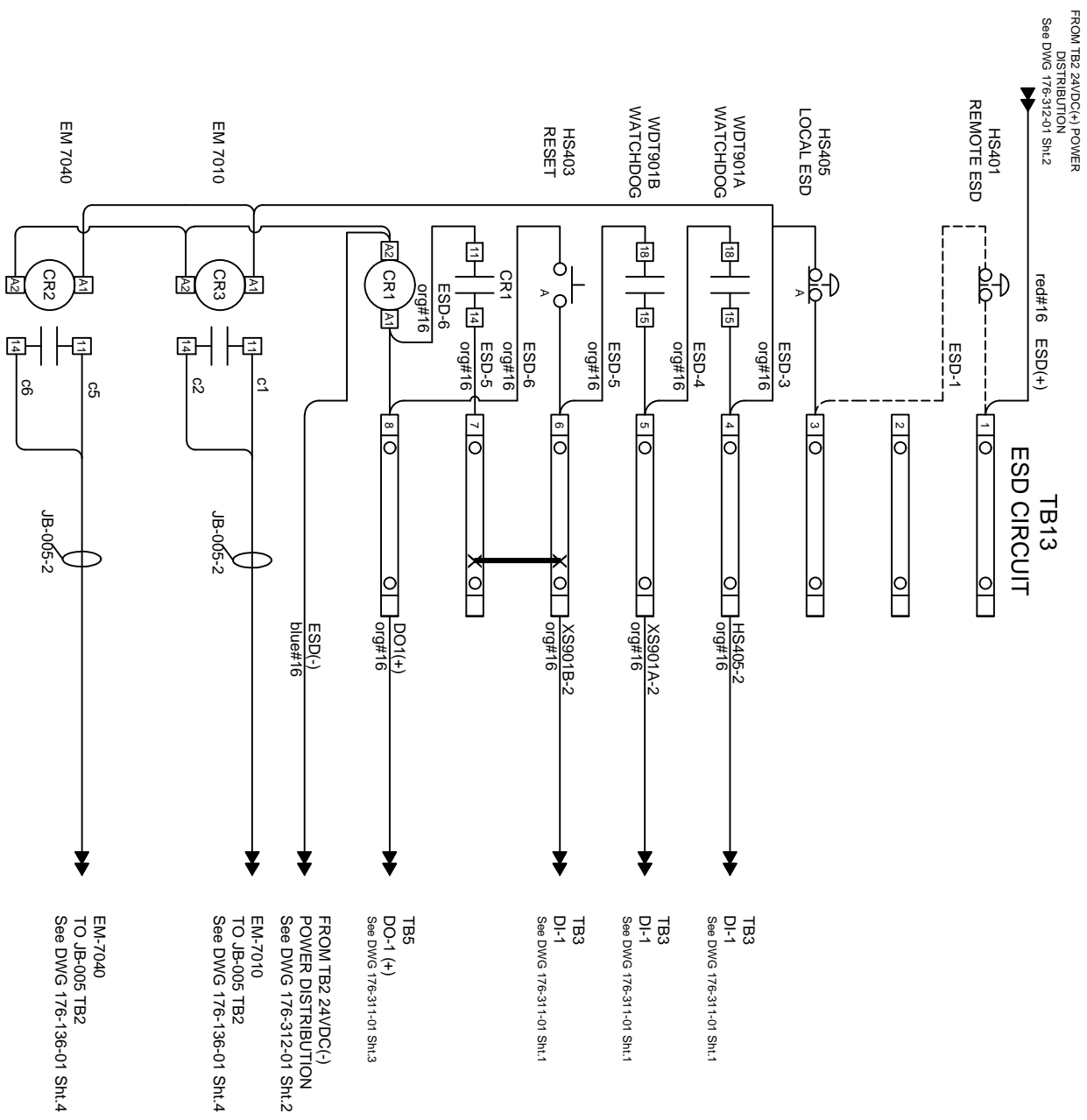
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ENG. STAMP AREA

PERMIT TO PRACTICE P08884

END USER:	CUST. STRUTHERS WELLS	
PROJECT TITLE:	CUST. PO NO:	
END USER PROJECT NO:	HEATER TAG NO:	
DRAWING DESCRIPTION:	CONTROL PANEL 0401-B-001-CP 120VAC POWER DISTRIBUTION	
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO:
JOB NO: 176	SCALE: NONE	176-312-01 2/3

REV: **1**



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
1	AS BUILT	01OCT2012	PR	PR	PR	
0	ISSUE FOR CONSTRUCTION	18 MAY 2012	PR	PR	BV	

REVISIONS



Combustion Solutions Inc.

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ENG. STAMP AREA

END USER:	STRUTHERS WELLS	
PROJECT TITLE:	MURPHY OIL VISTA OTSG 25MBTU/HR	
END USER PROJECT NO:	HEATER TAG NO:	
DRAWING DESCRIPTION:	CONTROL PANEL 0401-B-001-CP 120VAC POWER DISTRIBUTION	
DRAWN BY: PR	DATE: 01OCT2012	DRAWING NO: 176-312-01 3/3
JOB NO: 176	SCALE: NONE	

REV: 1

PERMIT TO PRACTICE P08884



176-351 IO Configuration Data

Date : March 22, 2012
 CSI Doc Number: 176-351
 Customer Job Number:T31109
 Project : STRUTHERS WELLS - MURPHY OIL

By	Chk	App	Date	Description	Rev
PR			Mar 22, 2012	First Issue	A
PR			Sept 14, 2012	Issued for Construction	0
PR			Oct 3, 2012	As Built	1

TAG																
UNIT	UPPER	LOWER	S	TAG	DESCRIPTION	TYPE	ENG UNITS	RANGE LOW	RANGE HIGH	LOW LOW TRIP	LOW ALARM	HIGH ALARM	HIGH HIGH TRIP	NOTES	REV	
Heater Name																
	FT	506		FT506	FUEL GAS FLOW TRANSMITTER	Analog Input	SCMH	0	1020							0
	FT	708		FT708	COMBUSTION AIR FLOW TRANSMITTER	Analog Input	SCMH	0	12000							1
	TT	722		TT722	COMBUSTION AIR TEMPERATURE TRANSMITTER	Analog Input	C	-25	125							1
	TT	107		TT107	STACK TEMPERATURE TRANSMITTER	Analog Input	C	-18	260							0
	TT	206		TT206	BFW TEMPERATRUE TRANSMITTER	Analog Input	C	0	200		0	100				0
	AT	109		AT109	OXYGEN ANALYZER	Analog Input	%	0	21							A
	FCZ	108		FCZ108	STACK DAMPER POSITION FEEDBACK	Analog Input	%	0	100							A
	FCZ	712		FCZ712	COMBUSTION AIR DAMPER POSITION FEEDBACK	Analog Input	%	0	100							A
	FT	208		FT208	BFW FLOW TRANSMITTER	Analog Input	Kg/hr	0	12000	1000	2425					A
	TT	309		TT309	STEAM OUTLET TEMPERATURE TRANSMITTER	Analog Input	C	0	400			300	328			0
	TT	104		TT104	RADIANT TUBESKIN TEMPERATURE TRANSMITTER	Analog Input	C	-18	538			399	538			0
	PT	207		PT207	BFW PRESSURE TRANSMITTER	Analog Input	Kpag	0	17237			13100	13790			0
	PT	307	A	PT307A	STEAM OUTLET PRESSURE A TRANSMITTER	Analog Input	Kpag	0	17237			12500	12755	1oo2D		0
	PT	307	B	PT307B	STEAM OUTLET PRESSURE B TRANSMITTER	Analog Input	Kpag	0	17237			12500	12755	1oo2D		0
	PT	307	C	PT307C	STEAM OUTLET PRESSURE C TRANSMITTER	Analog Input	Kpag	0	17237							0
	PT	103		PT103	RADIANT CHAMBER PRESSURE TRANSMITTER	Analog Input	in w.g.	0.5	5			3	4			0
	FCV	511		FCV511	FUEL GAS CONTROL VALVE	Analog Output	%	0	100							A
	FV	203		FV203	BFW FLOW CONTROL VALVE	Analog Output	%	0	100							A
	FV	310		FV310	STEAM BYPASS CONTROL VALVE	Analog Output	%	0	100							A
	FY	712		FY712	COMBUSTION AIR DAMPER	Analog Output	%	0	100							A
	FY	108		FY108	STACK DAMPER	Analog Output	%	0	100							A
	PSHH	512		PSHH512	HIGH HIGH FUEL GAS PRESSURE SWITCH	Digital Input	Kpag						172			0
	PSLL	507		PSLL507	LOW LOW FUEL GAS PRESSURE SWITCH	Digital Input	Kpag			117						0
	PSLL	705		PSLL705	LOW INSTRUMENT AIR PRESSURE SWITCH	Digital Input	Kpag			517						0
	PSLL	713		PSLL713	LOW LOW COMBUSTION AIR PRESSURE SWITCH	Digital Input	mm w.c.			5.1						1
	FSL	701		FSL701	LOW COMBUSTION AIR FLOW SWITCH	Digital Input	Kg/hr			1650						1
	FSL	702		FSL702	LOW PURGE AIR FLOW PRESSURE SWITCH	Digital Input	mm w.c.			178						1

CUSTOMER: STRUTHERS WELLS		PROJ. NAME: MURPHY OIL OTSG PROJECT		By: PR		CSI Doc #: 176-352		Revision: 0																																	
CUST. JOB # UNIT #		T31109		App:		Description: SHUT DOWN KEY		Date: September 12, 2012																																	
EFFECT	CAUSE	SERVICE		DEVICE TAG		XV603		XV604		XYV508		XYV510		XYV509																											
		FAILURE	FC	FC	FC	FC	FC	FO	FO																																
DEVICE TAG	SERVICE	Alarm Setting	Trip Setting	Units	RESET ON SD	L	L	L	L	L																															
					NOTE	1	1	1	1	1																															
PSLL507	Low Low Fuel Gas Pressure Trip	-	117	kpag	1	SD	SD	SD	SD	SD																															
PSHH512	High High Fuel Gas Pressure Trip	-	172	kpag	1	SD	SD	SD	SD	SD																															
TT104	High High Radiant Tubeskin Temperature Trip	399	538	degC	1	SD	SD	SD	SD	SD																															
TT309	High High Steam outlet Temperature Trip	300	328	degC	1	SD	SD	SD	SD	SD																															
PSLL705	Low instrument pressure switch Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
PSLL713	Low Combustion Air pressure switch Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
FSLL701	Low Combustion Air Flow switch Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
PT307A/B	High high main steam pressure trip	12500	12755	kpag	1,9	SD	SD	SD	SD	SD																															
PT207	High high BFW pressure trip	13100	13790	kpag	1,9	SD	SD	SD	SD	SD																															
BSLL703	Main Flame Failure Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
	ESD Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
PM7000	Controlled Shutdown Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
ZSO108	Stack Damper Not Open Trip	-	FALSE	-	1,2	SD	SD	SD	SD	SD																															
MI7010	Loss of BFW pump running status trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
MI7040	Loss of blower running status trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
	Purge Failed Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
XS731	Combustion Air Failed to Reach Low Fire Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
HS403	Burner Stop hand switch	-	FALSE	-	1	SD	SD	SD	SD	SD																															
XYV508	Critical Valve Mismatch Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
XYV509	Critical Valve Mismatch Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
XYV510	Critical Valve Mismatch Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
IVT902	Input Check Fail Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
XS735	BCS PLC not running Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
WDT901A/B	PLC Fault/Watchdog Timer Trip	-	FALSE	-	1	SD	SD	SD	SD	SD																															
BSL703	Main burner lit for 10 seconds	-	FALSE	-	3	SD	SD																																		
FT208	Low Low BFW flow trip	2425	1000	kg/hr	1,8	SD	SD	SD	SD	SD																															
PT103	High high radiant chamber pressure trip	3	4	inwg	1,8	SD	SD	SD	SD	SD																															

ABBREVIATION LEGEND:
SD - SHUTDOWN (SEE NOTE)
FC - FAIL CLOSED
FO - FAIL OPEN

RESET ON SHUTDOWN ROW:
L - LOCAL EQUIPMENT / PACKAGE RESET

GENERAL NOTES:
A) UNLESS NOTED OTHERWISE, "SHUTDOWN" MEANS VALVES IN FAILURE POSITION AND OTHER EQUIPMENT TURNED OFF (DE-ENERGIZED).
B) ACTIVATION OF RESET AND AUTO-RESETS ARE ONLY PERMISSIVES TO OPERATE AN EQUIPMENT - NO AUTO START IS PERMITTED, UNLESS MARKED.
C) REFER TO DOCUMENT # 148-351 FOR RANGES, ALARM AND TRIP SETTINGS

REFERENCED NOTES:
1. ALARM RESET BUTTON LOCATED ON HEATER CONTROL PANEL.
2. THIS TRIP IS SUPPRESSED WHEN THE STEAM GENERATOR IS OUT OF SERVICE, THE STACK DAMPER MUST BE OPEN IN ORDER FOR THE BURNER TO BE READY TO START
3. PILOT IS TURNED OFF WHEN THE MAIN BURNER IS LIT FOR 10 SECONDS
4. ONLY POSSIBLE WHEN THE STEAM GENERATOR IS OUT OF SERVICE
5. PROCESS TRIP FROM BCS OVER THE SOFT LINK
6. THIS TRIP IS DELAYED FOR 15 MINUTES
7. POSITION NEEDS TO BE REACHED WITHIN 10 MINUTES
8. INCLUDED IN BCS PROCESS TRIP
9. IF TRANSMITTER IS FAULTY THE BURNER IS TRIPPED



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG-7000	<i>[Signature]</i>	2012-0625

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-354-00

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Drawing Index Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

LOGIC DRAWING INDEX

Drawing	Description
176-354-00	Logic drawing index
176-354-01	BMS – Fuel Gas Pressure & Feed Water Pressure alarms and trips
176-354-02	BMS – Radiant Tube & Steam temperature alarms and trips
176-354-03	BMS – Feedwater & Radiant Chamber pressure alarms and trips
176-354-04	BMS – Steam pressure A & B alarms and trips
176-354-05	BMS – Combustion air flow & instrument air pressure alarms and trips
176-354-06	BMS – Local/Remote ESD trips, and Flame Scanner
176-354-07	BMS – Main Burner ESD Valves
176-354-08	BMS – Watchdog Timer Test Logic
176-354-09	BMS – Boiler Feedwater Pump
176-354-10	BMS – Stack Damper and Combustion air Blower
176-354-11	BMS – Ready to Purge
176-354-12	BMS – Purge
176-354-13	BMS – Pilot and Main Ignition
176-354-14	BMS – Steam Generator Trips
176-354-15	BMS – First Out
176-354-16	BMS – First Out
176-354-17	BMS – Interrogation Voltage and Input Check
176-354-18	BMS – BCS Running and Steam Pressure Bypass
176-354-19	BMS – Post Purge and Cooldown
176-354-20	Legend

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						



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FOR:			
STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
DRAWING INDEX			
LOGIC DIAGRAMS			
DWN. BY:	PR	DATE:	31-MAY-2012
JOB No:	176	SCALE:	NONE
DRAWING NO:			176-354-00
REV.			0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
D103	PKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

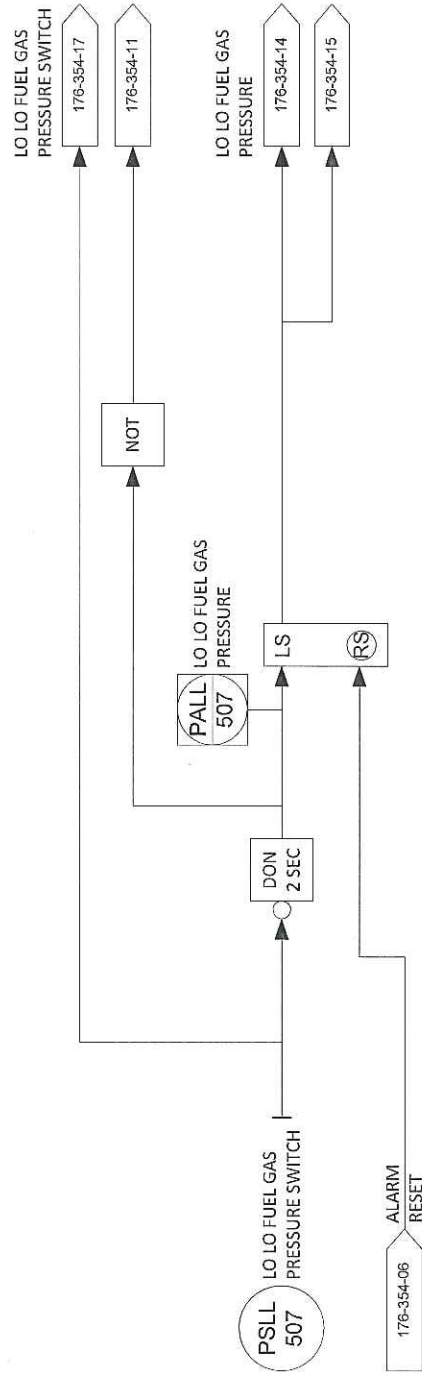
DOCUMENT NUMBER: 176-354-01

VENDOR REVISION: 0

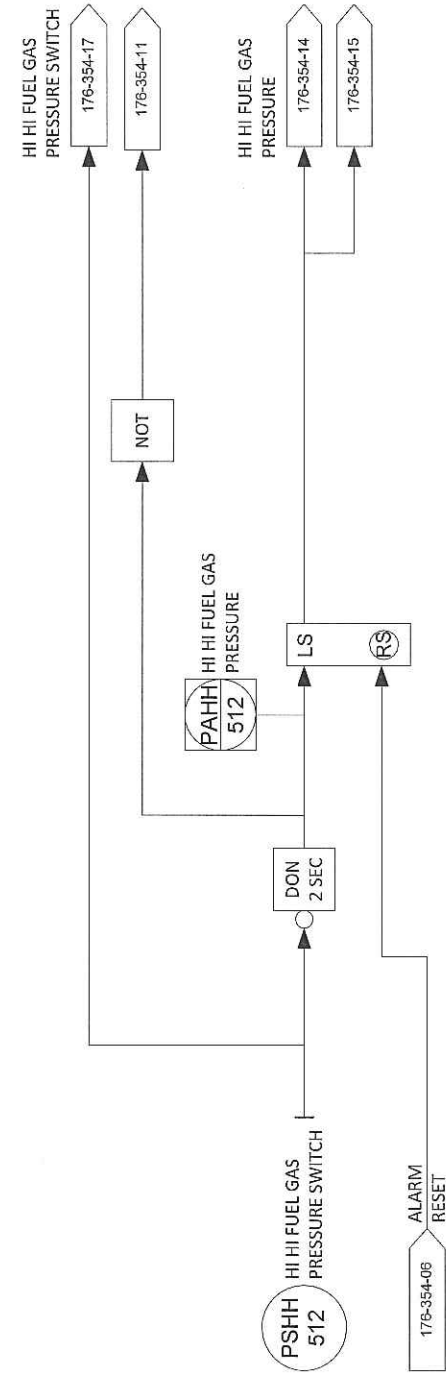
DOCUMENT DESCRIPTION: Fuel Gas Pressure & Feed Water Flow Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

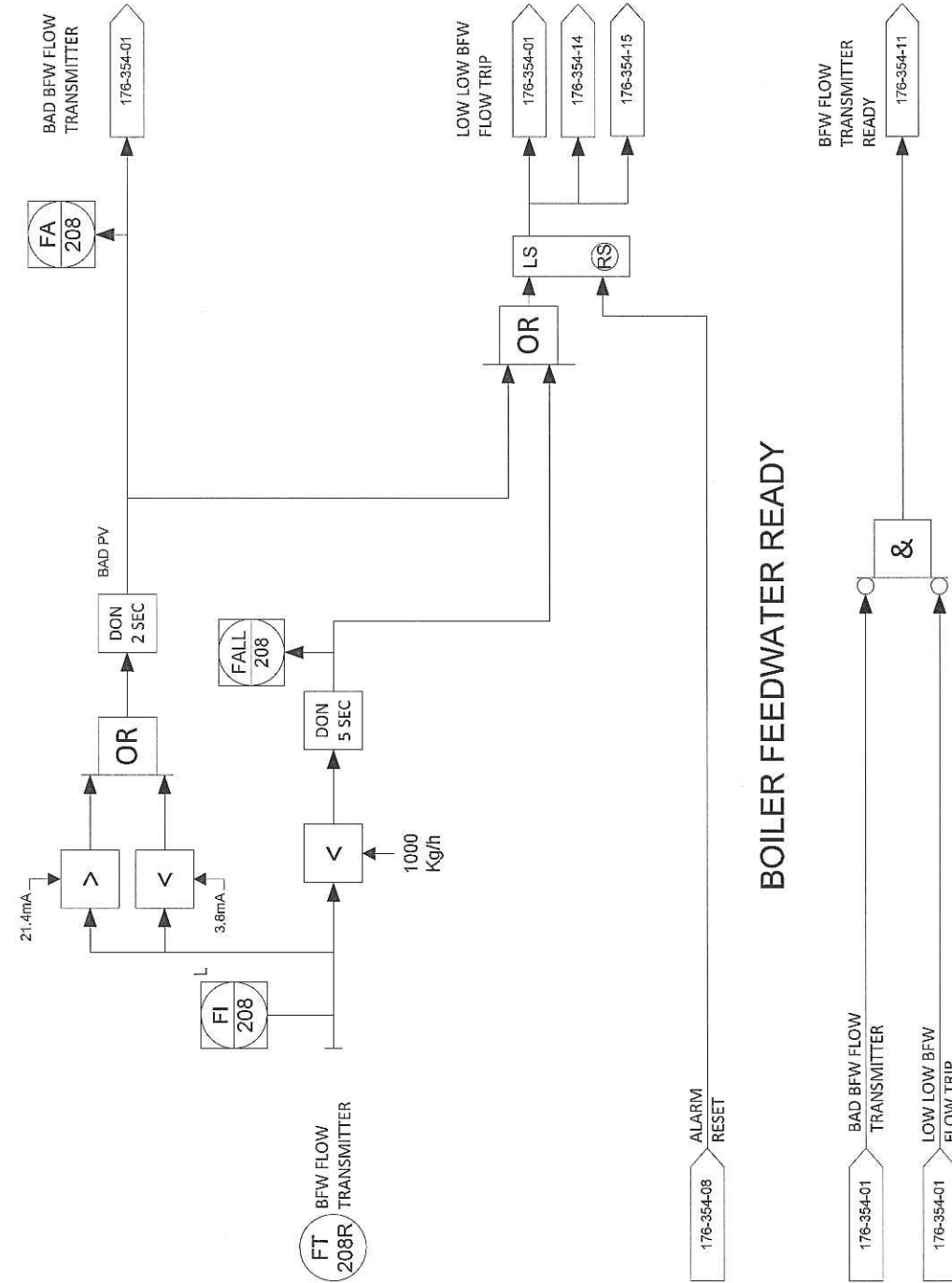
LOW FUEL GAS PRESSURE SWITCH



HIGH FUEL GAS PRESSURE SWITCH



BOILER FEEDWATER FLOW ALARMS AND TRIPS



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr FUEL GAS PRESSURE & FEED WATER FLOW LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO: 176-354-01	REV. 0
JOB No: 176	SCALE: NONE		



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKB-7000	DL	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

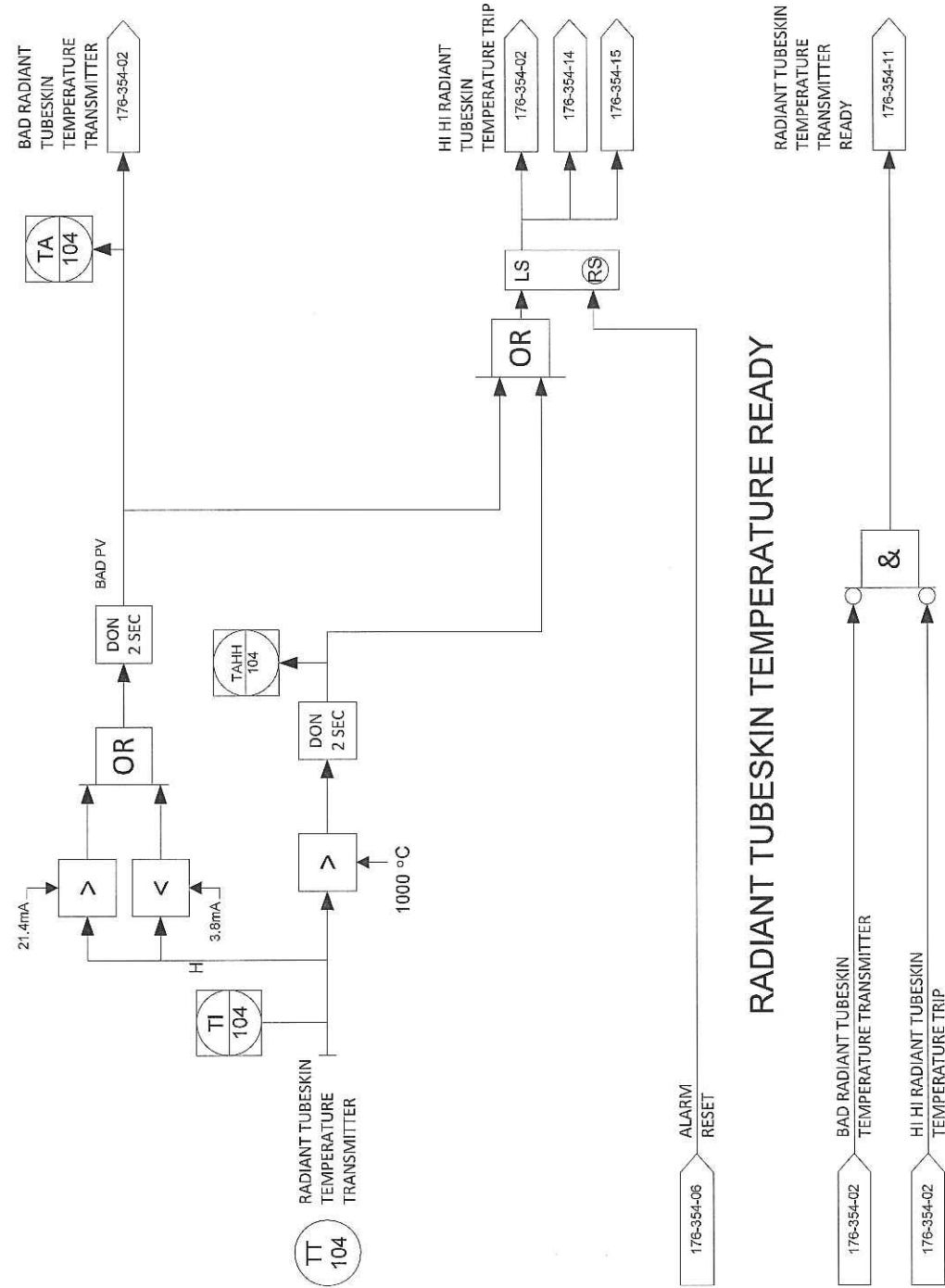
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VENDOR REVISION: 0

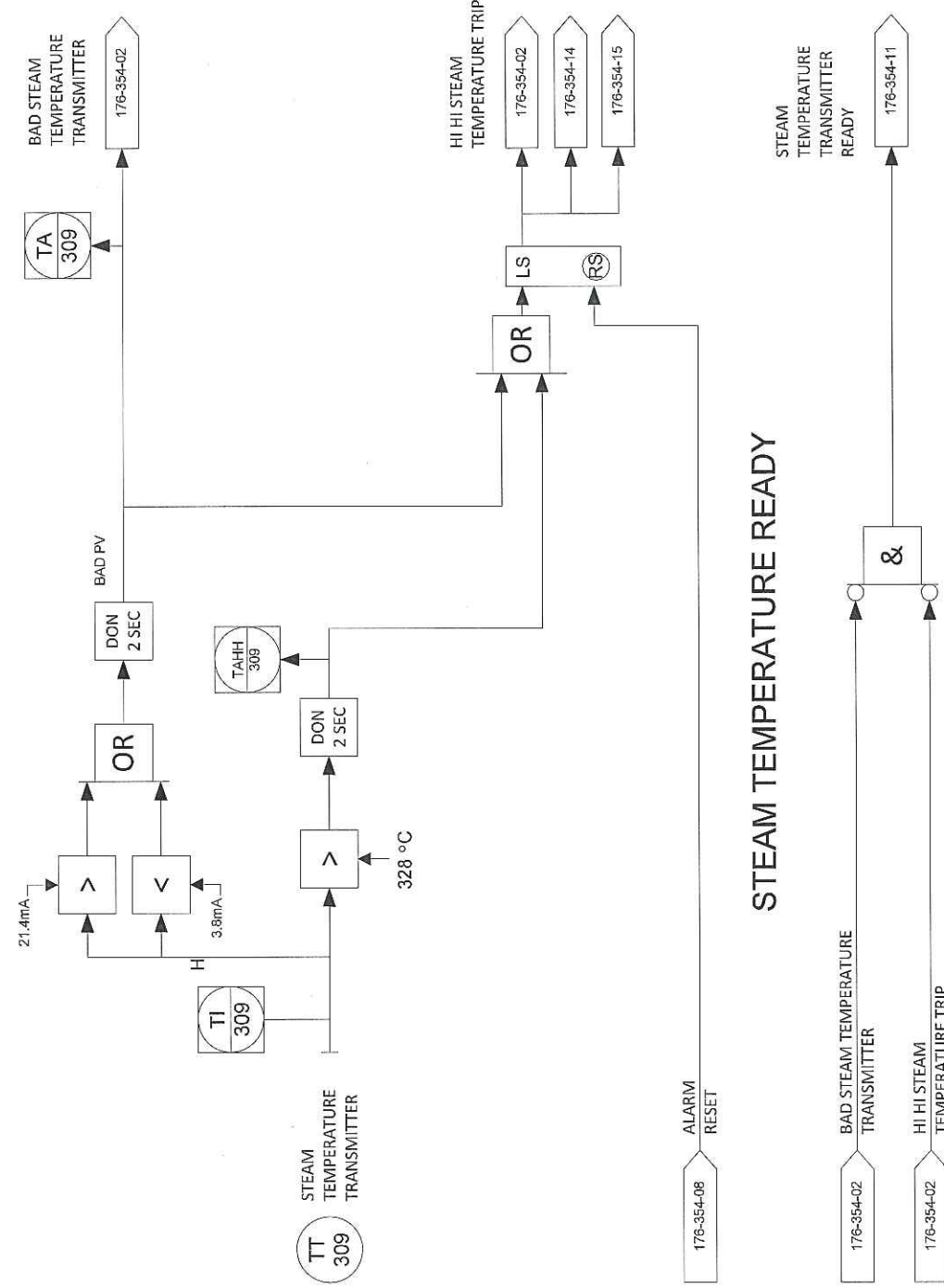
DOCUMENT DESCRIPTION: Radiant Tube & Steam Temperature Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

HIGH RADIANT TUBESKIN TEMPERATURE ALARMS AND TRIPS



HIGH STEAM TEMPERATURE ALARMS AND TRIPS



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr RADIANT TUBE & STEAM TEMPERATURE LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO:	REV. 0
JOB No: 176	SCALE: NONE	176-354-02	



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PL6-700		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

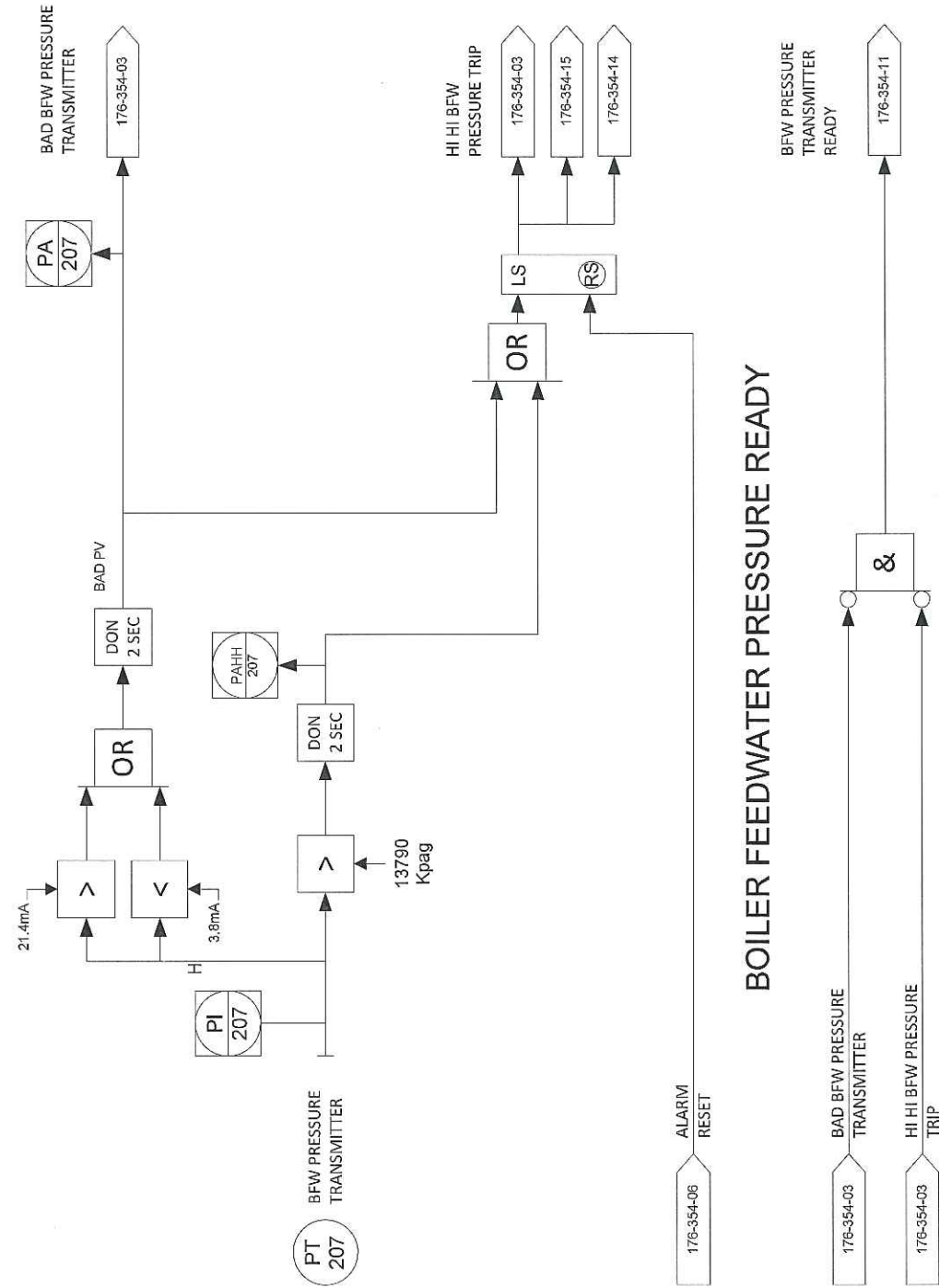
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VENDOR REVISION: 0

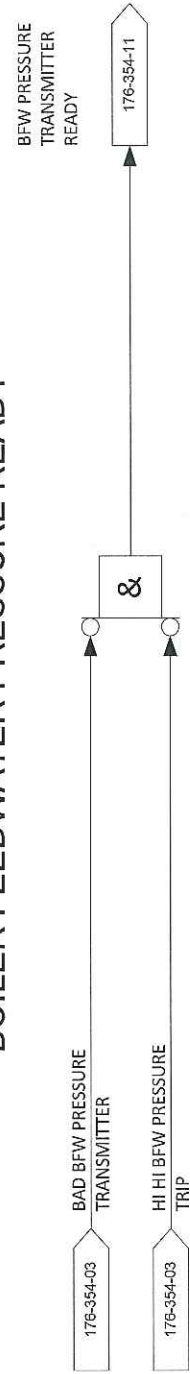
DOCUMENT DESCRIPTION: Feedwater & Radiant Chamber Pressure Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

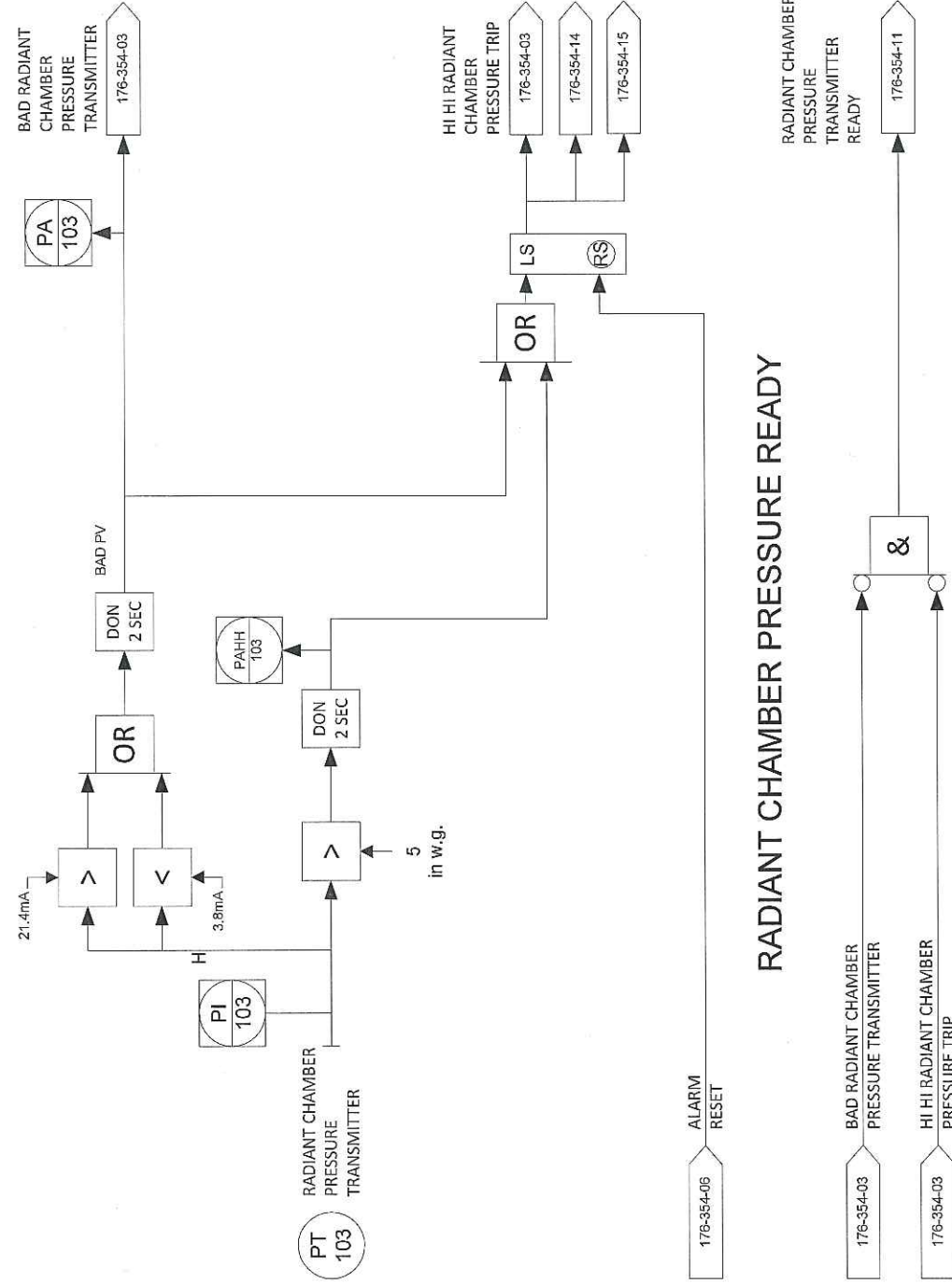
BOILER FEEDWATER PRESSURE ALARMS AND TRIPS



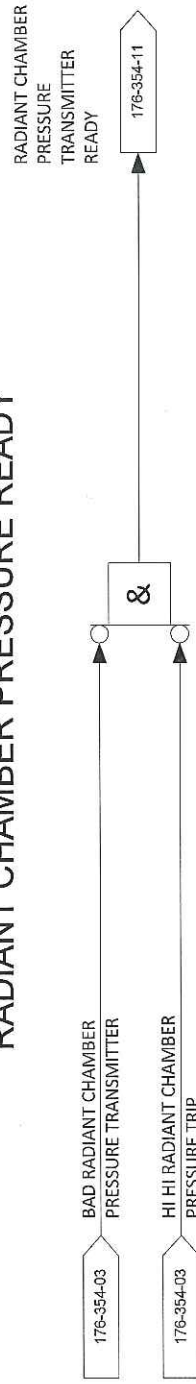
BOILER FEEDWATER PRESSURE READY



RADIANT CHAMBER PRESSURE ALARMS AND TRIPS



RADIANT CHAMBER PRESSURE READY



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr FEEDWATER & RADIANT CHAMBER PRESSURE LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO:	REV.
JOB No: 176	SCALE: NONE	176-354-03	0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PLG-7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

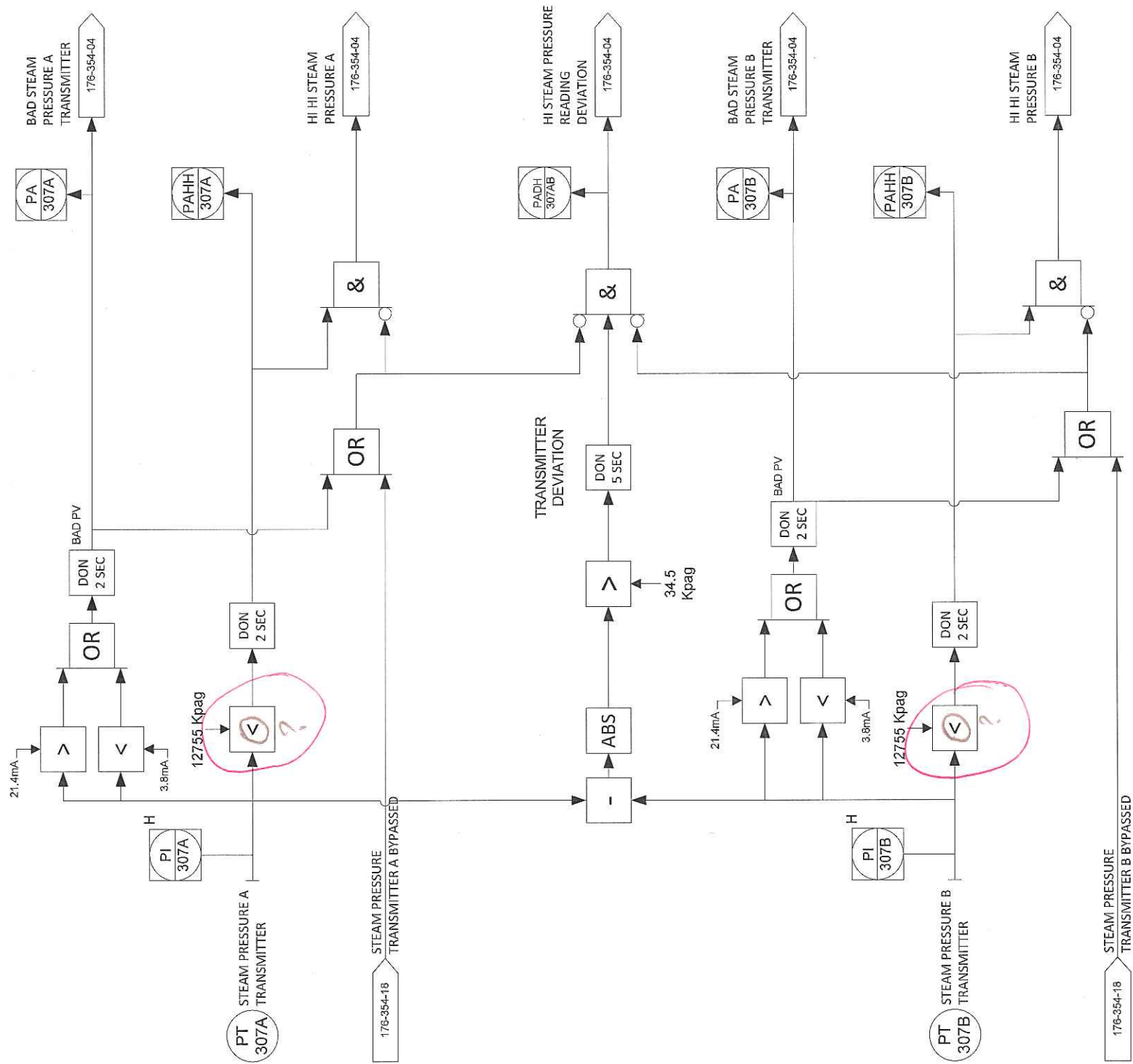
DOCUMENT NUMBER: 176-354-04

VENDOR REVISION: 0

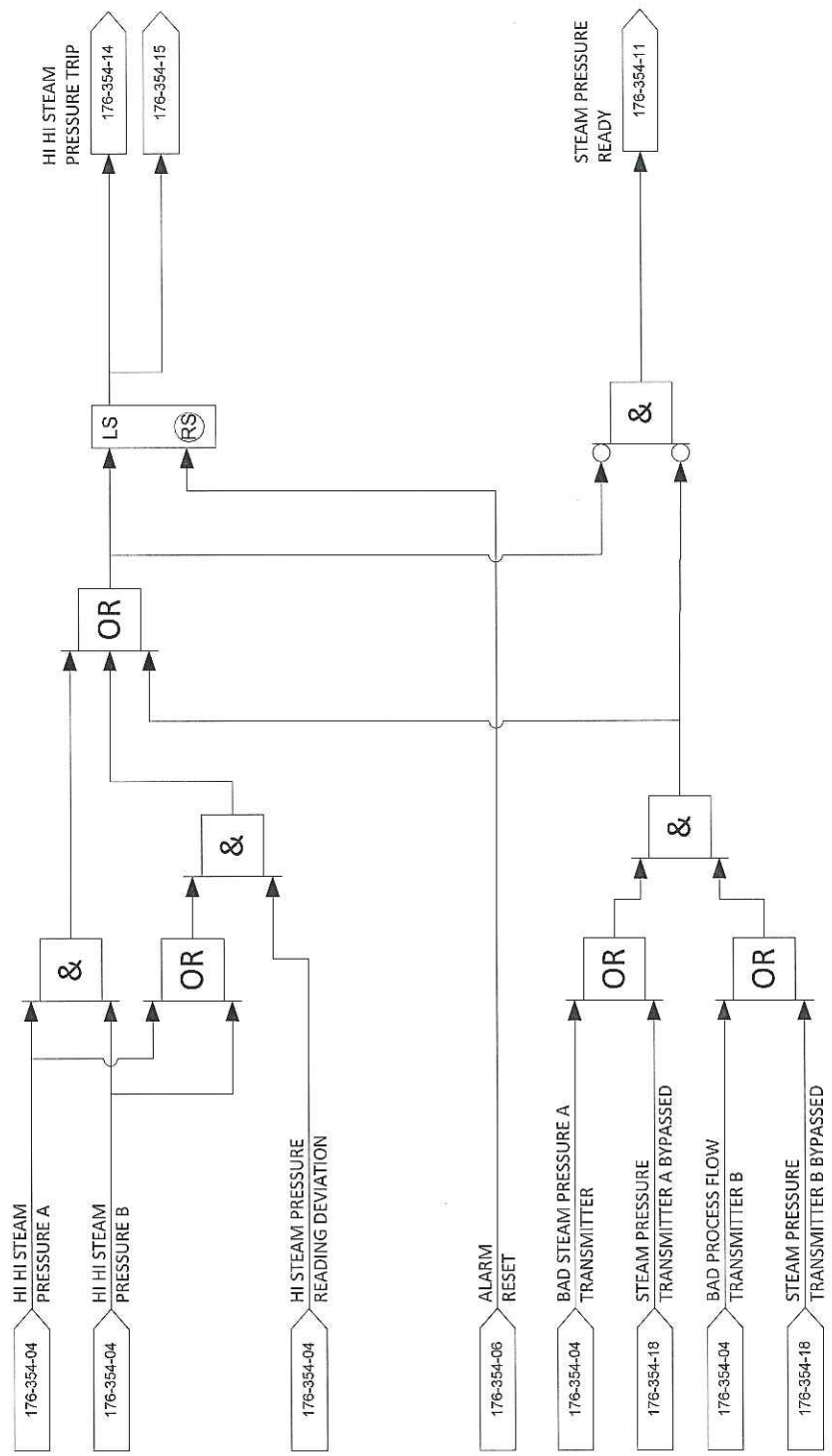
DOCUMENT DESCRIPTION: Steam Pressure A & B Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

STEAM PRESSURE A & B ALARMS AND TRIPS



STEAM PRESSURE A & B ALARMS AND TRIPS (1oo2D)



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
STEAM PRESSURE A & B			
LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO: 176-354-04	
JOB No: 176	SCALE: NONE		REV. 0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI03	DKG-7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

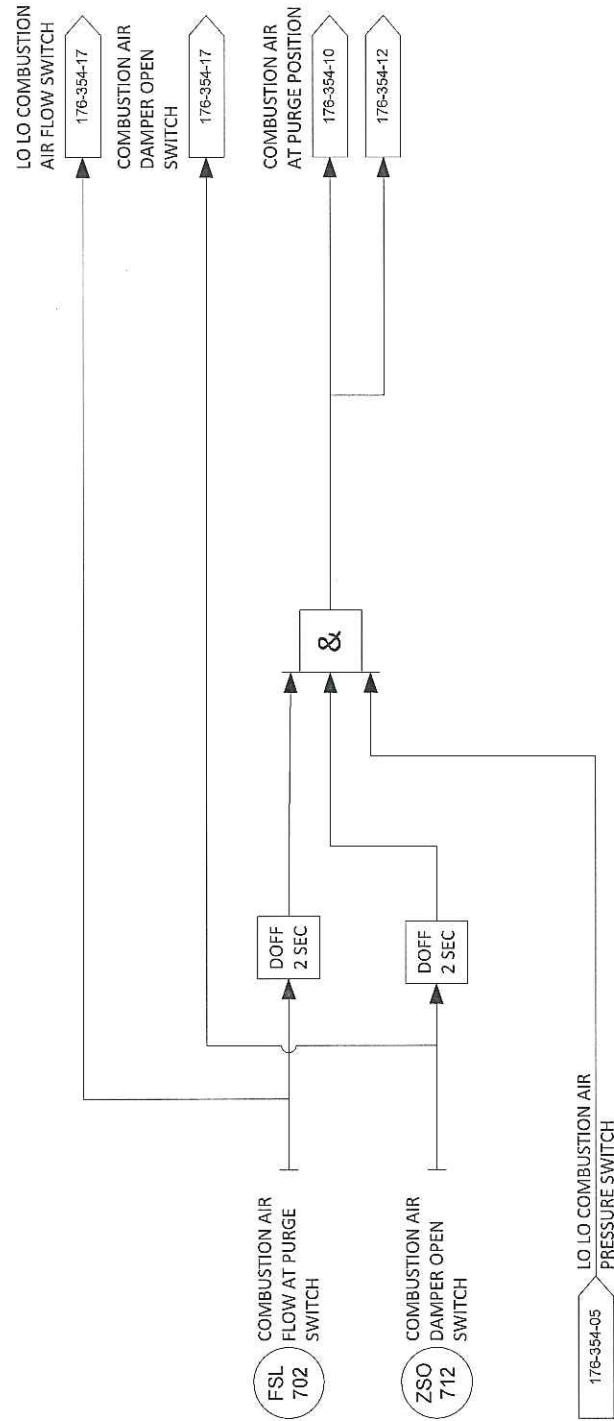
DOCUMENT NUMBER: 176-354-05

VENDOR REVISION: 0

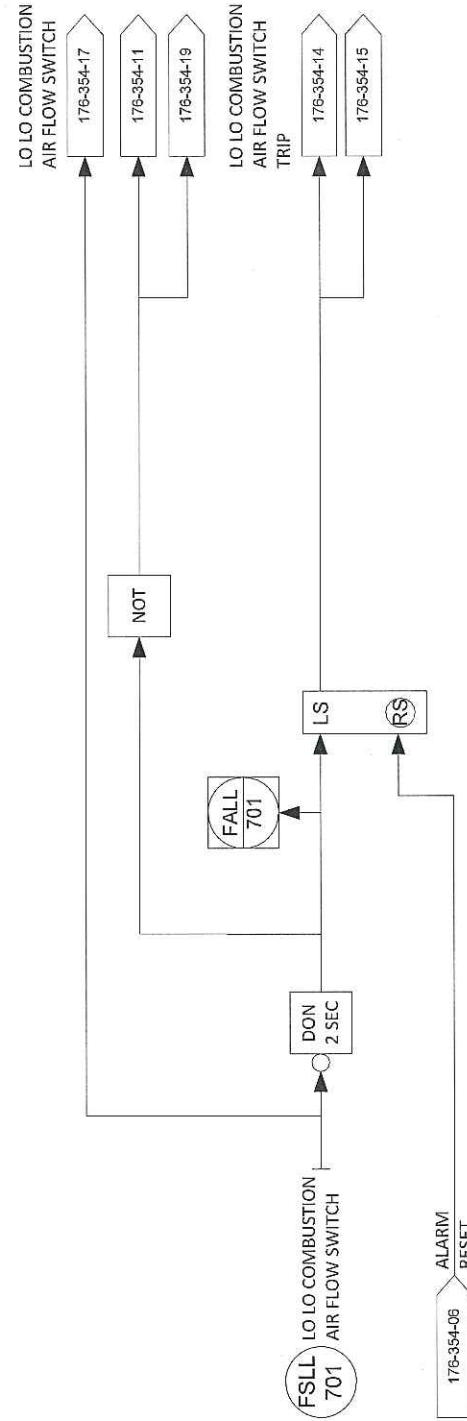
DOCUMENT DESCRIPTION: Comb. Air & Instrument Air Pressure Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

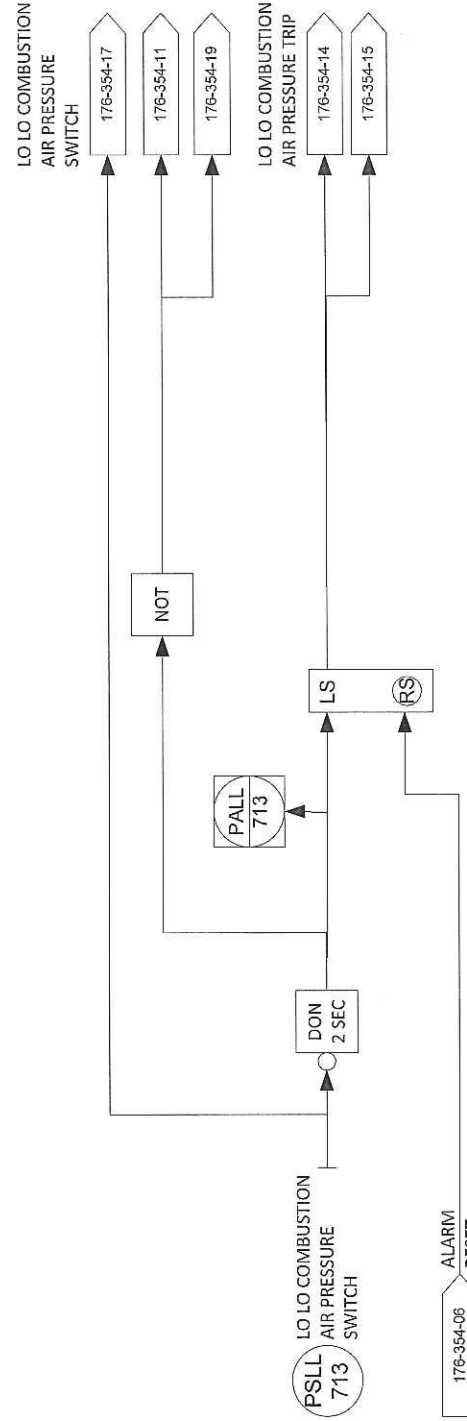
COMBUSTION AIR FLOW FOR PURGE



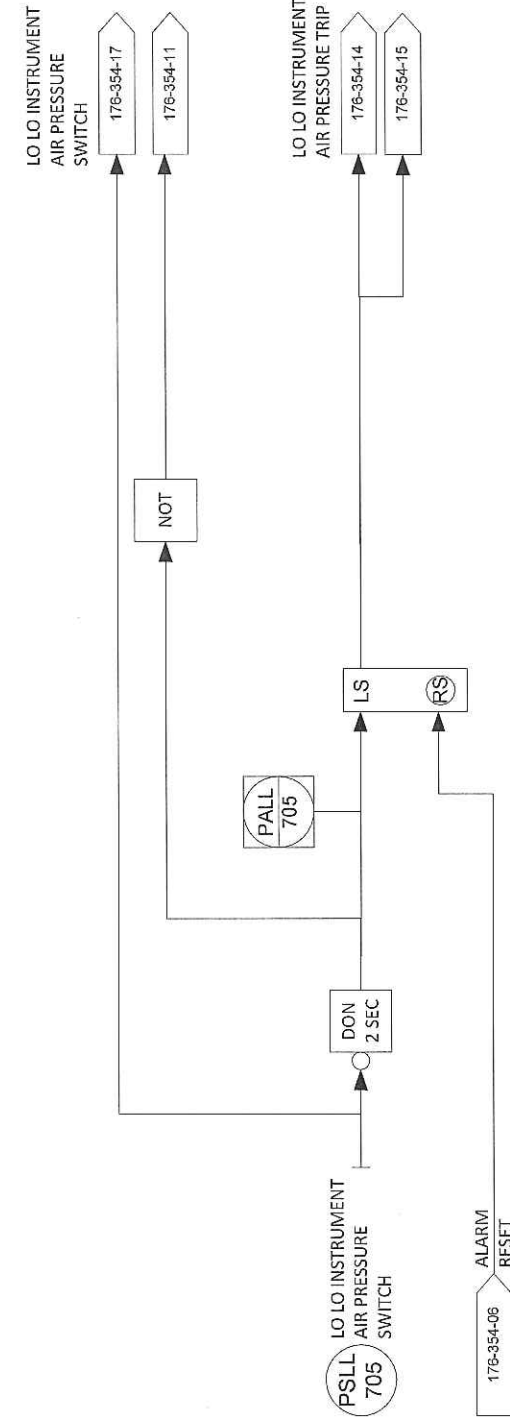
LOW COMBUSTION AIR FLOW SWITCH



LOW COMBUSTION AIR PRESSURE SWITCH



LOW INSTRUMENT AIR PRESSURE SWITCH



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr COMB. AIR & INSTRUMENT AIR PRESSURE LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO: 176-354-05	REV. 0
JOB No: 176	SCALE: NONE		



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG-7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

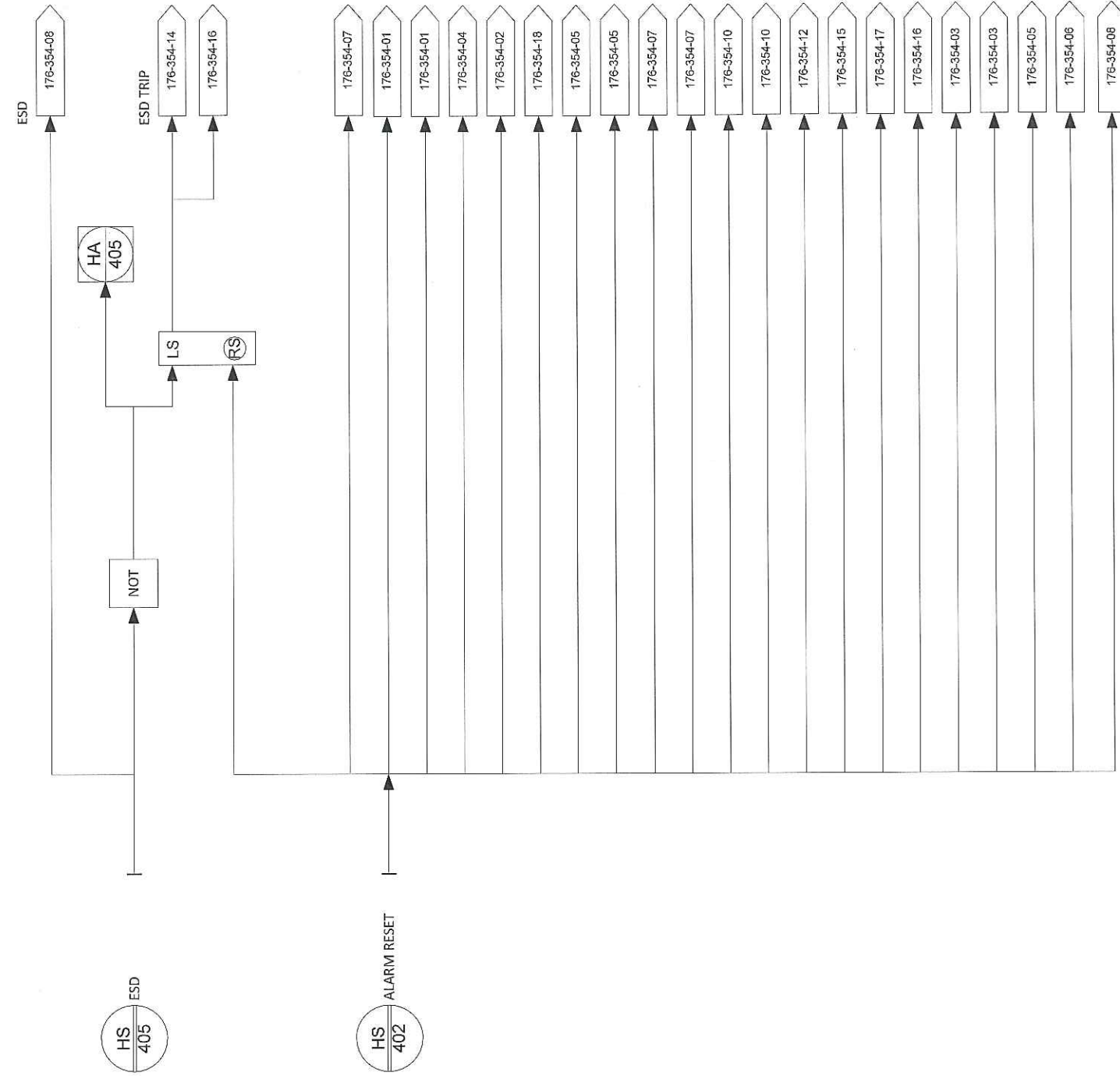
DOCUMENT NUMBER: 176-354-06

VENDOR REVISION: 0

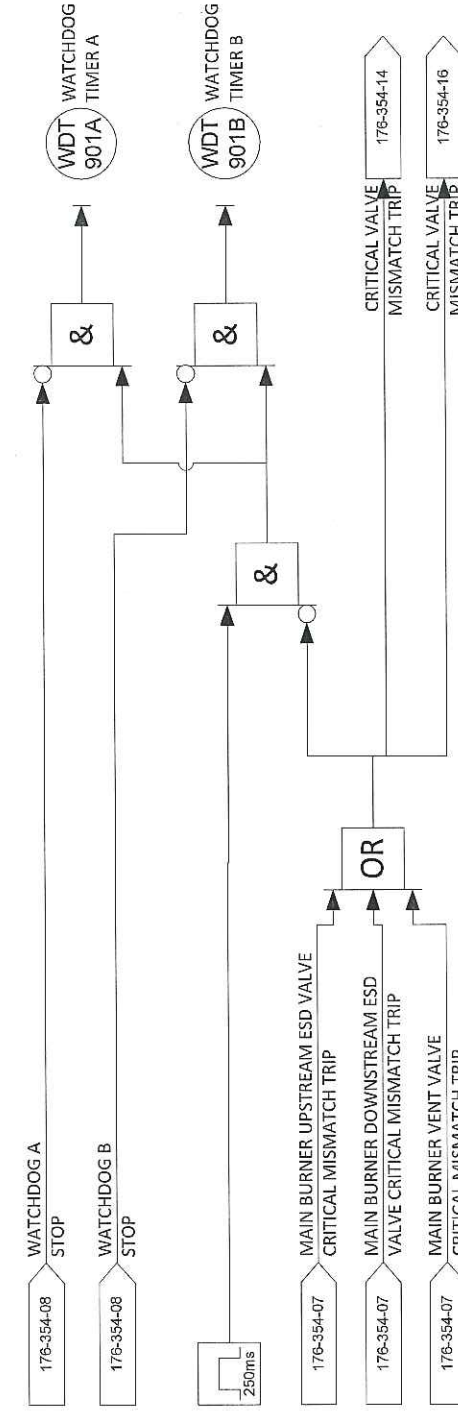
DOCUMENT DESCRIPTION: Local/Remote ESD Trip & Flame Scanner Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

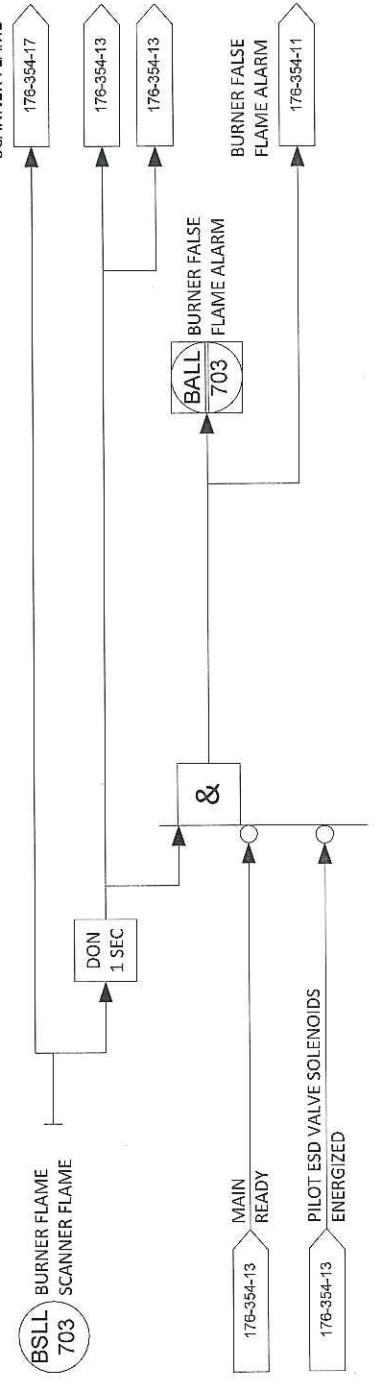
LOCAL OR REMOTE ESD TRIP



WATCHDOG TIMER



FLAME SCANNER LOGIC



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
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REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr LOCAL/REMOTE ESD TRIP & FLAME SCANNER LOGIC DIAGRAMS			
DWN. BY:	PR	DATE:	31-MAY-2012
JOB No:	176	SCALE:	NONE
DRAWING NO:		176-354-06	
REV.			0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI03	PK6-7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

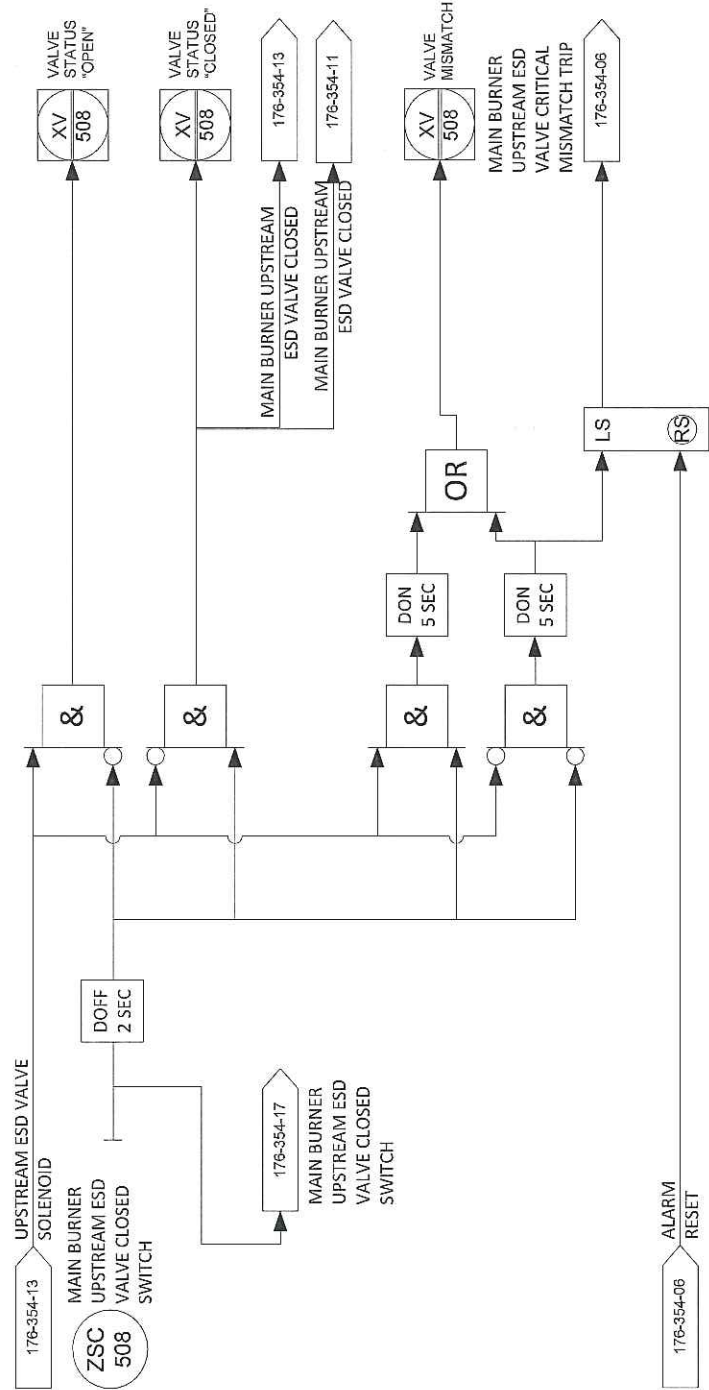
DOCUMENT NUMBER: 176-354-07

VENDOR REVISION: 0

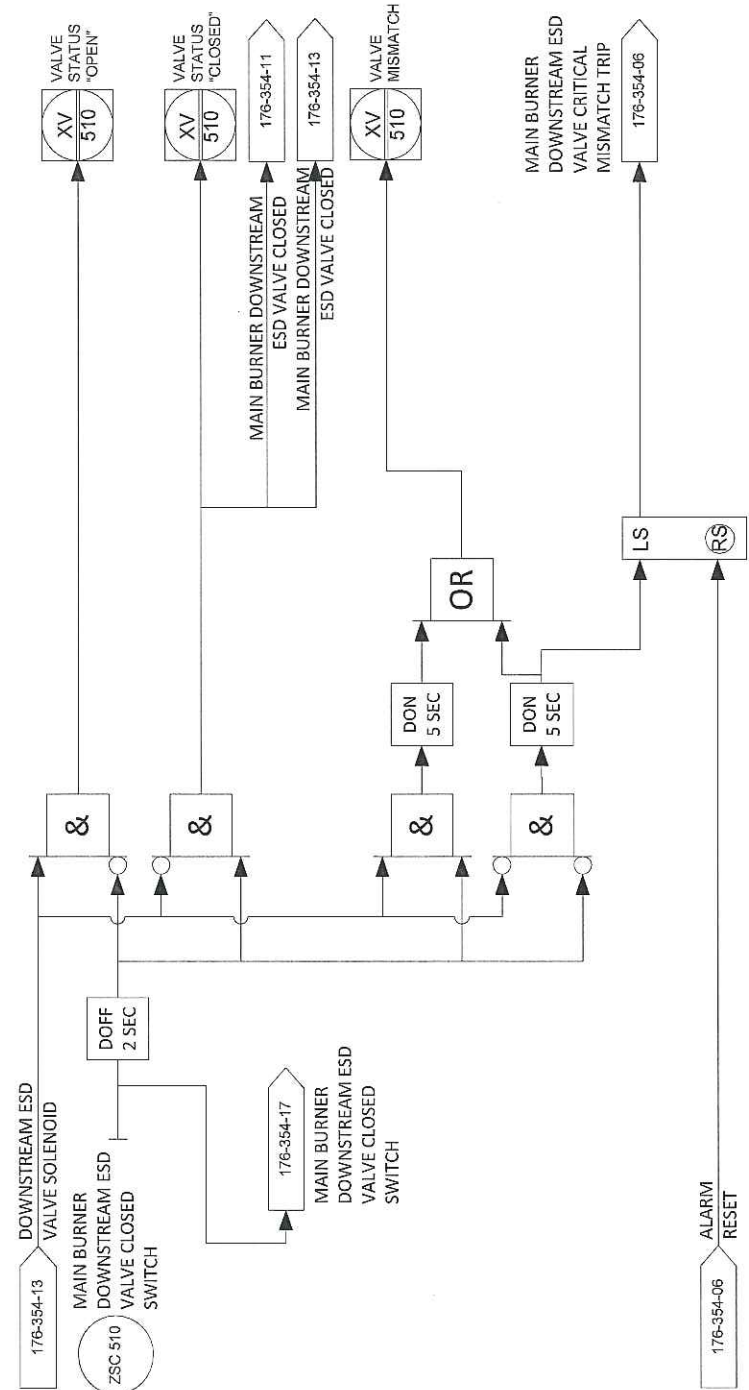
DOCUMENT DESCRIPTION: Main Burner ESD Valve Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

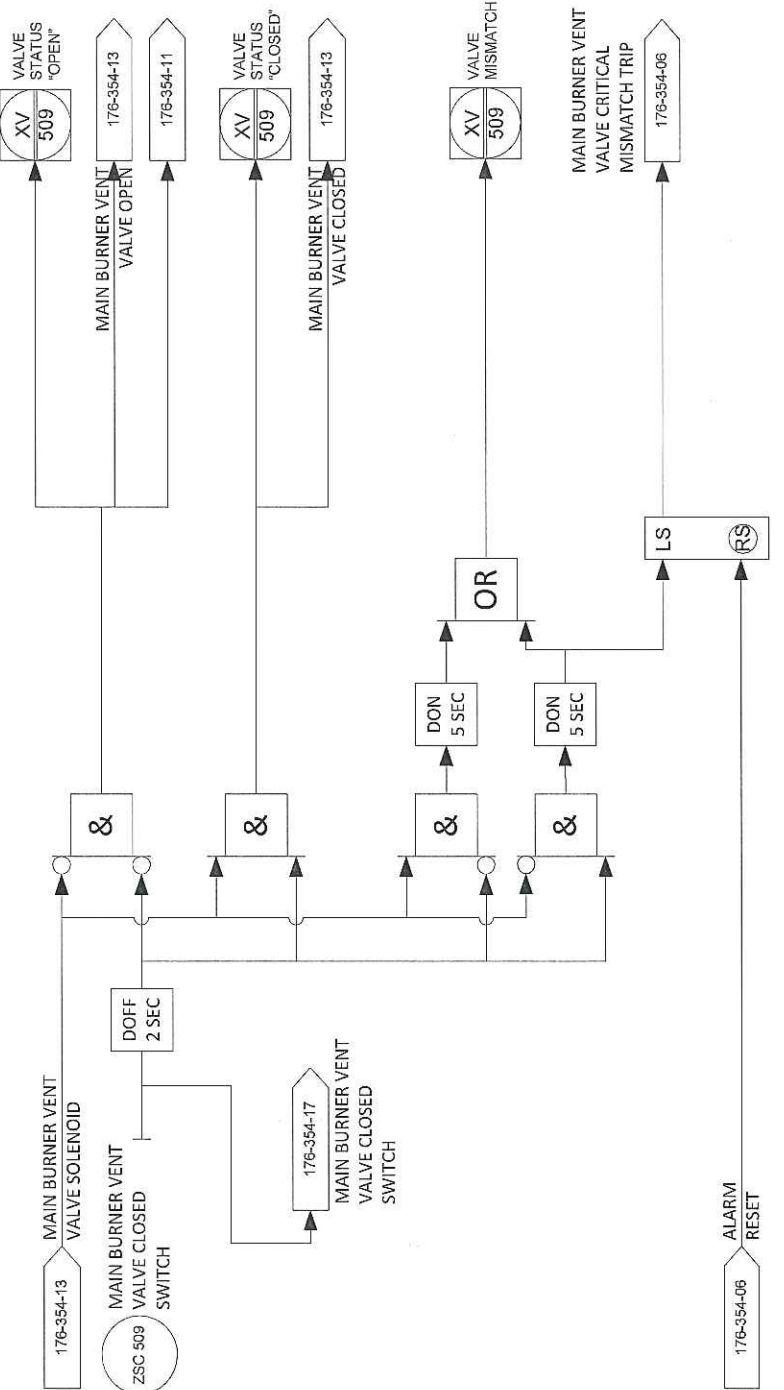
MAIN BURNER UPSTREAM ESD VALVE LOGIC



MAIN BURNER DOWNSTREAM ESD VALVE LOGIC



MAIN BURNER VENT ESD VALVE LOGIC



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						



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FOR:			
STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
MAIN BURNER ESD VALVE			
LOGIC DIAGRAMS			
DWN. BY:	PR	DATE:	31-MAY-2012
JOB No:	176	SCALE:	NONE
DRAWING NO:			176-354-07
REV.			0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	P166-7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

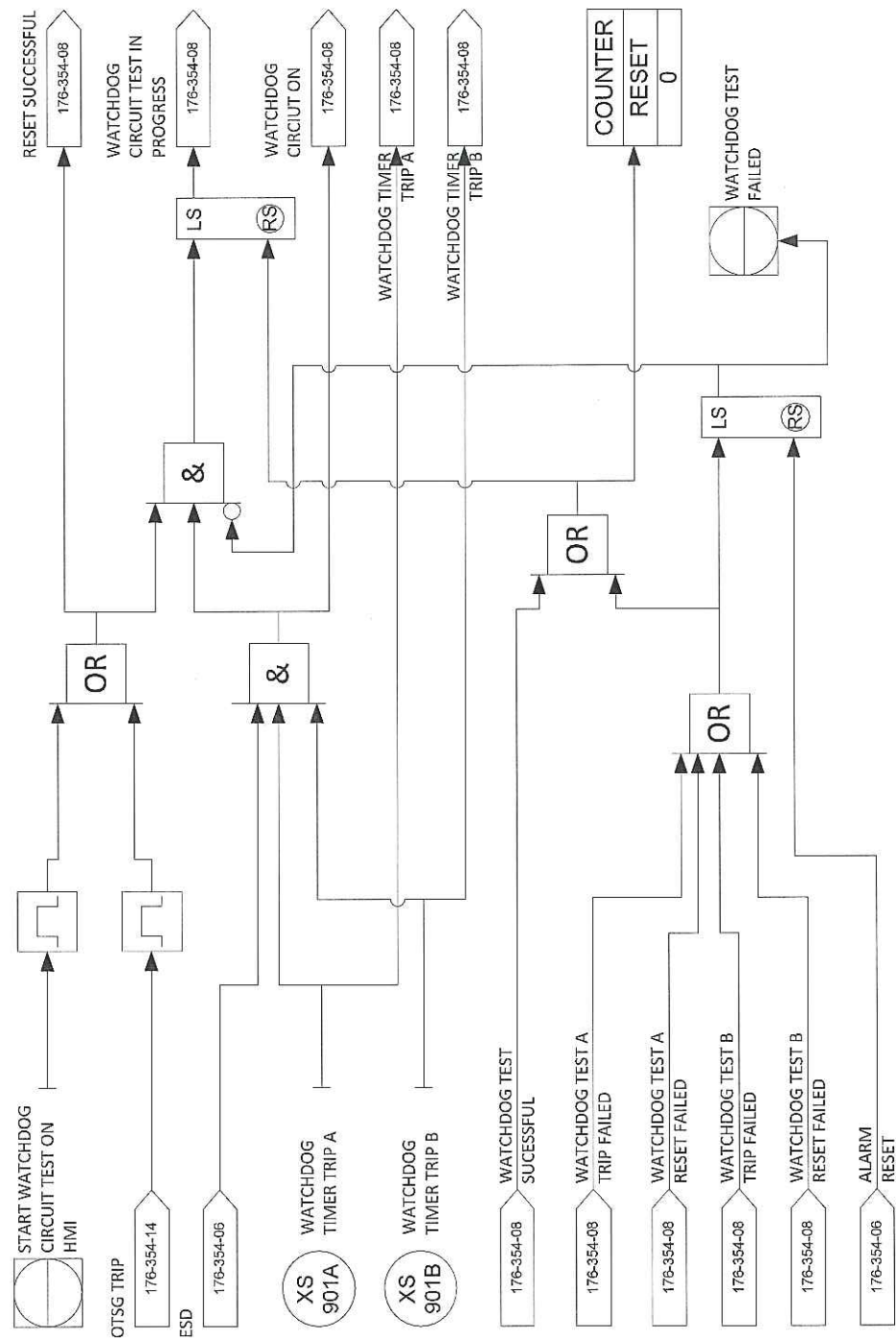
DOCUMENT NUMBER: 176-354-08

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Boiler Feed Water Pump Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

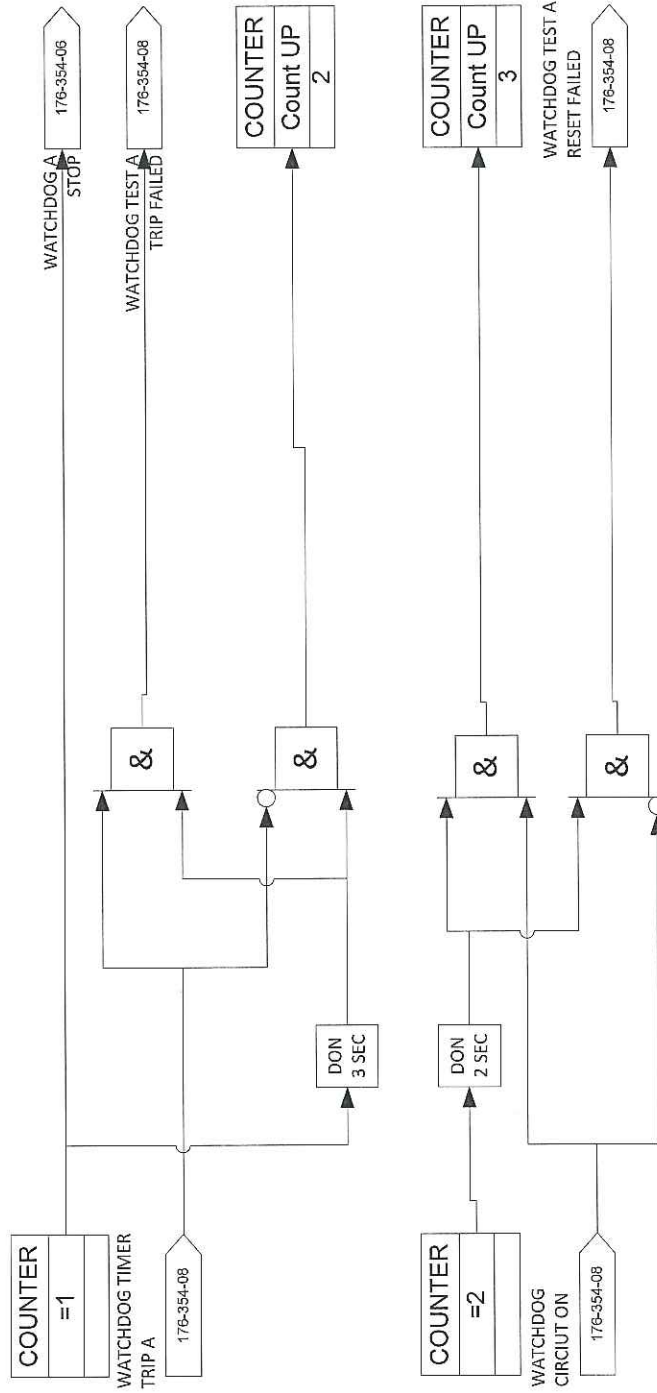
WATCHDOG TIMER TEST LOGIC



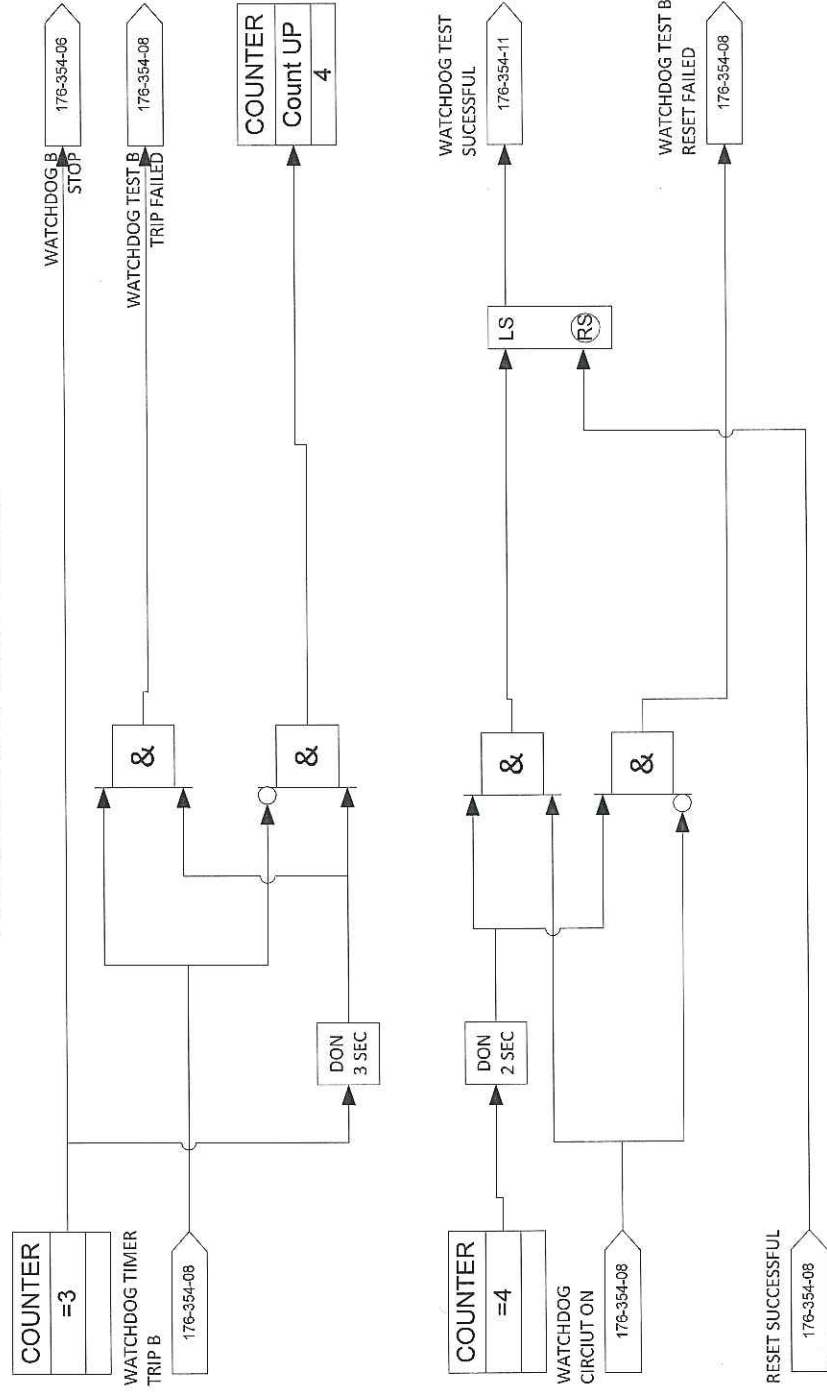
WATCHDOG A TEST LOGIC



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WATCHDOG B TEST LOGIC



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						

FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr BOILER FEED WATER PUMP LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO: 176-354-08	
JOB No: 176	SCALE: NONE	REV. 0	



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

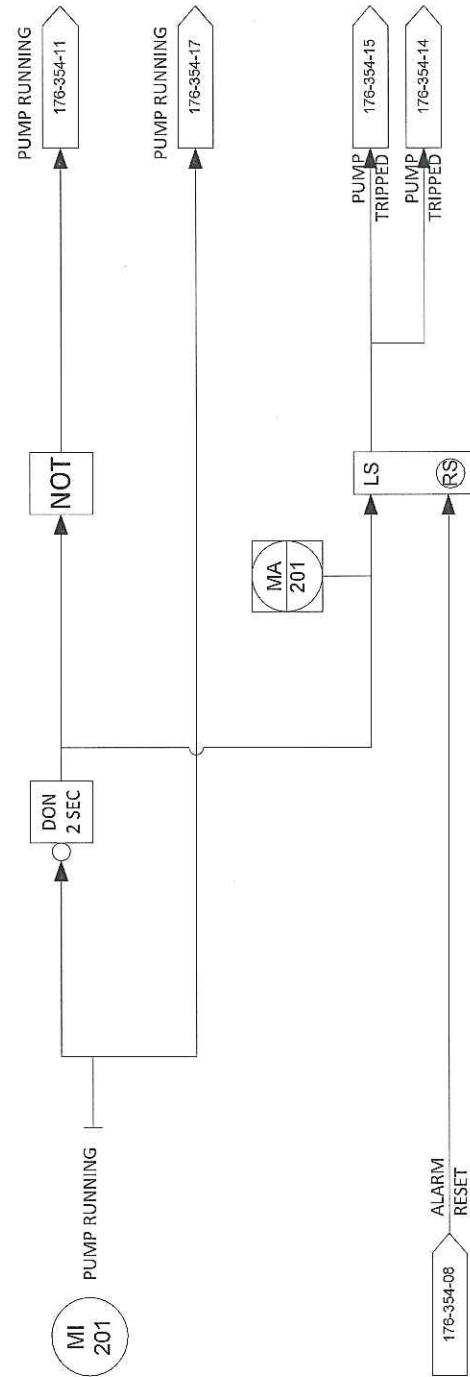
DOCUMENT NUMBER: 176-354-09

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Firetube 2 Automatic Valve Test Logic Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

BOILER FEED WATER PUMP LOGIC



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
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FOR:			
STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
FIRETUBE 2 AUTOMATIC VALVE TEST LOGIC LOGIC DIAGRAMS			
DWN. BY:	PR	DATE:	31-MAY-2012
JOB No:	176	SCALE:	NONE
DRAWING NO:			176-354-09
REV.			0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	DKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

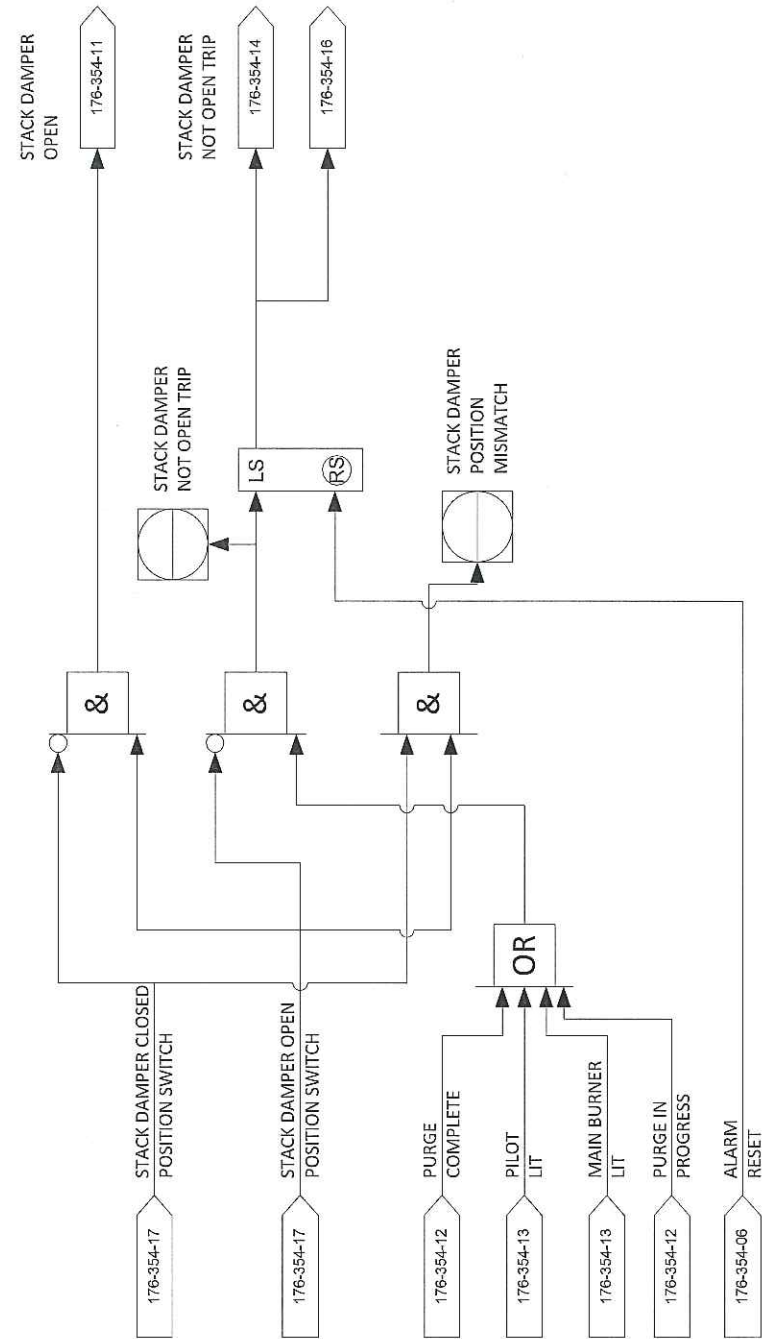
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VENDOR REVISION: 0

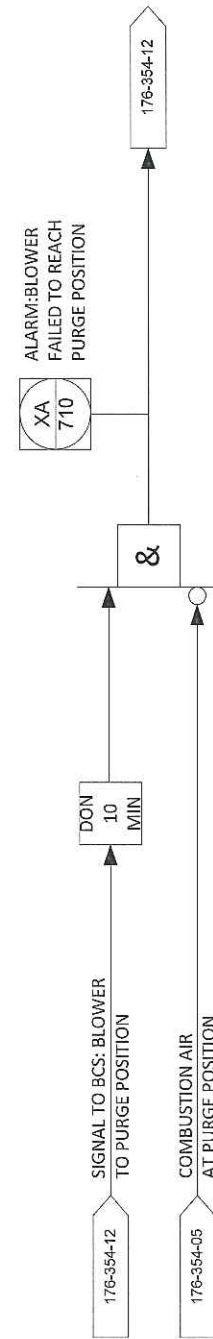
DOCUMENT DESCRIPTION: Stack Dampener and Comb. Air Blower Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

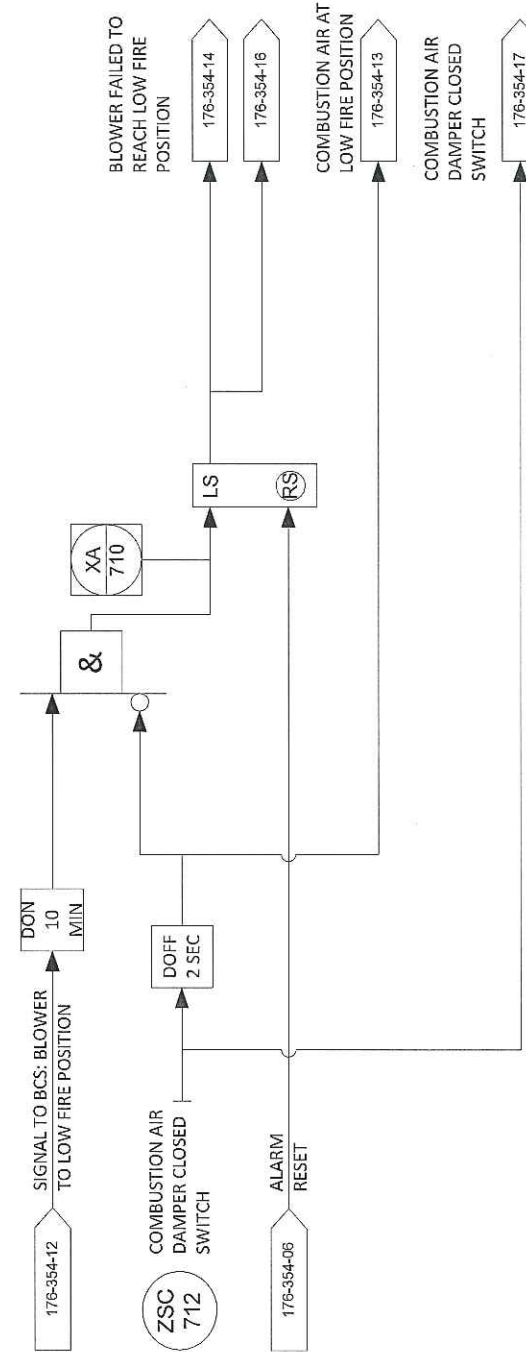
STACK DAMPER NOT OPEN TRIP



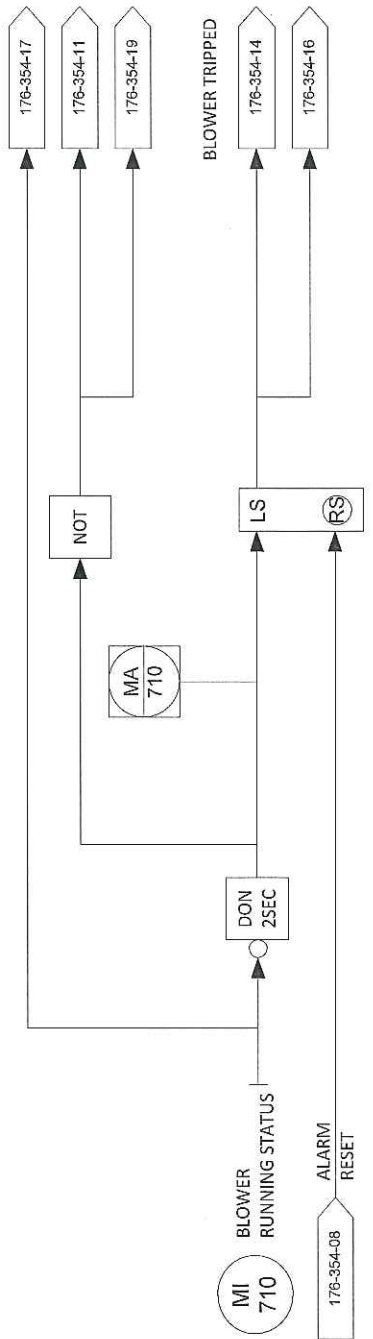
BLOWER FAILED TO REACH PURGE POSITION



BLOWER FAILED TO REACH LOW FIRE POSITION



BLOWER FAILED TRIP



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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
STACK DAMPER AND COMB. AIR BLOWER			
LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO:	REV.
JOB No: 176	SCALE: NONE	176-354-10	0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI05	PKG-700		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

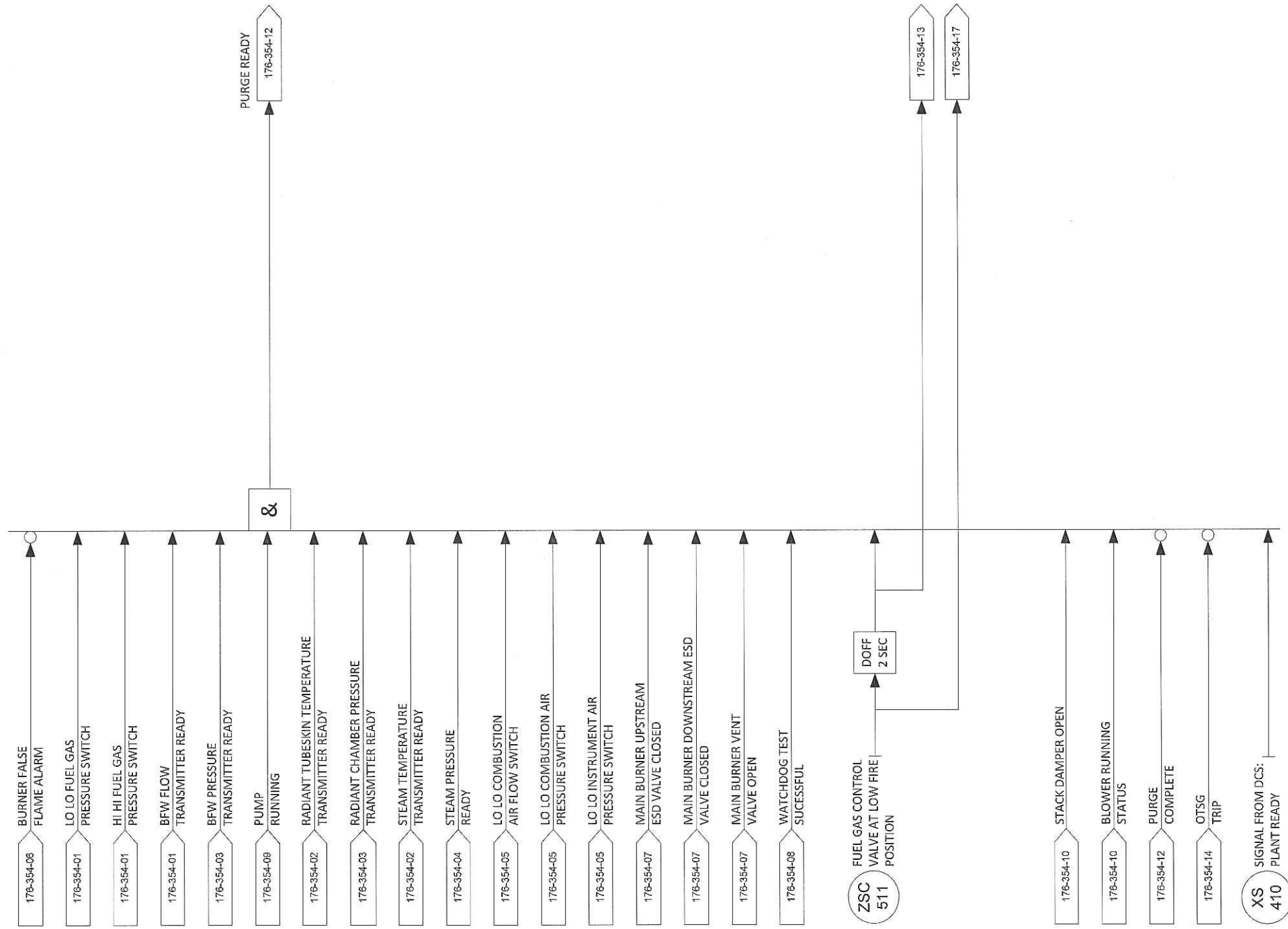
DOCUMENT NUMBER: 176-354-11

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Ready to Purge Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

READY TO PURGE LOGIC



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr READY TO PURGE LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO:	REV. 0
JOB No: 176	SCALE: NONE	176-354-11	



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG-7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

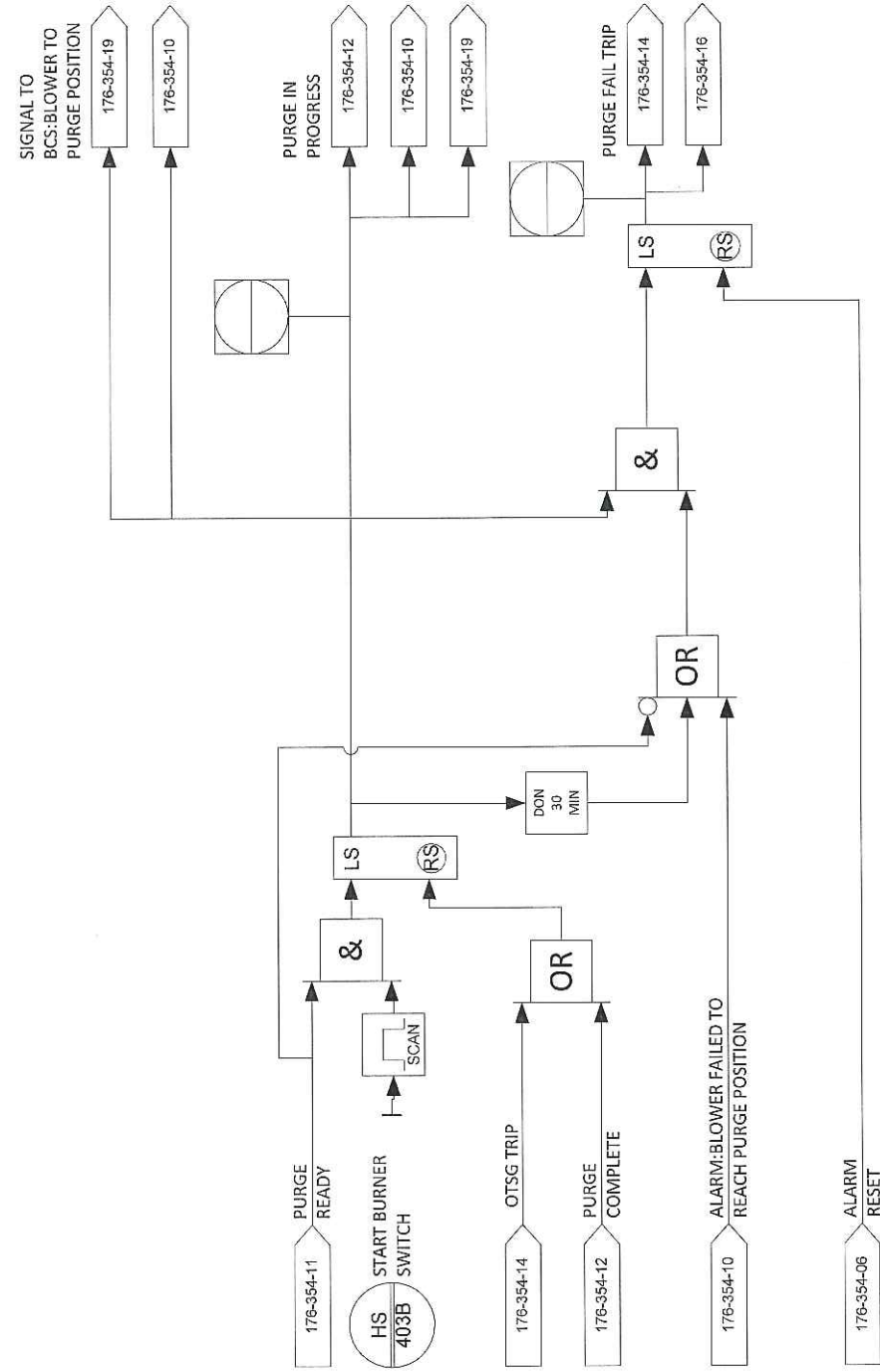
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VENDOR REVISION: 0

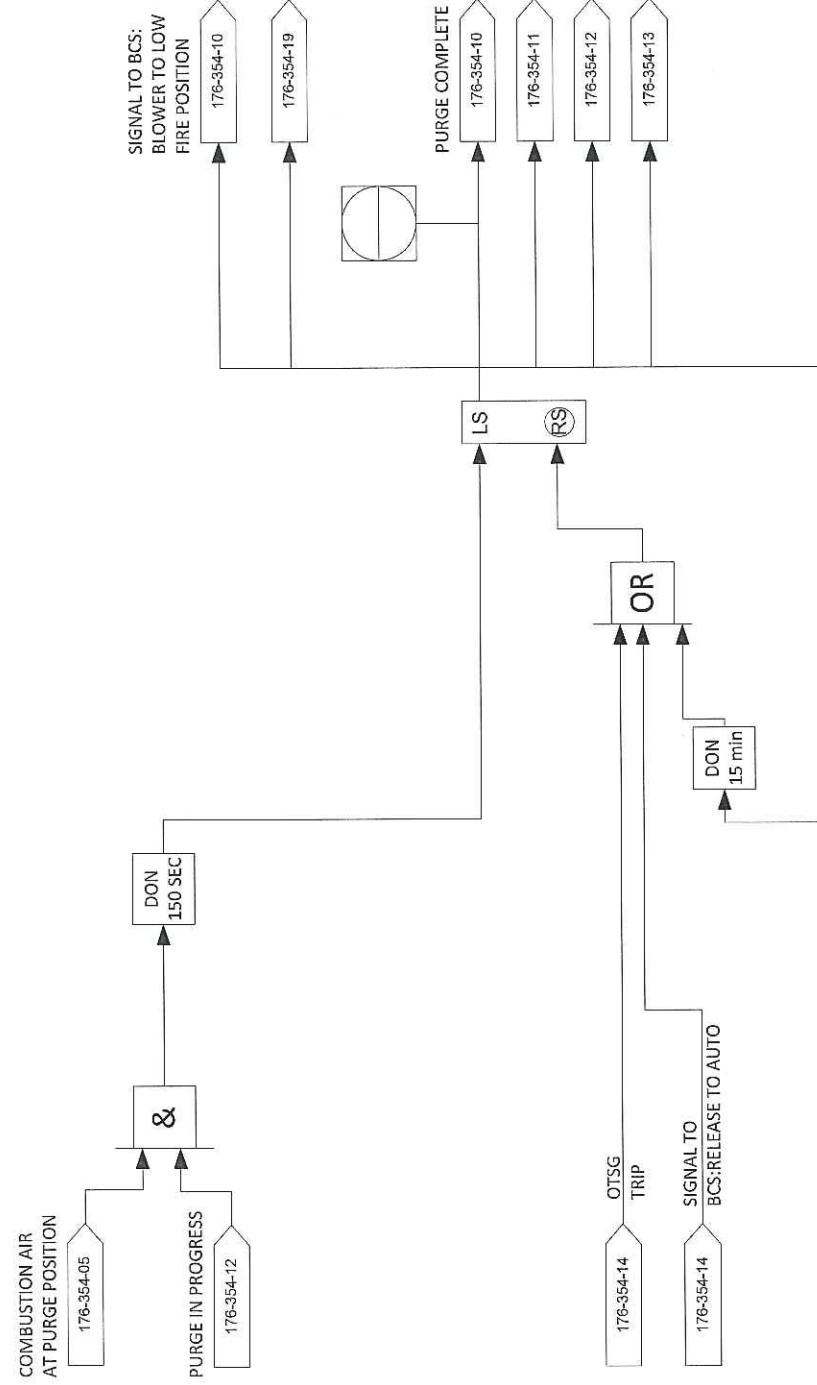
DOCUMENT DESCRIPTION: Purge Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

PURGE IN PROGRESS AND PURGE FAIL TRIP LOGIC



PURGE COMPLETE LOGIC



NOTE 1:
 THE PURGE TIME HAS BEEN CALCULATED BASED ON A TOTAL VOLUME OF 56.5 m³ (226m³ FOR 4 VOLUME CHANGES) AND A VOLUME FLOW RATE OF 5556 Nm³/h (60% OF MAX FIRING FLOW RATE OF 9260 Nm³/h)

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
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FOR:			
STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
PURGE			
LOGIC DIAGRAMS			
DWN. BY:	PR	DATE:	31-MAY-2012
JOB No:	176	SCALE:	NONE
DRAWING NO:			176-354-12
REV.			0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG-7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

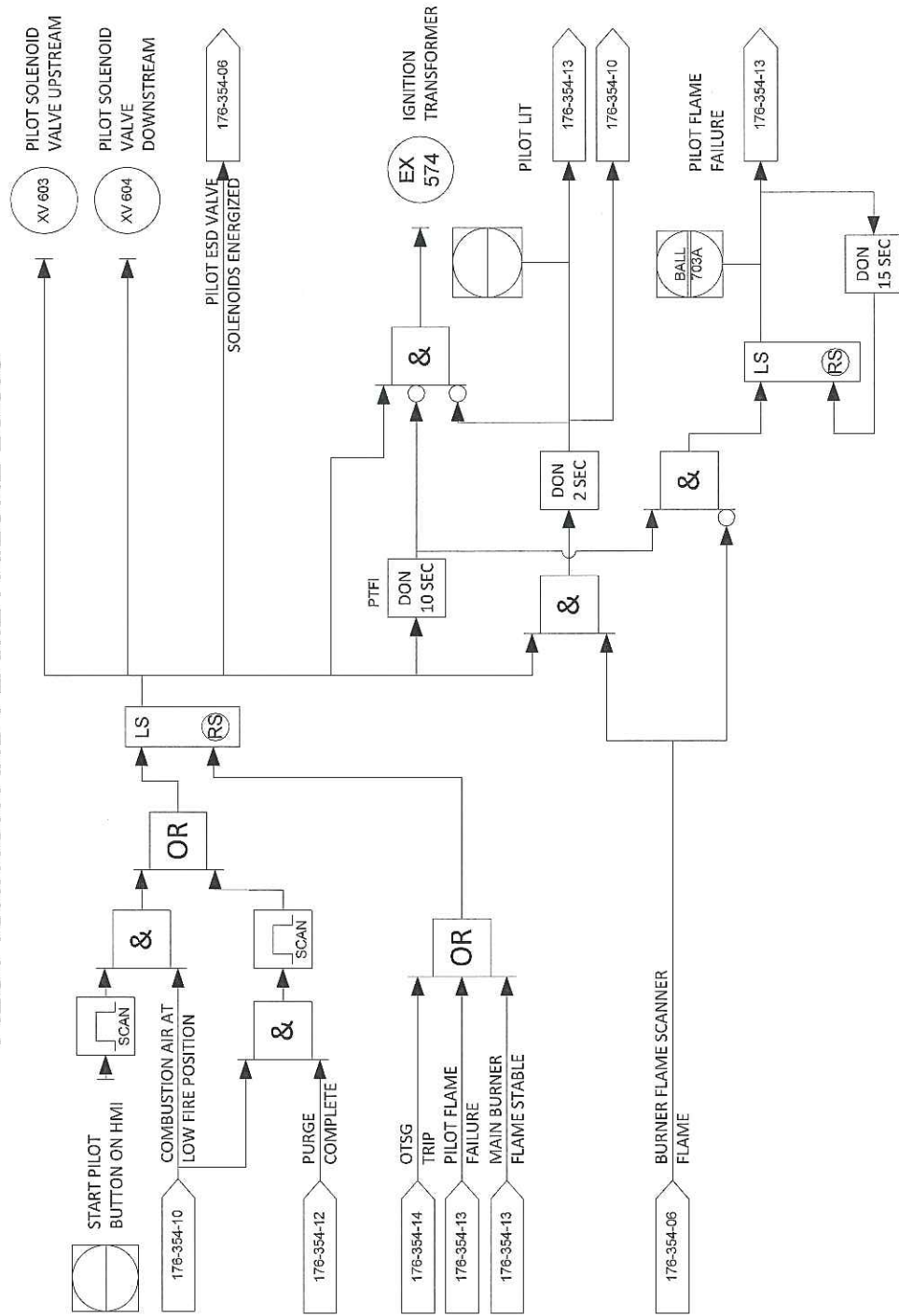
DOCUMENT NUMBER: 176-354-13

VENDOR REVISION: 0

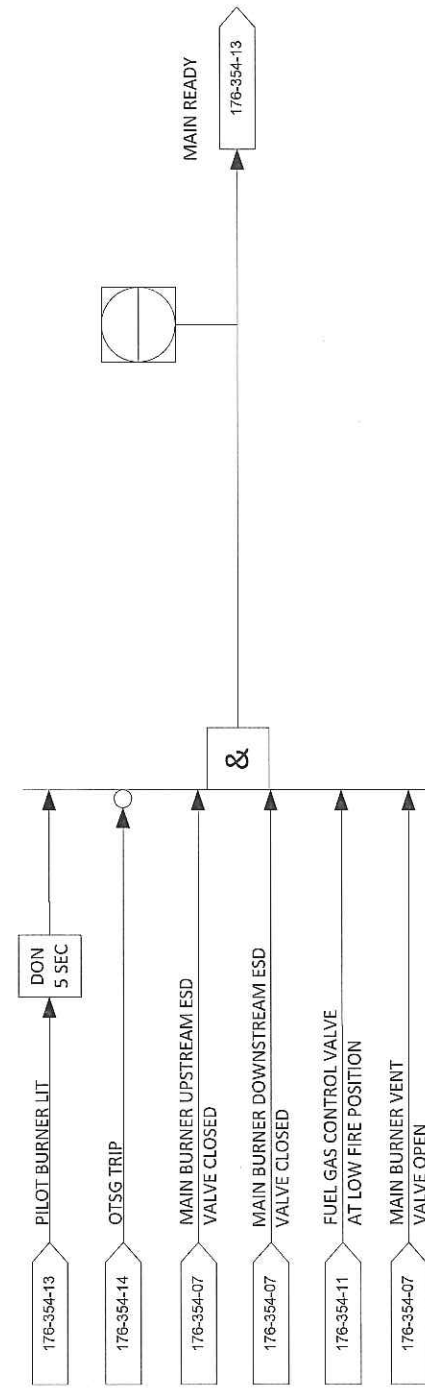
DOCUMENT DESCRIPTION: Pilot & Main Ignition Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

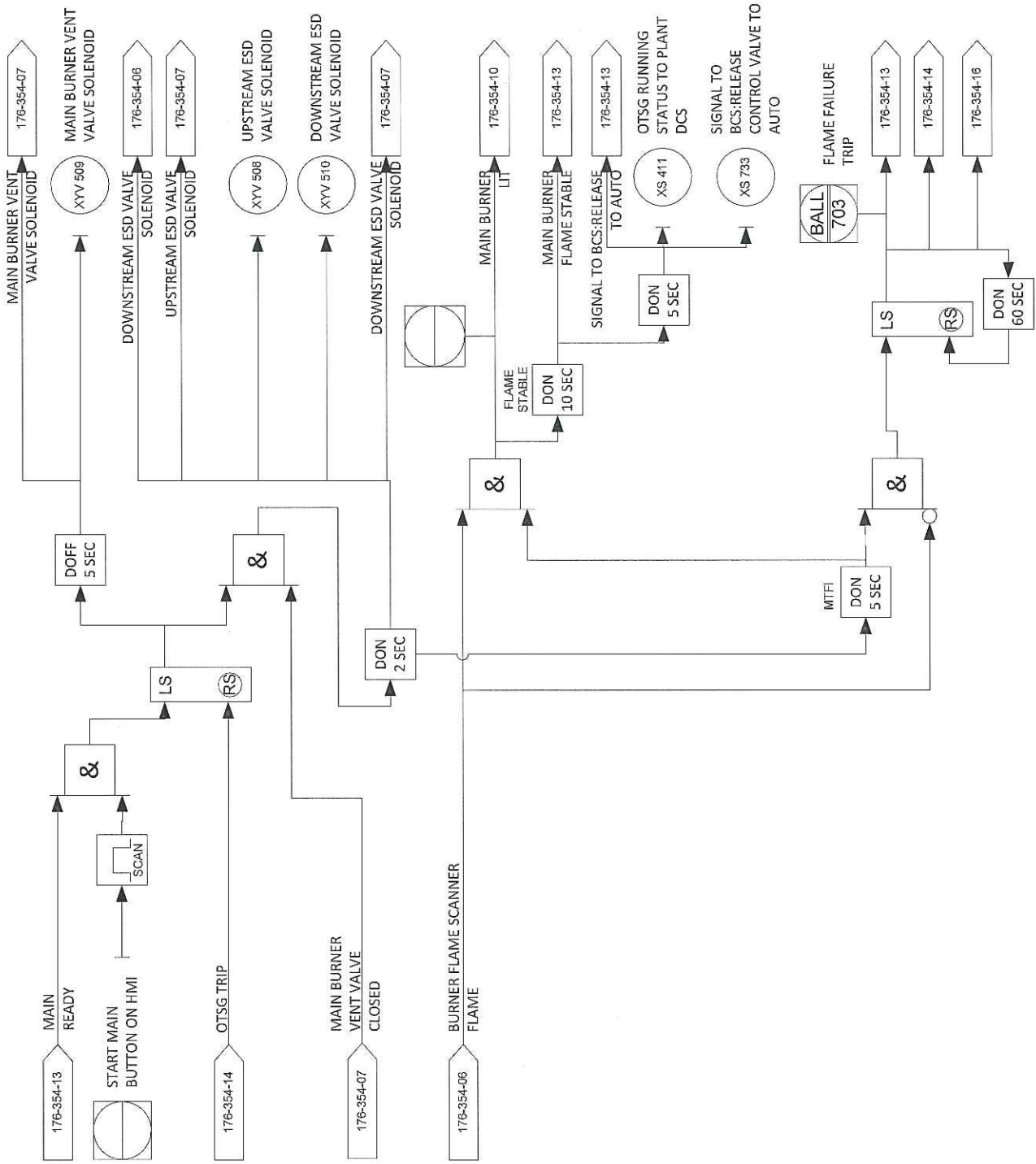
PILOT IGNITION AND FLAME FAILURE LOGIC



MAIN BURNER READY LOGIC



MAIN BURNER IGNITION AND FLAME FAILURE LOGIC



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
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FOR:			
STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
PILOT & MAIN IGNITION			
LOGIC DIAGRAMS			
DWN. BY:	PR	DATE:	31-MAY-2012
JOB No:	176	SCALE:	NONE
DRAWING NO:		176-354-13	
REV.			0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

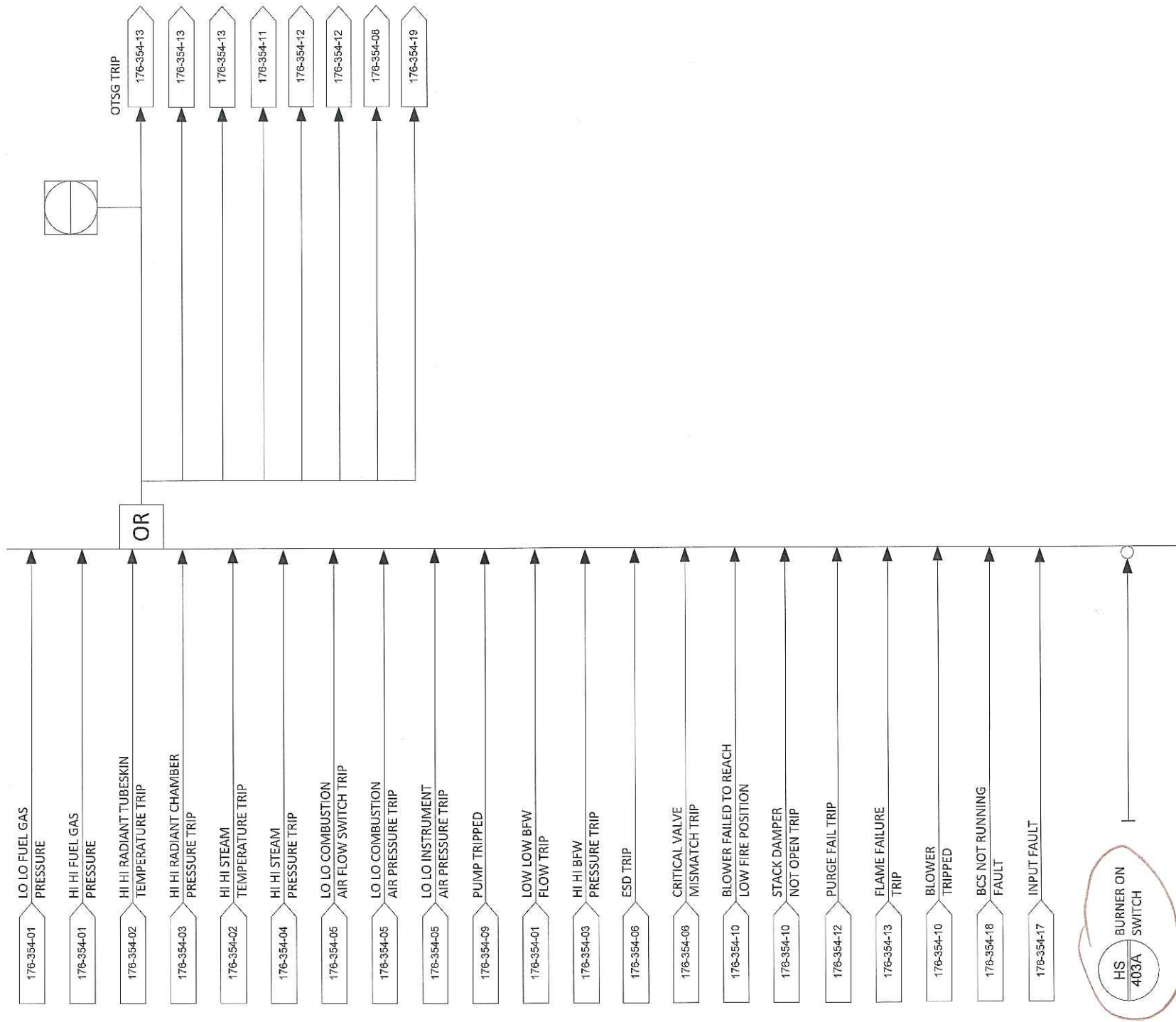
DOCUMENT NUMBER: 176-354-14

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Steam Generator Trips Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

STEAM GENERATOR TRIPS



When Burner switch off, will it show as "OTSG Trip" alarm?

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr STEAM GENERATOR TRIPS LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO:	REV. 0
JOB No: 176	SCALE: NONE	176-354-14	



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG-7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

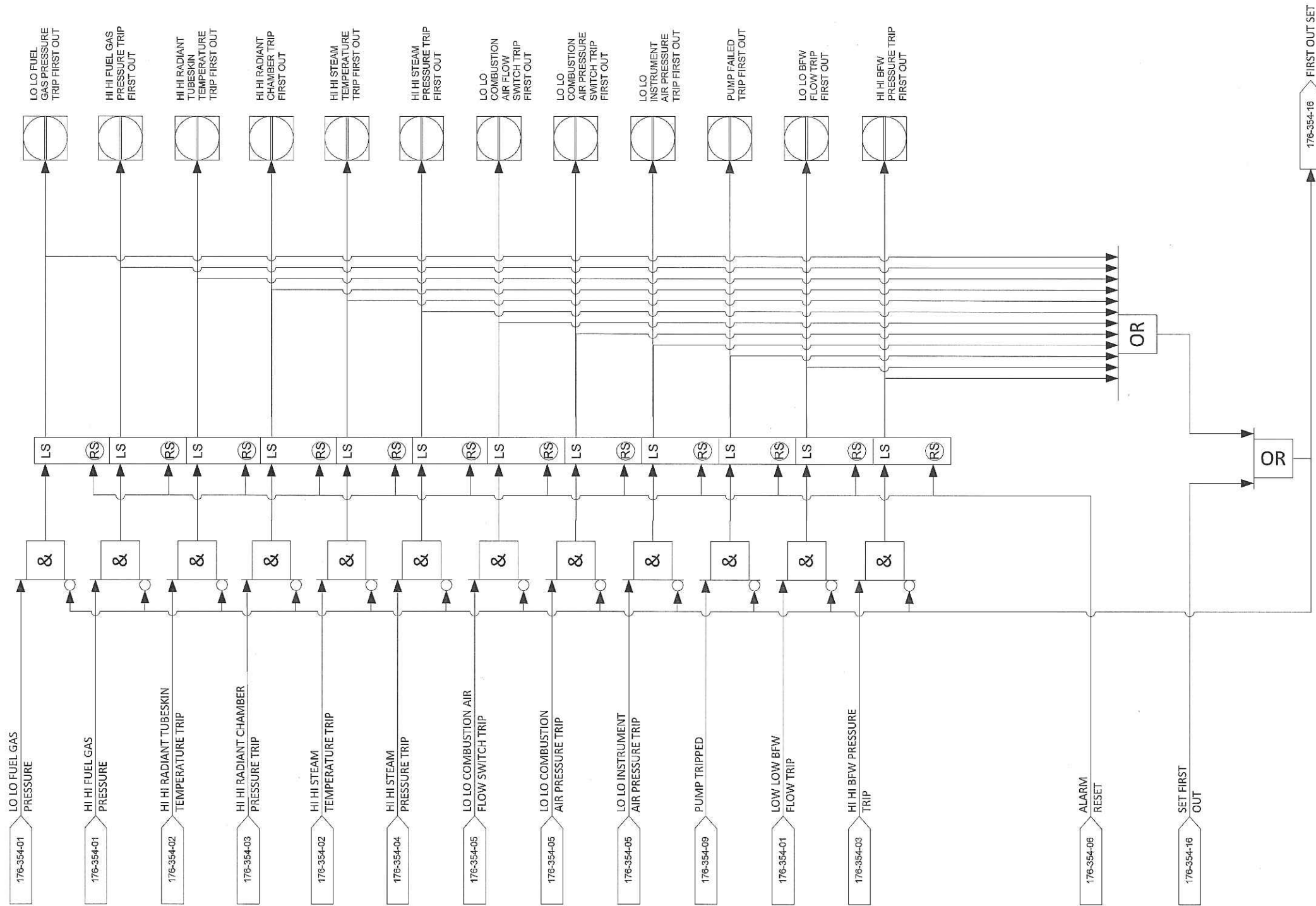
DOCUMENT NUMBER: 176-354-15

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: First Out Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

FIRST OUT TRIP LOGIC



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
FIRST OUT LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO:	REV.
JOB No: 176	SCALE: NONE	176-354-15	0



CODE SHEET

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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG -7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

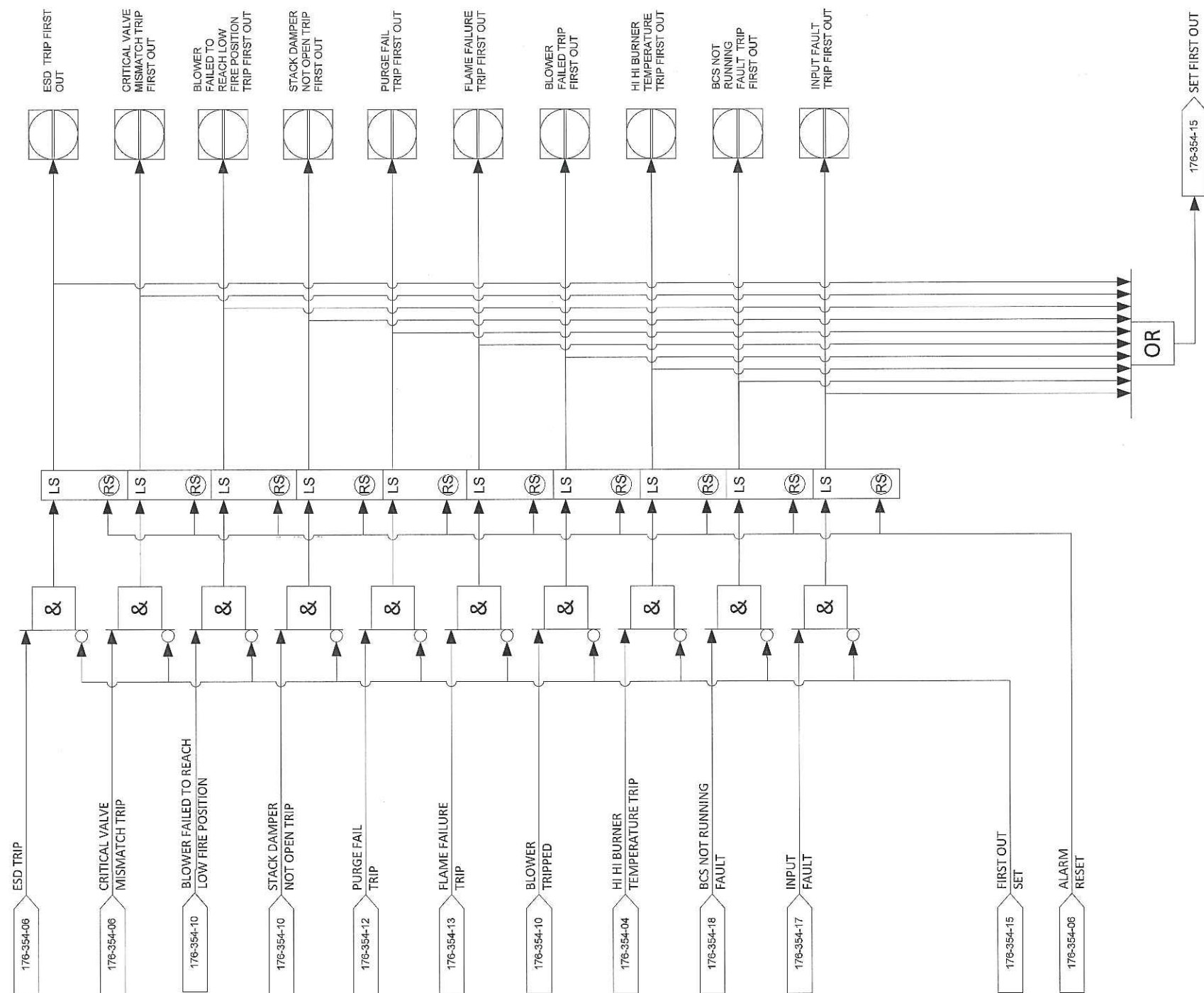
DOCUMENT NUMBER: 176-354-16

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: First Out Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

FIRST OUT TRIP LOGIC



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						



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FOR:			
STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
FIRST OUT			
LOGIC DIAGRAMS			
DWN. BY:	PR	DATE:	31-MAY-2012
JOB No:	176	SCALE:	NONE
DRAWING NO:		176-354-16	
REV.			0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DE 03	PKG-7000	Dh.	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

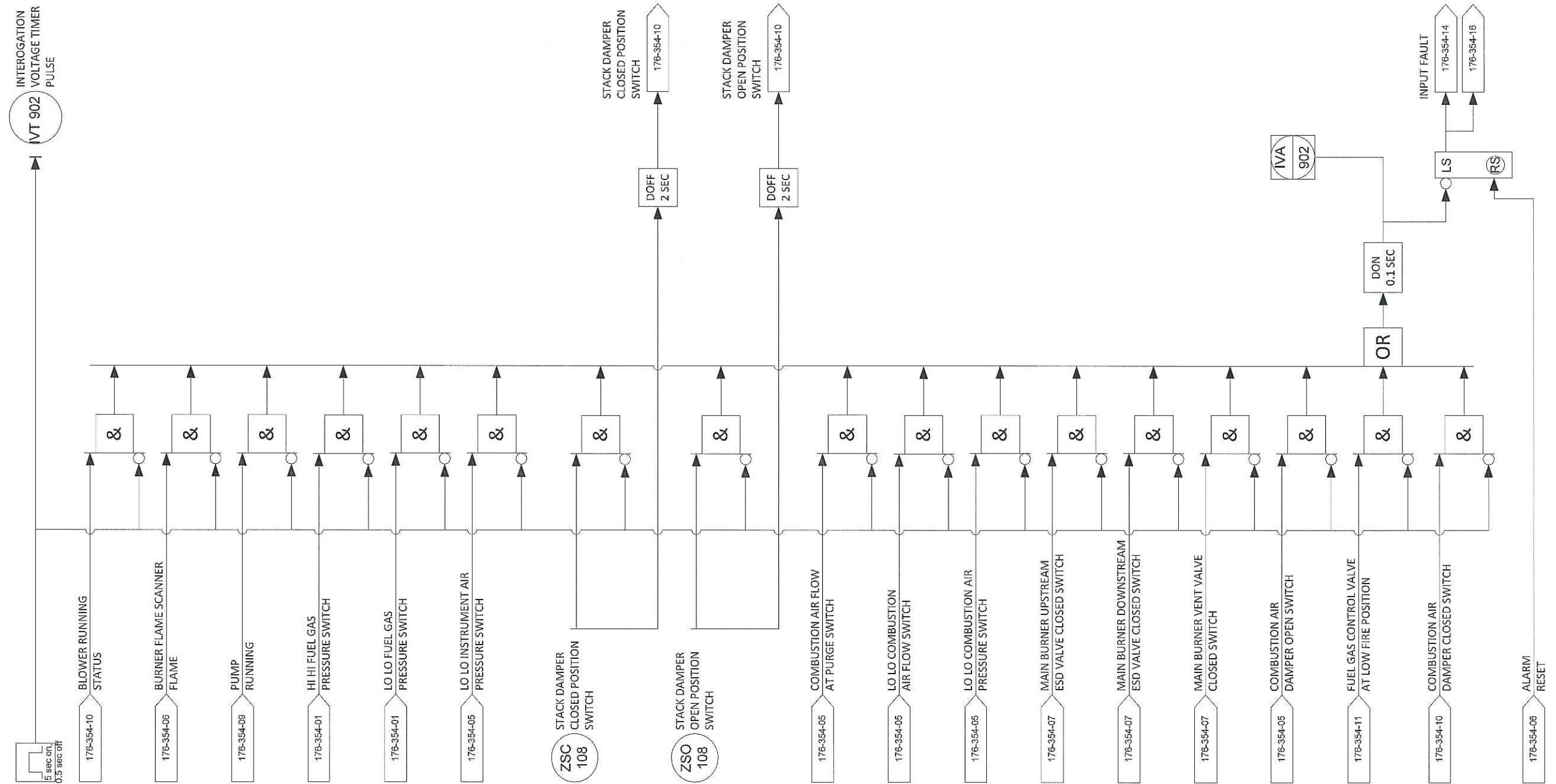
DOCUMENT NUMBER: 176-354-17

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Interogation Voltage & Input Check Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

INTEROGATION VOLTAGE IO CHECK



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
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FOR: STRUTHERS WELLS / MURPHY OIL					
VISTA PROJECTS OTSG 25 MBTU/hr					
INTEROGATION VOLTAGE & INPUT CHECK					
LOGIC DIAGRAMS					
DWN. BY:	PR	DATE:	31-MAY-2012	DRAWING NO.:	176-354-17
JOB No:	176	SCALE:	NONE		
					REV. 0



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DI 03	PKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

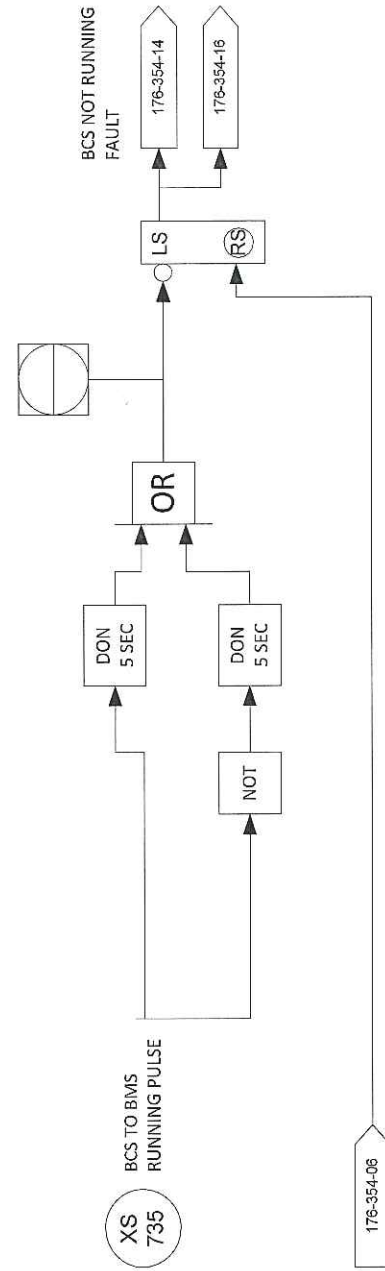
DOCUMENT NUMBER: 176-354-18

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: BCS Running & Steam Pressure Bypass Logic Diagrams

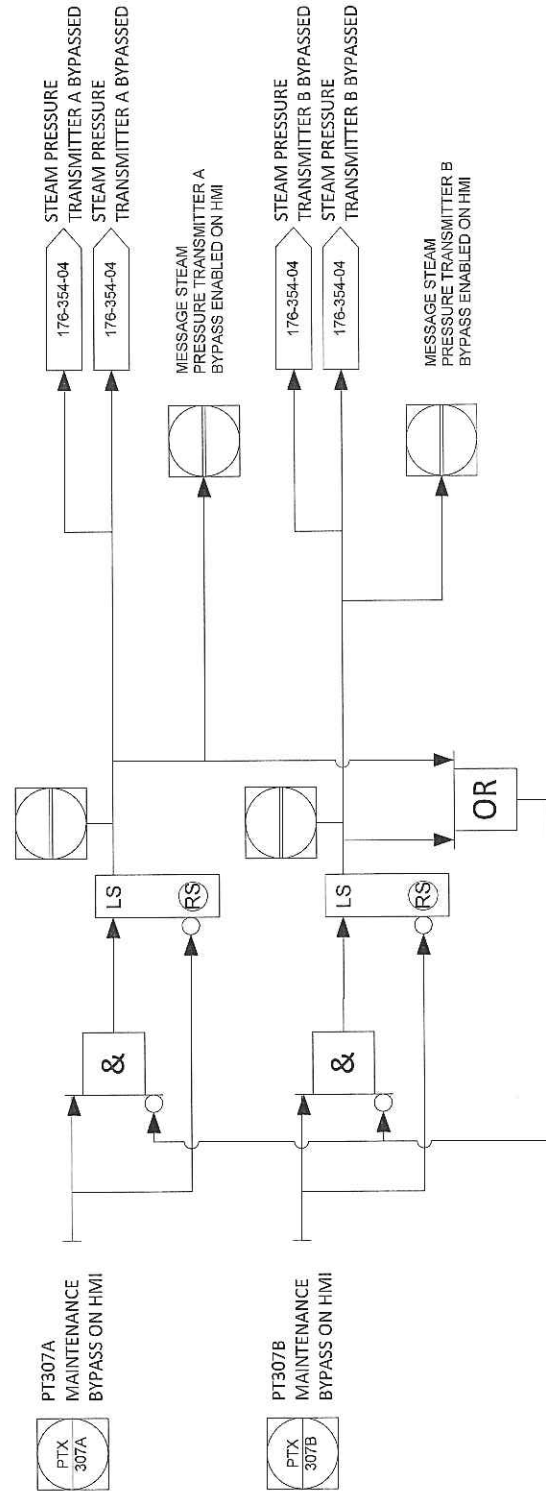
VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

BCS RUNNING CHECK LOGIC



NOTE 1: THE BCS SENDS A PULSE TO THE BMS, IF THE PULSE STOPS, THEN THE BMS WILL TRIP THE STEAM GENERATOR AND BURNER

STEAM PRESSURE TRANSMITTER BYPASS LOGIC



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
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FOR:			
STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
BCS RUNNING & STEAM PRESSURE BYPASS LOGIC DIAGRAMS			
DWN. BY:	PR	DATE:	31-MAY-2012
JOB No:	176	SCALE:	NONE
DRAWING NO:		176-354-18	
REV.			0



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG-7000	<i>DL</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

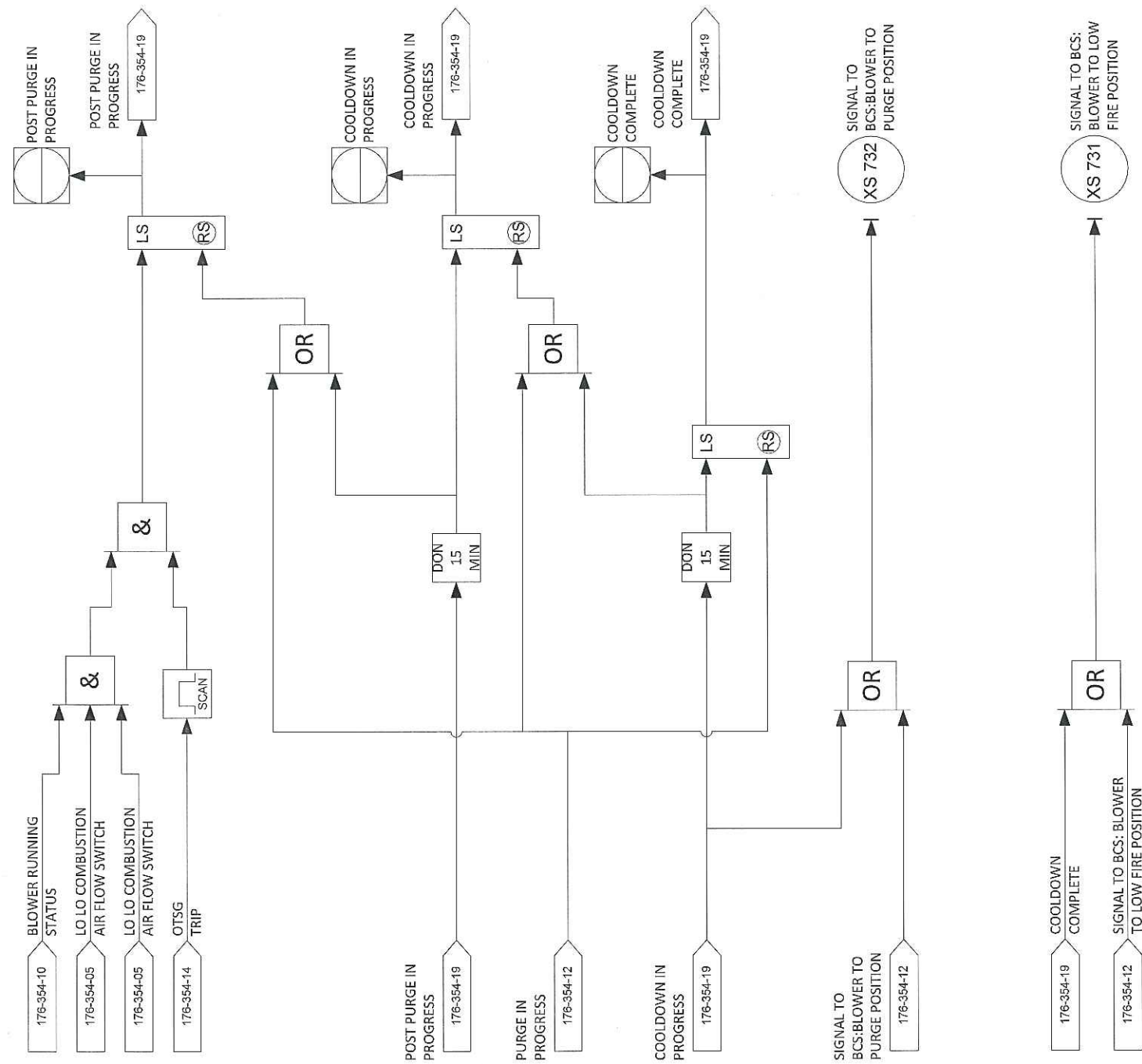
DOCUMENT NUMBER: 176-354-19

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Post Purge and Cooldown Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

POST PURGE & COOLDOWN LOGIC



NOTE 1:
 POST PURGE AND COOLDOWN HAPPENS WHENEVER THE OTSG IS TRIPPED, THE COMBUSTION AIR BLOWER WILL CONTINUE TO RUN, AND THE DAMPER WILL REMAIN IN ITS LAST POSITION. POST PURGE HAPPENS ONLY WHEN THE BLOWER IS STILL RUNNING. THE BLOWER ONLY STOPS DUE TO HARD WIRED TRIP OR THE OPERATOR TURNING IT OFF.

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr POST PURGE AND COOLDOWN LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO:	REV. 0
JOB No: 176	SCALE: NONE	176-354-19	



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DI 03	PKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780


















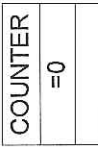
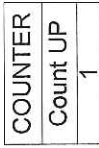
VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-354-20



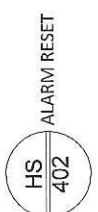
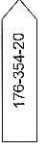

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Symbols and Identification for Logic Diagrams

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

Logic Symbols
 Logical OR
 Logical AND
 Reset dominant latch
 Delay On timer with duration indicated in block
 Pulse
 Greater than or equal to
 Greater than
 Less than
 Sum, counts the inputs that are true from discrete signals
 This symbol before any logic symbol inverts the signal
 Pulse train
 Addition (analog)
 Subtraction (analog)
 Absolute value (analog)
 Square root (analog)
 Multiplication (analog)
 Division (analog)
 Test that counter is 0
 Action: count up Result: 1

Indications
LL Low low alarm
L Low alarm
H High alarm
HH High high alarm
TT Timer timing
DN Timer down
LS Latch or Set
RS Reset
PTFI Pilot Trial For Ignition
MTFI Main Trial For Ignition

I/O symbols
 Analog or digital input from field instrumentation PROCESS FLOW TRANSMITTER PASS A FT 526A
 Digital output to Field instrumentation OUTLET TEMP. CONTROL VALVE B SOLENOID TY 524B
 Digital input from button located on the Local Control Panel ALARM RESET HS 402
 Sheet transfer 176-354-20
 Indication on HMI FA 526A

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	ISSUED FOR CONSTRUCTION	31-MAY-2012	PR	PR		
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL			
VISTA PROJECTS OTSG 25 MBTU/hr			
SYMBOLS AND IDENTIFICATIONS FOR LOGIC DIAGRAMS			
DWN. BY: PR	DATE: 31-MAY-2012	DRAWING NO:	REV. 0
JOB No: 176	SCALE: NONE	176-354-20	



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DM02	PKG 7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

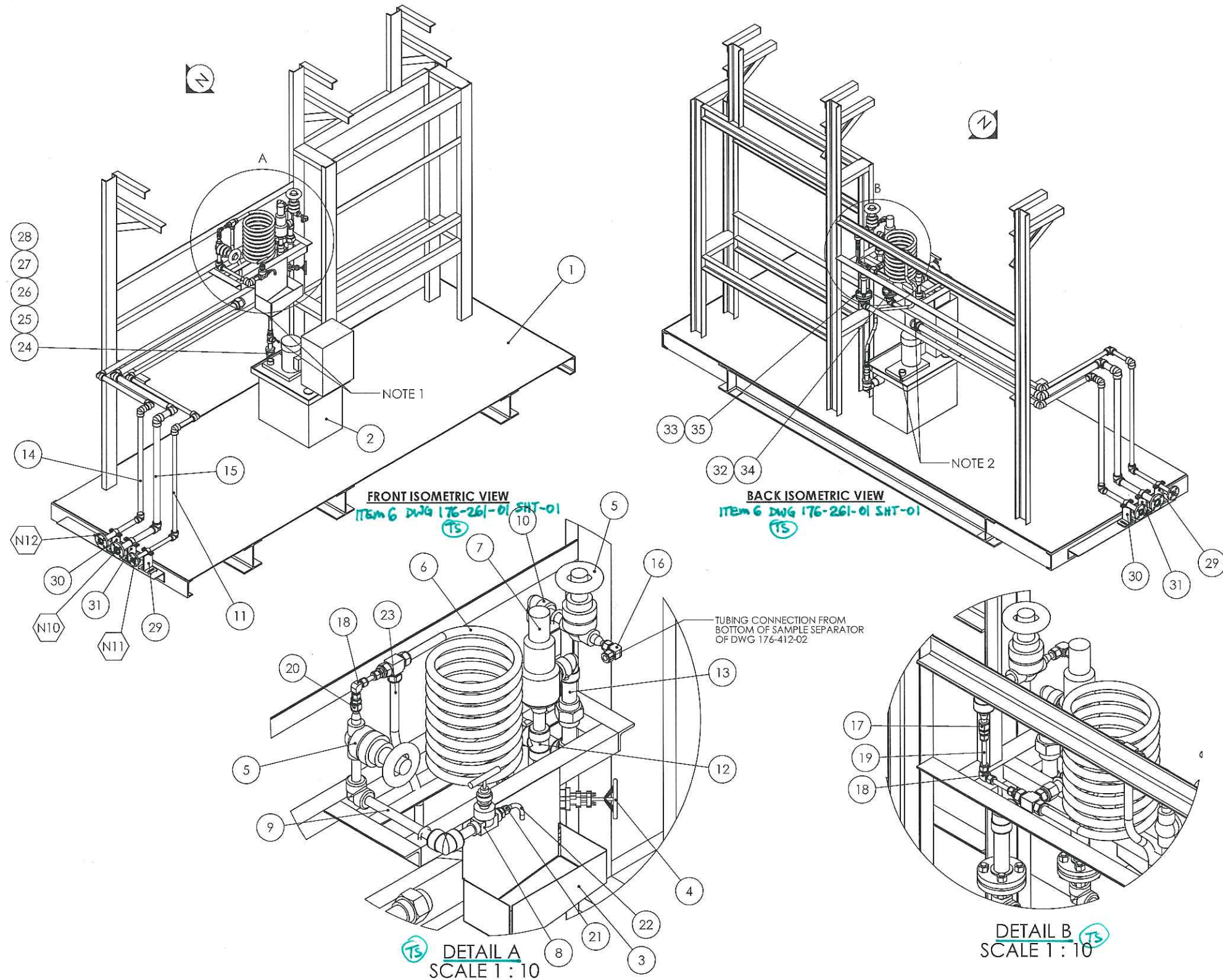
VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-402-01

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: Cooling Station General Assembly

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00



ITEM	MAKE	DESCRIPTION	QTY.	MATERIAL
1	-	OTSG SKID - SEE DWG 176-432-01 AND 176-432-03	1	-
2	SERFILCO	WATER COLLECTION TANK, C/W PUMP, HIGH LEVEL SWITCH	1	-
3	CUSTOM	SAMPLE COLLECTION SINK	1	316SS
4	NEWCO	3/4" CL800 SW GLOBE VALVE, P/N 285-FS2-NC	1	A105N
5	NEWCO	1/2" CL1500 SW GATE VALVE, P/N 115S-FS3-WB-RP-NC	2	A105N
6	NOR-WEST	COOLER, 3/4" OD X 0.065" WT OUTER TUBING FOR COOLING WATER, 3/8" OD X 0.049W INNER TUBING FOR SAMPLE WATER, ZINC PLATED COIL	1	A179
7	CROSBY	3/4"X1" RELIEF VALVE, SET AT 1500 KPAG, P/N 951101FD	1	316SS / A216 WCB
8	PGI	1/2" NEEDLE VALVE, B31.1 APPROVED, P/N PV-508-S6G	1	A105N
9	CSI	SPOOL 176-402-01-SP-01 SAMPLE OUTLET SPOOL	1	-
10	CSI	SPOOL 176-402-01-SP-02 SAMPLE INLET SPOOL	1	-
11	CSI	SPOOL 176-402-01-SP-03 COOLING WATER INLET SPOOL	1	-
12	CSI	SPOOL 176-402-01-SP-04 COOLING WATER RELIEF VALVE SPOOL	1	-
13	CSI	SPOOL 176-402-01-SP-05 RELIEF VALVE OUTLET SPOOL 1	1	-
14	CSI	SPOOL 176-402-01-SP-06 RELIEF VALVE OUTLET SPOOL 2	1	-
15	CSI	SPOOL 176-402-01-SP-07 DUNK TANK OUTLET SPOOL	1	-
16	-	1/2" TUBE 90° ELBOW	1	CS
17	-	1/2" TUBE X 3/8" TUBE UNION	1	CS
18	-	3/8" TUBE 90° ELBOW	2	CS
19	-	3/8" OD X 0.049W TUBING	1	CS
20	-	3/8" MALE TUBE X 3/8" TUBE 90° ELBOW	1	CS
21	-	3/8" TUBE x 1/2" MNPT STRAIGHT CONNECTOR	1	CS
22	-	3/8" OD X 0.049W TUBING, BENT TO SINK	1	CS
23	-	3/4" X 0.065" WT TUBING, BENT TO CONNECT TO TEE	1	CS
24	-	1 1/2" CL2000 90° NPT ELBOW	1	A105N
25	-	1 1/2" MNPT X 3/4" FNPT CL2000 HEX BUSHING	1	A105N
26	-	3/4" SCH. 80 SMLS PIPE NIPPLE, TBE	1	A106 Gr. B
27	-	3/4" CL2000 NPT TEE	1	A105N
28	-	3/4" TUBE X 3/4" MNPT STRAIGHT CONNECTOR	1	CS
29	CSI	LIGHT PIPE SHOE VERTICAL	1	A36
30	CSI	LIGHT PIPE SHOE VERTICAL	1	A36
31	CSI	LIGHT PIPE SHOE VERTICAL	1	A36
32	-	3/4" 304SS-FLEX GRAPH SWND CSOR CL150 B13.20 GASKET	1	304SS
33	-	1" 304SS-FLEX GRAPH SWND CSOR CL150 B13.20 GASKET	1	304SS
34	-	1/2" X 2.50" LONG A193 Gr. B7 STUD C/W 2X1/2" HVY HEX NUT A194 Gr. 2H	4	A193/A194
35	-	1/2" X 2.50" LONG A193 Gr. B7 STUD C/W 2X1/2" HVY HEX NUT A194 Gr. 2H	4	A193/A194

QC INSPECTORS APPROVAL	
PP NUMBER	
ABSA TRACKING NUMBER	2012-01099
SERIAL NUMBER	

- NOTES:**
- CONNECT SINK DRAIN TO 3/4" TEE USING GREENLINE HOSE
 - CONNECT PUMP OUTLET TO SPOOL 176-402-SP-07 USING GREENLINE HOSE
 - FOR STRUCTURAL DETAILS SEE DWG 176-432-03
 - FOR NOZZLE LIST SEE SHT-02
 - 1/2" X 0.065" WT TUBING TO BE RUN FROM SAMPLE SEPARATOR TO COOLING STATION ALONG SIDE OF OTSG, RUN LENGTH = ~60FT. TUBING WILL BE INSULATED AND HEAT TRACED
 - SPOOLS 176-402-01-SP-01, -02, AND -08 ARE PART OF THE ABSA REGISTRATION

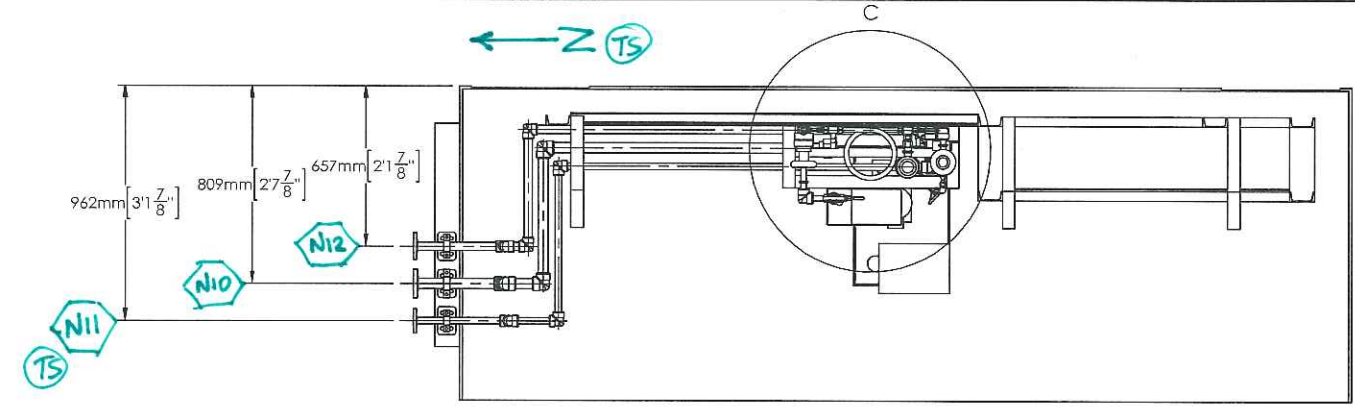
REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	29-MAY-2012	WA	WA	JS	JS
REVISIONS						



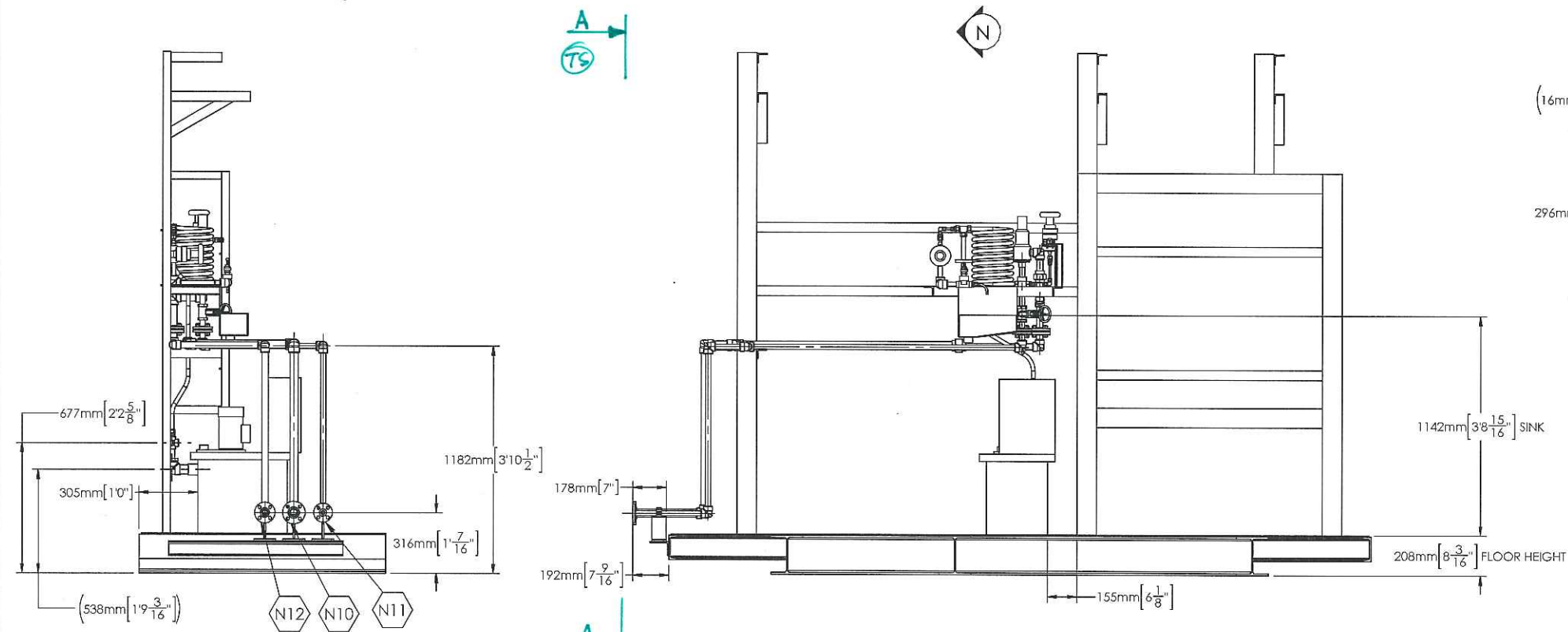

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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR COOLING STATION GENERAL ASSEMBLY		REV: 0
DWN. BY: WA	DATE: 5/29/2012	DRAWING NO. 176-402-01 SHT-01
CSI JOB NO. 176	SCALE: 1:30	

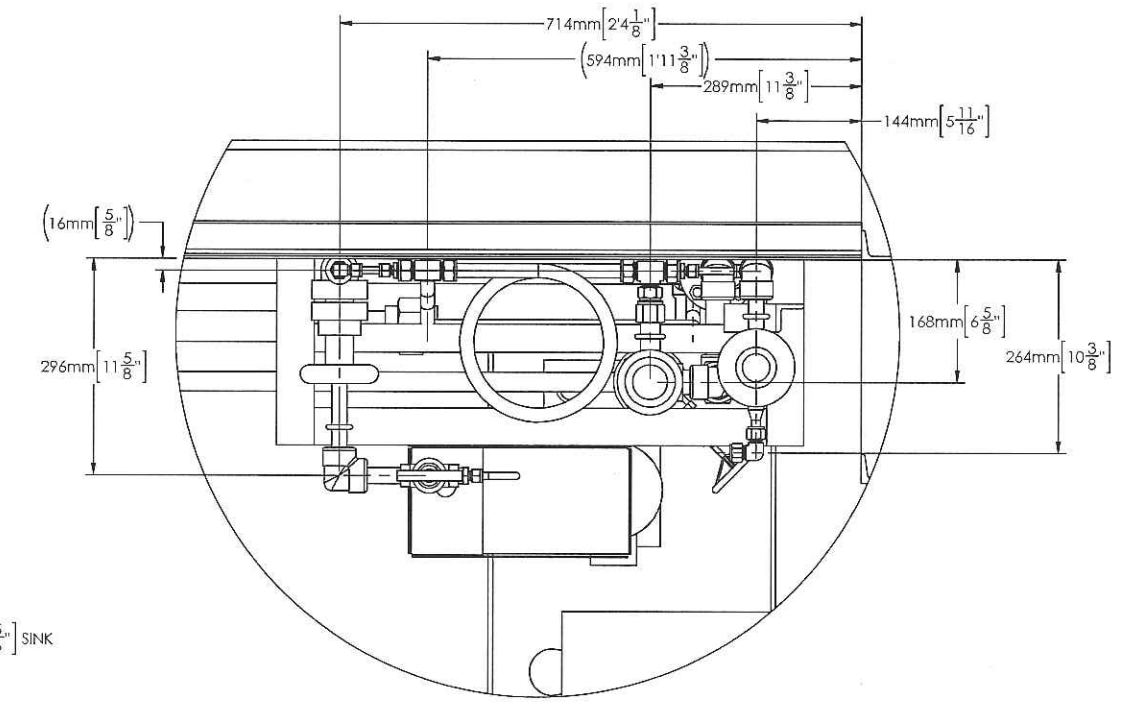
NOZZLE#	LINE SIZE	DESCRIPTION
N10	1 1/4" CL150RF	DUNK TANK OUTLET
N11	3/4" CL150RF	COOLING WATER INLET
N12	1" CL150RF	SAMPLE STATION PSV-302 OUTLET



PLAN TOP VIEW
TS



FRONT VIEW ELEVATION
TS



DETAIL C
SCALE 1:10

LEFT VIEW A-A
TS

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	29-MAY-2012	WA	WA	js	js
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR COOLING STATION GENERAL ASSEMBLY		REV: 0
DWN. BY: WA	DATE: 5/29/2012	DRAWING NO.
CSI JOB NO. 176	SCALE: 1:30	176-402-01 SHT-02



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DM02	PKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

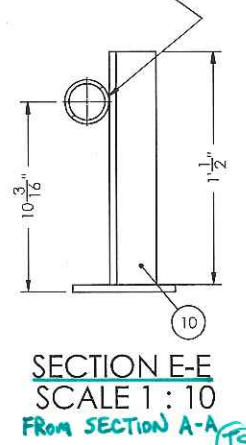
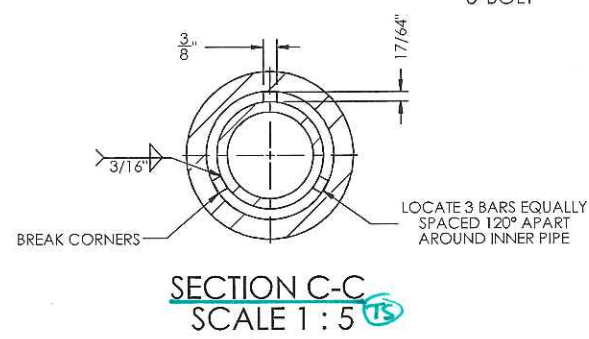
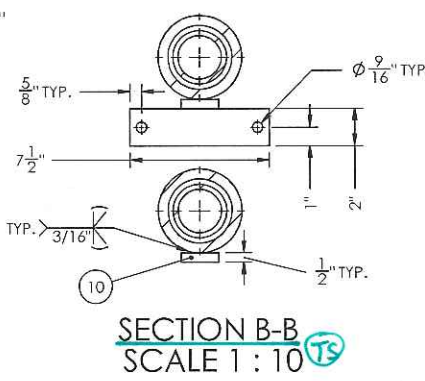
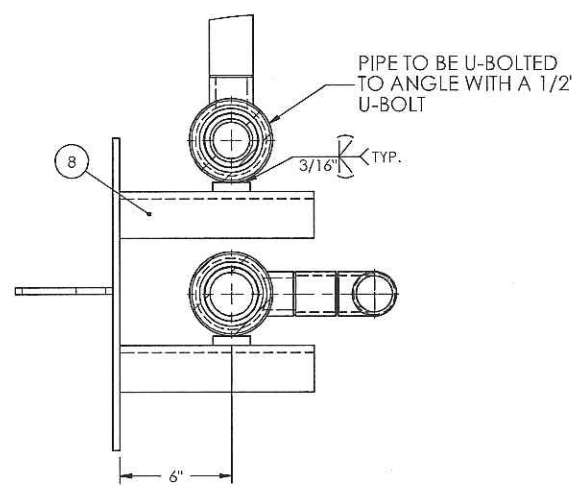
VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-411-03-1

VENDOR REVISION: 2

DOCUMENT DESCRIPTION: PKG-7000 Once Through Steam Generator BFW Preheater

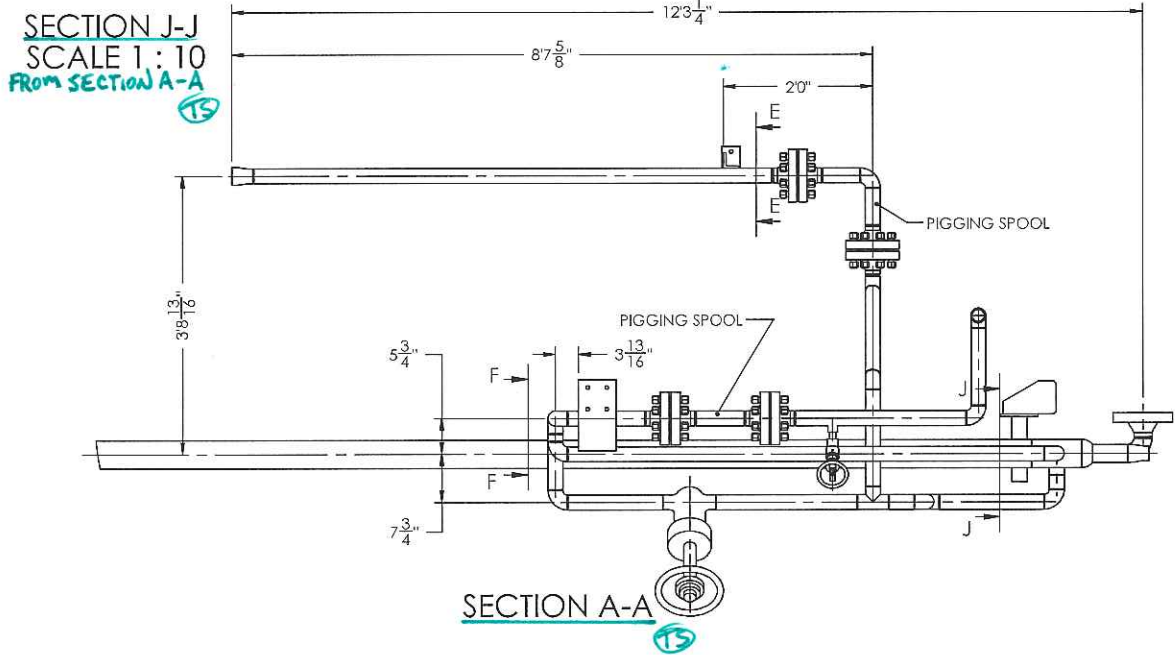
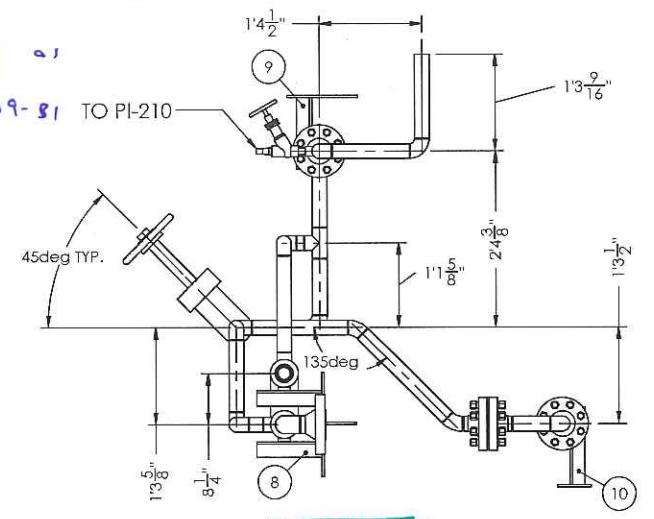
VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00



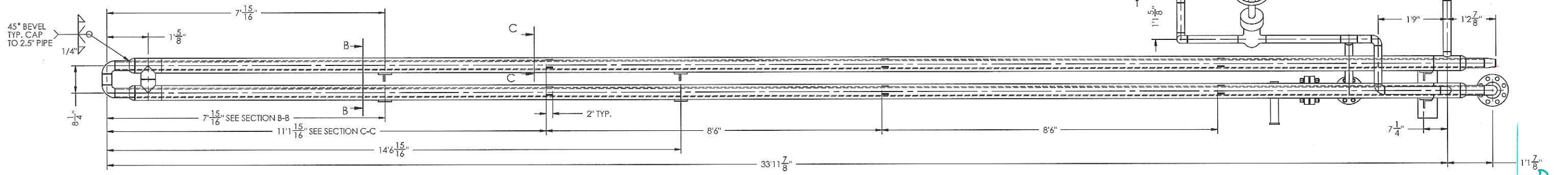
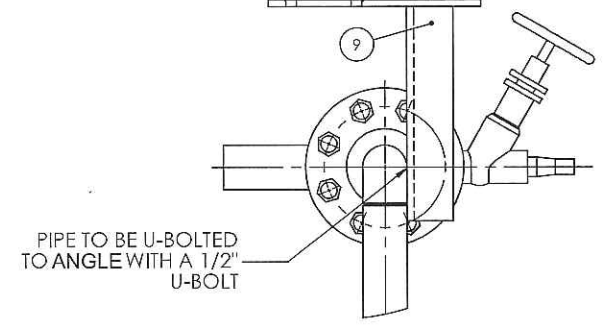
DESIGN DATA:
 CODE: ASME SECTION I
 PRESSURE: 2505 PSIG
 TEMPERATURE: 595 °F
 HYDROTEST PRESSURE: 3757.50 PSIG
 CORROSION ALLOWANCE: 0.0625"
 NDT: 10% RANDOM RADIOGRAPHY
 HEATING SURFACE AREA: 51.18 SQFT
 WELD GAP: 1/16 INCHES

NOTES:
 1. APPROXIMATE WEIGHT = 3000 LBS
 2. TOLERANCES ARE ±1/8" UNLESS OTHERWISE SPECIFIED
 3. SEE DWG 176-411-03-SP-03 SHT-03 AND 176-411-03 SHT-02 FOR PIPE SUPPORTS DETAILS
 4. PREHEATER PIPING TO BE INSULATED W/ 2" THICK MINERAL WOOL INSULATION AND CLAD WITH 0.025" ALUMINUM JACKET
 5. ALL PIPE AND FITTINGS TO COME WITH MTRS, FITTINGS TO COME WITH CRN#S FOR ALBERTA

Min 2541 psig (15v-202 set pressure) req'd.
 662°F (350°C) as per desⁿ T31109-81



FOR INNER BOLTS, DRILL & TAP I-BEAM AS INNER SPACE IS NOT ACCESSIBLE
 OUTER BOLTS TO BE BOLTED THROUGH I-BEAM



FRONT VIEW
 NOTE: HIDDEN LINES SHOWN FOR PIPE IN PIPE SECTION
 FROM 176-411-03 SHT-02

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
2	REVISED FOR CONSTRUCTION	10-MAY-2012	BB	WA	WA	JS
1	REVISED TO ADD BYPASS	7-MARCH-2012	WA	WA	JN	
0	FOR CONSTRUCTION	6-JAN-2012	WA	WA	JN	

FOR:	STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT:	1780
DESC:	PKG-7000 ONCE THROUGH STEAM GENERATOR BFW PREHEATER ASSEMBLY 1 OF 3		REV:	2
DWN. BY:	BB	DATE:	10/05/2012	DRAWING NO.
CSI JOB NO.	176	SCALE:	1:30	176-411-03 SHT-01



CODE SHEET

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Reviewed only as to general conformity with the design concept and specifications provided. The engineer does not warrant or represent that the information contained on this drawing/document is either accurate or complete. Sole responsibility for correct design, detail and dimensions shall remain with the party submitting the drawing/document.			
SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DM02	PKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

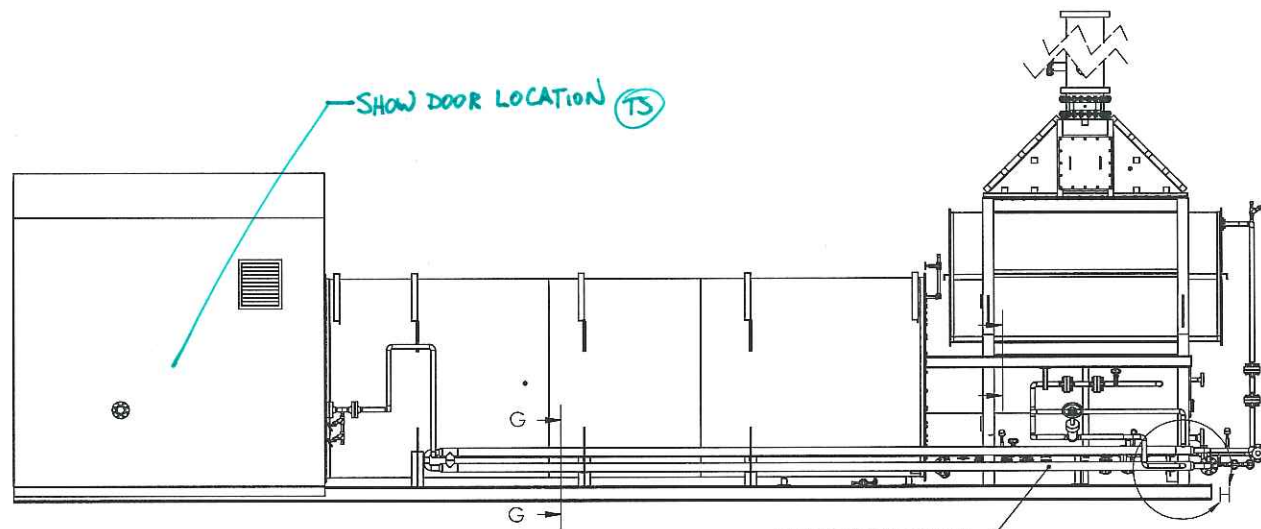
VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-411-03-2

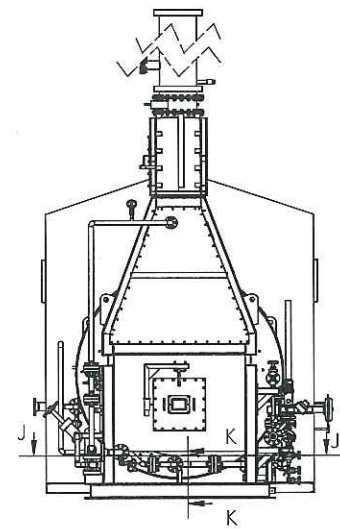
VENDOR REVISION: 2

DOCUMENT DESCRIPTION: PKG-7000 Once Through Steam Generator BFW Preheater

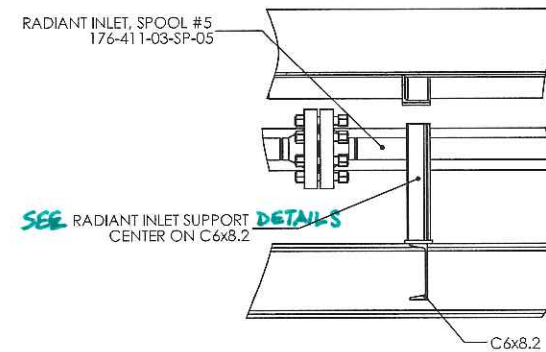
VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00



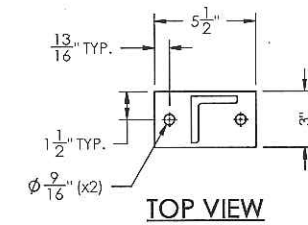
FRONT VIEW A-A
HEATER ASSEMBLY AND BFW PREHEATER ASSEMBLY
FROM 176-10B-01 SHT-05 (TS)
BFW PREHEATER ASSEMBLY
SEE FRONT VIEW
DWG 176-411-03 SHT-01



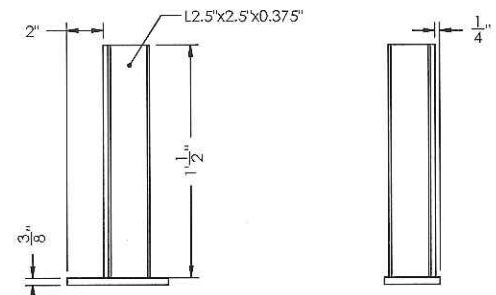
SIDE VIEW B-B
HEATER ASSEMBLY AND BFW PREHEATER ASSEMBLY
FROM 176-103-01 SHT-05 (TS)



SECTION K-K
SCALE 1:20



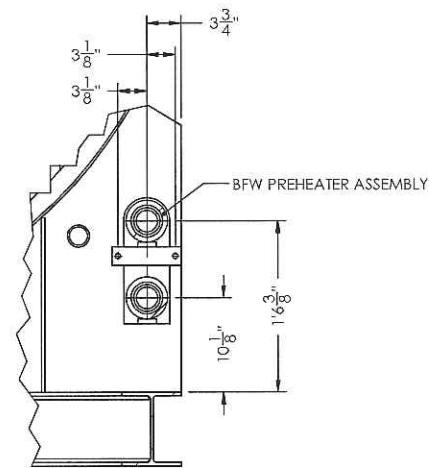
TOP VIEW



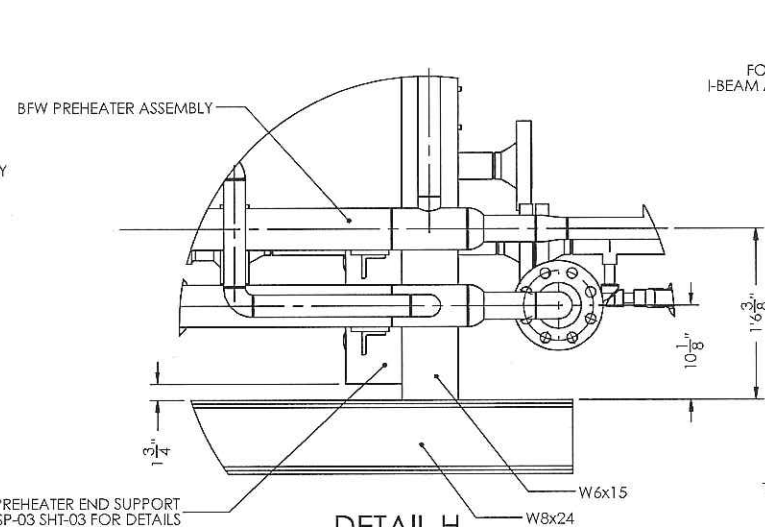
FRONT VIEW
SIDE VIEW
RADIANT INLET SUPPORT

RADIANT INLET SUPPORT DETAILS

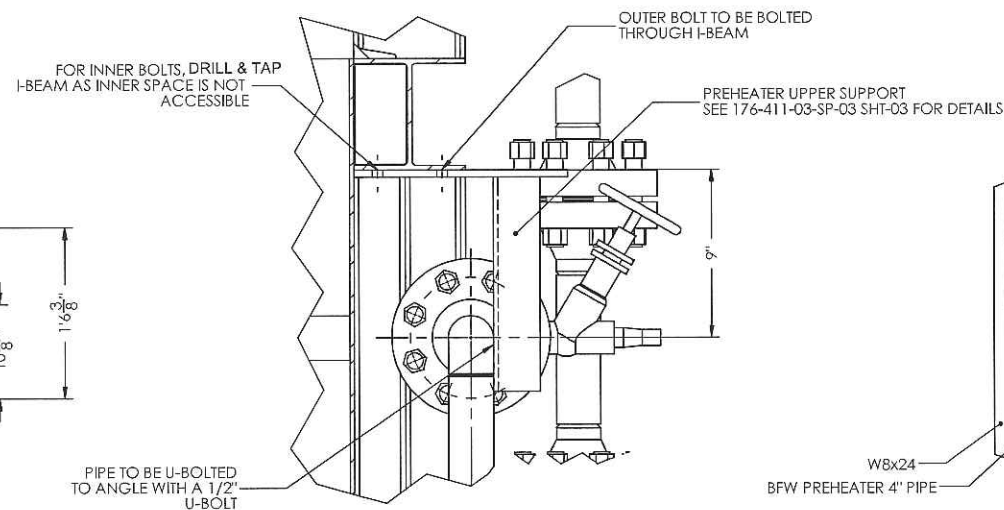
(TS)



SECTION G-G
SCALE 1:20

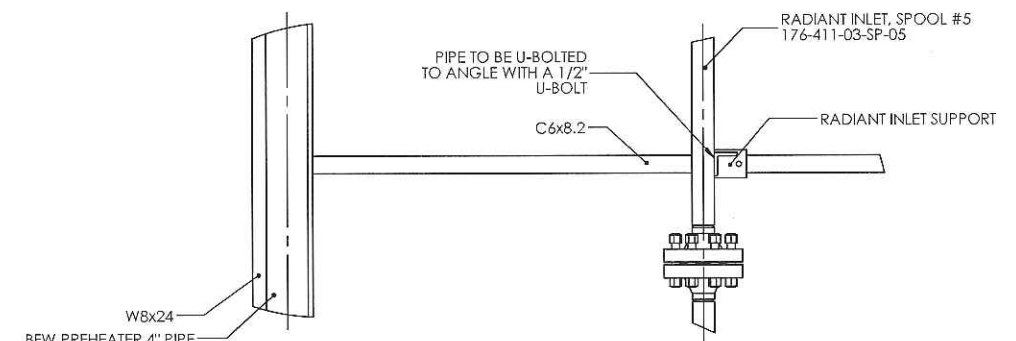


DETAIL H
SCALE 1:20



SECTION I-I
SCALE 1:10

CAN NOT FIND WHERE THIS SECTION IS TAKEN FROM (TS)



SECTION J-J
SCALE 1:20 (TS)

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
2	FOR CONSTRUCTION	10-MAY-2012	BB	NA	NA	JS
REVISIONS						



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FOR:	STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT:	1780
DESC:	PKG-7000 ONCE THROUGH STEAM GENERATOR BFW PREHEATER ASSEMBLY 2 OF 3		REV:	2
DWN. BY:	BB	DATE:	10/05/2012	DRAWING NO.
CSI JOB NO.	176	SCALE:	1:100	176-411-03 SHT-02



CODE SHEET

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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
	PKG-7000		JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

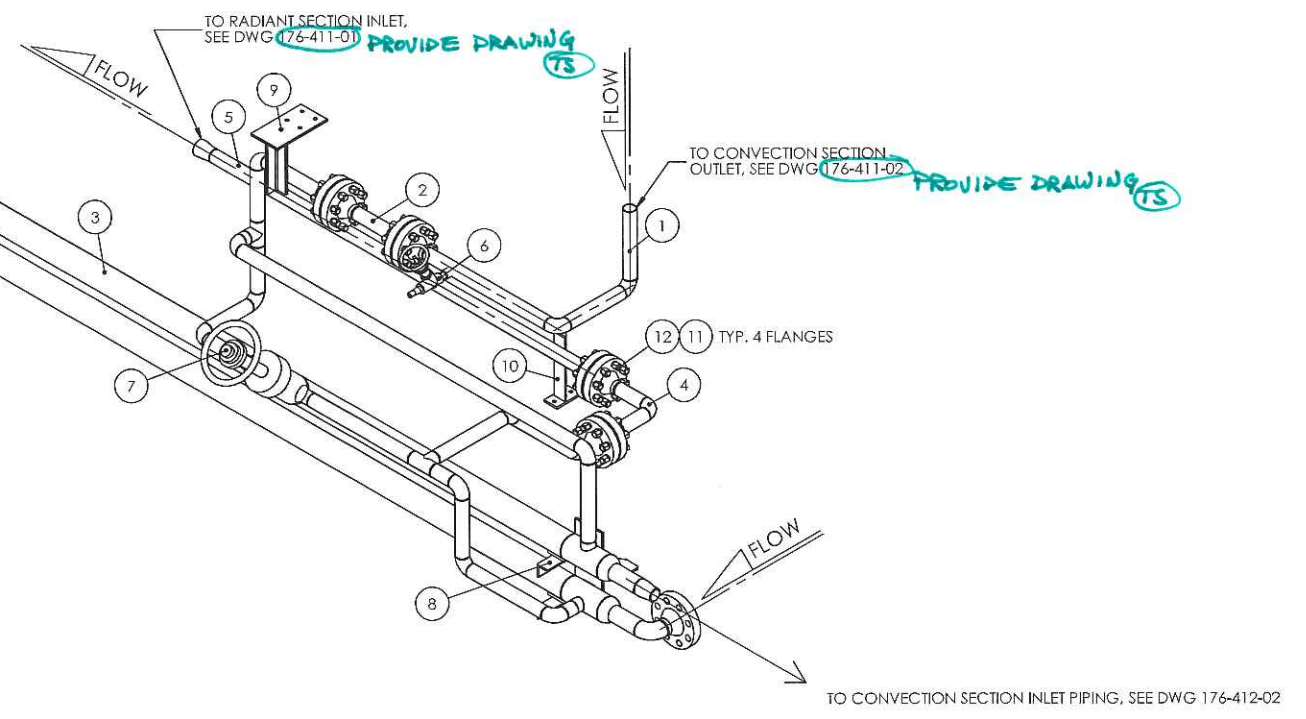
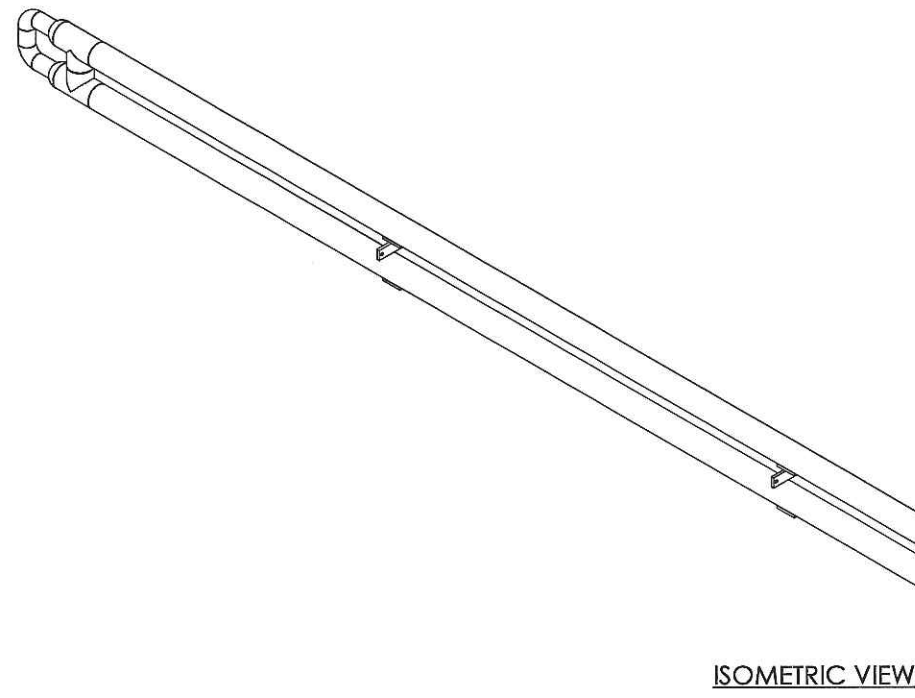
DOCUMENT NUMBER: 176-411-03-3

VENDOR REVISION: 2

DOCUMENT DESCRIPTION: PKG-7000 Once Through Steam Generator BFW Preheate

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

ITEM	MAKE	DESCRIPTION	QTY.	MATERIAL
1	CSI	176-411-03-SP-01	1	-
2	CSI	176-411-03-SP-02	1	-
3	CSI	176-411-03-SP-03	1	-
4	CSI	176-411-03-SP-04	10	-
5	CSI	176-411-03-SP-05	1	-
6	NEWCO	3/4" CL1690 SW Y-PATTERN GLOBE VALVE	1	SA105N
7	NEWCO	2" CL1500 BW GATE VALVE	1	SA216 Gr.WCB
8	CSI	PREHEATER END SUPPORT	1	A36
9	CSI	PREHEATER UPPER SUPPORT	1	A36
10	CSI	PREHEATER INLET SUPPORT	1	A36
11	-	2" 304SS-FLEX GRAPH S-WND CSOR CL 1500 B13.20 GASKET c/w 304SS INNER RING AND WIRE	4	304SS
12	-	7/8" x 5.75" A193 Gr.B7 STUD C/W 2 x 7/8" HVY HEX NUT A194 GR.2H	32	A193/A194



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
2	FOR CONSTRUCTION	10-MAY-2012	BB	XA	XA	JS
REVISIONS						



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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR BFW PREHEATER ASSEMBLY 3 OF 3		REV: 2
DWN. BY: BB	DATE: 10/05/2012	DRAWING NO. 176-411-03 SHT-03
CSI JOB NO. 176	SCALE: 1:30	



CODE SHEET

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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DM02	PKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-412-01

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: PKG-7000 Once Through Steam Generator Feedwater Isc

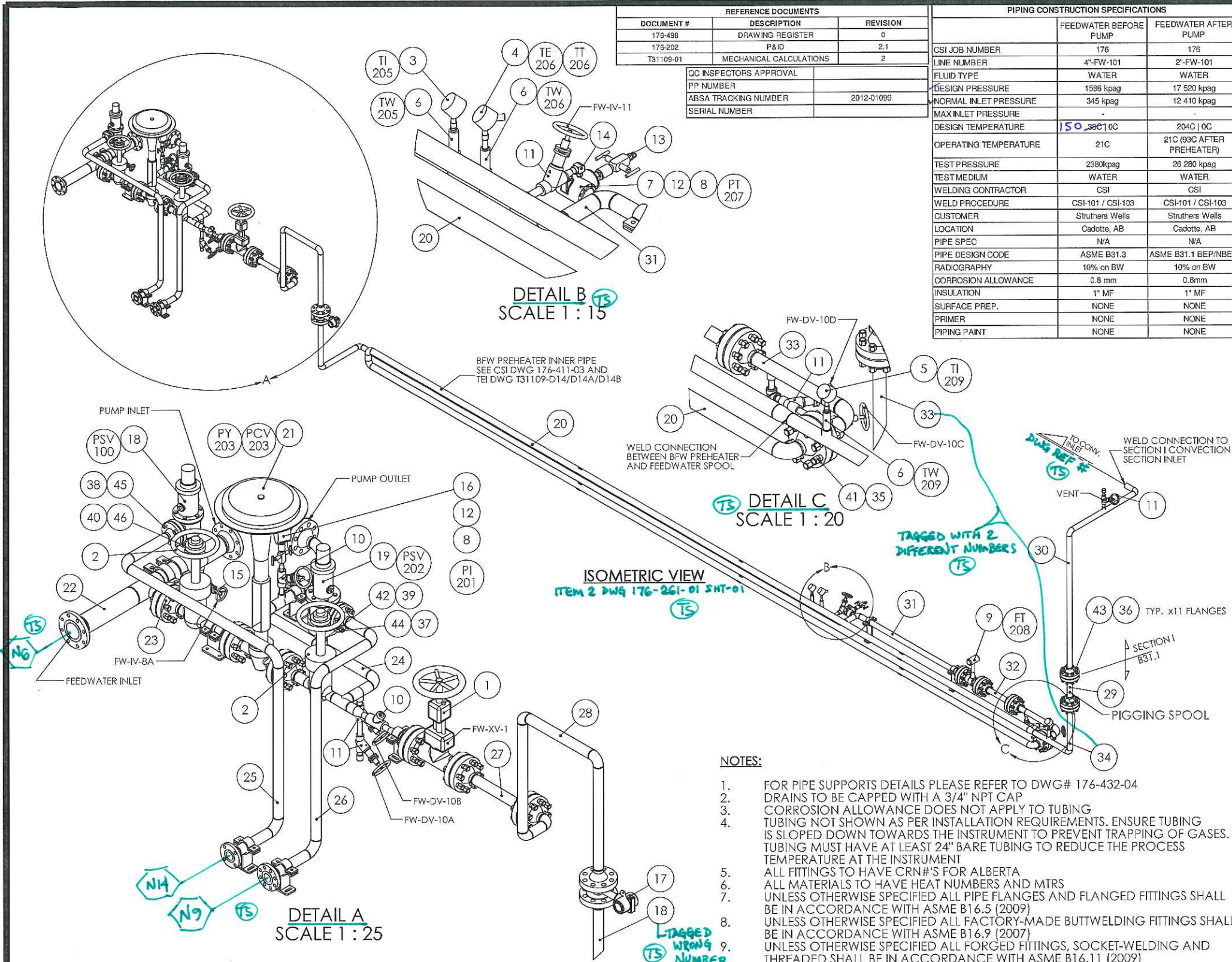
VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

REFERENCE DOCUMENTS		
DOCUMENT #	DESCRIPTION	REVISION
176-498	DRAWING REGISTER	0
176-202	P&ID	2.1
T31109-01	MECHANICAL CALCULATIONS	2

QC INSPECTORS APPROVAL	
PP NUMBER	
ABSA TRACKING NUMBER	2012-01099
SERIAL NUMBER	

	PIPING CONSTRUCTION SPECIFICATIONS	
	FEEDWATER BEFORE PUMP	FEEDWATER AFTER PUMP
CSI JOB NUMBER	176	176
LINE NUMBER	4"-FW-101	2"-FW-101
FLUID TYPE	WATER	WATER
DESIGN PRESSURE	1586 kpag	17 520 kpag
NORMAL INLET PRESSURE	345 kpag	12 410 kpag
MAX INLET PRESSURE	-	-
DESIGN TEMPERATURE	150 °C	204C 0C
OPERATING TEMPERATURE	21C	21C (93C AFTER PREHEATER)
TEST PRESSURE	2380 kpag	26 280 kpag
TEST MEDIUM	WATER	WATER
WELDING CONTRACTOR	CSI	CSI
WELD PROCEDURE	CSI-101 / CSI-103	CSI-101 / CSI-103
CUSTOMER	Struthers Wells	Struthers Wells
LOCATION	Cadotte, AB	Cadotte, AB
PIPE SPEC	N/A	N/A
PIPE DESIGN CODE	ASME B31.3	ASME B31.1 BEP/NBEP
RADIOGRAPHY	10% on BW	10% on BW
CORROSION ALLOWANCE	0.8 mm	0.8mm
INSULATION	1" MF	1" MF
SURFACE PREP.	NONE	NONE
PRIMER	NONE	NONE
PIPING PAINT	NONE	NONE

ITEM	MAKE	DESCRIPTION	QTY	MATERIAL
1	NEWCO	GATE VALVE, 2" CL1500 RF, m/n 115F-CB3-PS	1	SA105N
2	NEWCO	GATE VALVE, 2" CL1500 BW, m/n 115W-CB3-PS	2	SA105N
3	WIKA	TEMPERATURE GAUGE, 1/2" MNPT, 5" DIAL, m/n TL52, 50-500°F/C	1	304SS
4	WIKA	RTD ASSEMBLY, 1/2" MNPT PROCESS, 3/4" CONDUIT CONNECTION, EZ#55387071	1	ALUMINUM CASE
5	WIKA	TEMPERATURE GAUGE, 1/2" MNPT, m/n TL52, 5" DIAL, 150-750°F/C	1	304SS
6	WIKA	THERMOWELL, 1" SW PROCESS, 1/2" FNPT INSTRUMENT, EZ#55387357, U=2", FOR 6" PROBE	3	SA105N
7	FOXBORO	PRESSURE TRANSMITTER, 1/2" MNPT, m/n IGP10-T22E1C	1	316SS ELEMENT
8	PGI	MANIFOLD, 1/2" MNPT X 1/2" FNPT, m/n PV-614-S6G-P9	2	316SS
9	FOXBORO	VORTEX TRANSMITTER, 2" CL1500 RF, m/n 84F-T02R9SSTNM	1	316SS / CF8M
10	NEWCO	Y-PATTERN SPRING LOADED PISTON CHECK VALVE, 1" CL1500 SW, m/n 415S-FS3-WB-Y	1	SA105N
11	NEWCO	Y-PATTERN GLOBE VALVE, 3/4" CL1690 SW, m/n 216S-FS3-WB-Y	1	SA105N
12	-	1/2" CL6000 NPT FULL COUPLING	2	SA105N
13	-	1/2" TUBE X 1/2" MNPT STRAIGHT TUBE FITTING	1	CARBON STEEL
14	-	1/2" TUBE X 1/2" MNPT 90° TUBE FITTING	1	CARBON STEEL
15	NEWCO	3/4" CL800 SW X NPT, GATE VALVE	1	SA105N
16	WIKA	PRESSURE GAUGE, 1/2" MNPT, m/n 233.34, 0-21000 kpag	1	316SS/PHENOL
17	CAMERON	TURBINE METER, 2" CL1500 WAFER	1	316SS
18	CROSBY	PRESSURE RELIEF VALVE, 1" CL1500 RF X 2" CL150 RF, m/n 1D2 JLT-JOS-E-15-J, SET AT 1585 kpag	1	SA216 Gr.WCC / 316SS
19	CROSBY	PRESSURE RELIEF VALVE, 1.5" CL1500 RF X 2" CL300 RF, m/n 1.5D2 JLT-JOS-E-65-J, SET AT 17520 kpag	1	SA216 Gr.WCC / 316SS
20	CSI	BFW PREHEATER INNER PIPE ASSEMBLY - SEE CSI DWG 176-411-03 AND TEI DWG T31109-D14/D14A/D14B	1	-
21	DYNA-FLO	2" CL1500RF, m/n 392-2C2J-W3X-XP, c/w SIEMENS 6DR5210-0BN00-0AA3 POSITIONER AND BELGAS P050 AIR REGULATOR	1	WCC BODY
22	CSI	SPOOL 176-412-01-SP-01	1	-
23	CSI	SPOOL 176-412-01-SP-02	1	-
24	CSI	SPOOL 176-412-01-SP-03	1	-
25	CSI	SPOOL 176-412-01-SP-04	1	-
26	CSI	SPOOL 176-412-01-SP-05	1	-
27	CSI	SPOOL 176-412-01-SP-06	1	-
28	CSI	SPOOL 176-412-01-SP-07	1	-
29	CSI	SPOOL 176-412-01-SP-08	1	-
30	CSI	SPOOL 176-412-01-SP-09	1	-
31	CSI	SPOOL 176-412-01-SP-10	1	-
32	CSI	SPOOL 176-412-01-SP-11	1	-
33	CSI	SPOOL 176-412-01-SP-12	1	-
34	CSI	SPOOL 176-412-01-SP-13	1	-
35	-	2.5" 304SS-FLEX GRAPH S-WND CSOR CL1500 B13.20 GASKET, C/W CS INNER AND OUTER RING	1	304SS
36	-	2" 304SS-FLEX GRAPH S-WND CSOR CL1500 B13.20 GASKET, C/W CS INNER AND OUTER RING	11	304SS
37	-	2" 304SS-FLEX GRAPH S-WND CSOR CL300 B13.20 GASKET, C/W CS INNER AND OUTER RING	1	304SS
38	-	2" 304SS-FLEX GRAPH S-WND CSOR CL150 B13.20 GASKET, C/W CS INNER AND OUTER RING	1	304SS
39	-	1.5" 304SS-FLEX GRAPH S-WND CSOR CL1500 B13.20 GASKET, C/W CS INNER AND OUTER RING	1	304SS
40	-	1" 304SS-FLEX GRAPH S-WND CSOR CL150 B13.20 GASKET, C/W CS INNER AND OUTER RING	1	304SS
41	-	1" x 6.25" LONG A193 Gr. B7 STUD C/W 2 x 1" HVY HEX NUT A194 Gr. 2H	8	A193/A194
42	-	1" x 5.50" LONG A193 Gr. B7 STUD C/W 2 x 1" HVY HEX NUT A194 Gr. 2H	4	A193/A194
43	-	7/8" x 5.75" LONG A193 Gr. B7 STUD C/W 2 x 7/8" HVY HEX NUT A194 Gr. 2H	88	A193/A194
44	-	5/8" x 3.50" LONG A193 Gr. B7 STUD C/W 2 x 5/8" HVY HEX NUT A194 Gr. 2H	8	A193/A194
45	-	5/8" x 3.25" LONG A193 Gr. B7 STUD C/W 2 x 5/8" HVY HEX NUT A194 Gr. 2H	4	A193/A194
46	-	1/2" x 3.50" LONG A193 Gr. B7 STUD C/W 2 x 1/2" HVY HEX NUT A194 Gr. 2H	4	A193/A194

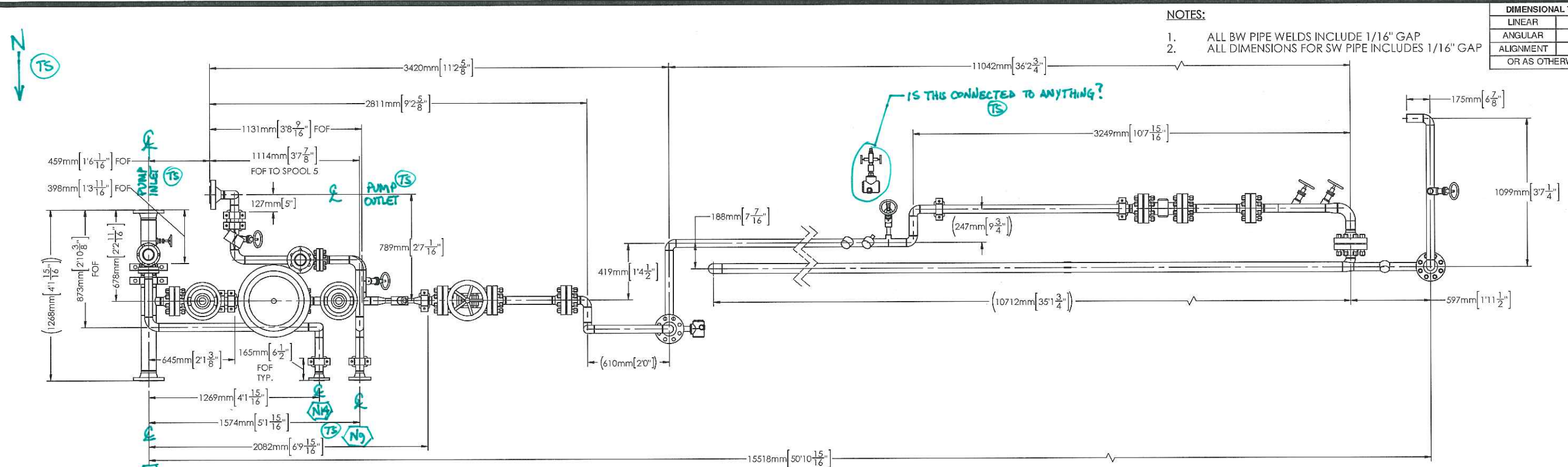


- NOTES:**
- FOR PIPE SUPPORTS DETAILS PLEASE REFER TO DWG# 176-432-04
 - DRAINS TO BE CAPPED WITH A 3/4" NPT CAP
 - CORROSION ALLOWANCE DOES NOT APPLY TO TUBING
 - TUBING NOT SHOWN AS PER INSTALLATION REQUIREMENTS. ENSURE TUBING IS SLOPED DOWN TOWARDS THE INSTRUMENT TO PREVENT TRAPPING OF GASES. TUBING MUST HAVE AT LEAST 24" BARE TUBING TO REDUCE THE PROCESS TEMPERATURE AT THE INSTRUMENT
 - ALL FITTINGS TO HAVE CRN#'S FOR ALBERTA
 - ALL MATERIALS TO HAVE HEAT NUMBERS AND MTRS
 - UNLESS OTHERWISE SPECIFIED ALL PIPE FLANGES AND FLANGED FITTINGS SHALL BE IN ACCORDANCE WITH ASME B16.5 (2009)
 - UNLESS OTHERWISE SPECIFIED ALL FACTORY-MADE BUTTWELDING FITTINGS SHALL BE IN ACCORDANCE WITH ASME B16.9 (2007)
 - UNLESS OTHERWISE SPECIFIED ALL FORGED FITTINGS, SOCKET-WELDING AND THREADED SHALL BE IN ACCORDANCE WITH ASME B16.11 (2009)

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	29-MAY-2012				

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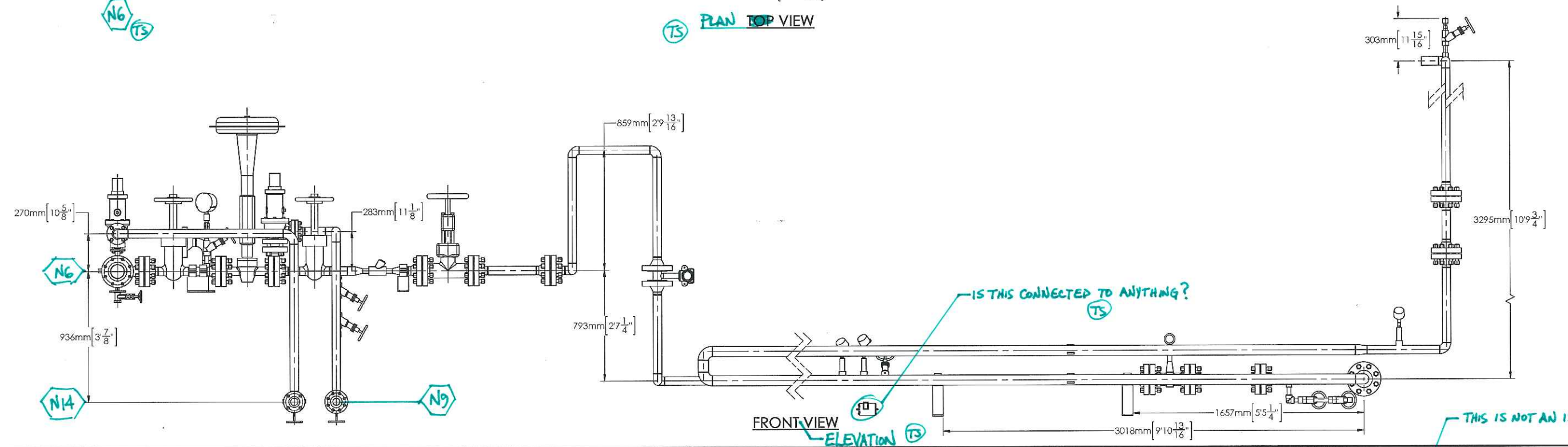
FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR FEEDWATER ISOMETRIC 1 OF 2		REV: 0
DWN. BY: BB	DATE: 29/05/2012	DRAWING NO. 176-412-01 SHT-01
CSI JOB NO. 176	SCALE: 1:50	



- NOTES:
1. ALL BW PIPE WELDS INCLUDE 1/16" GAP
 2. ALL DIMENSIONS FOR SW PIPE INCLUDES 1/16" GAP

DIMENSIONAL TOLERANCES	
LINEAR	±1/8"
ANGULAR	±5.0°
ALIGNMENT	±1/8"
OR AS OTHERWISE SHOWN	

TS PLAN TOP VIEW



FRONT VIEW ELEVATION TS

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	FOR CONSTRUCTION	29-MAY-2012	BB	JA	JA	JS

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FOR: STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT: 1780
DESC: PKG-7000 ONCE THROUGH STEAM GENERATOR FEEDWATER ISOMETRIC 2 OF 2		REV: 0
DWN. BY: BB	DATE: 29/05/2012	DRAWING NO. 176-412-01 SHT-02
CSI JOB NO. 176	SCALE: 1:50	



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SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DM02	PKG-7000	DL	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-412-02-1

VENDOR REVISION: 0

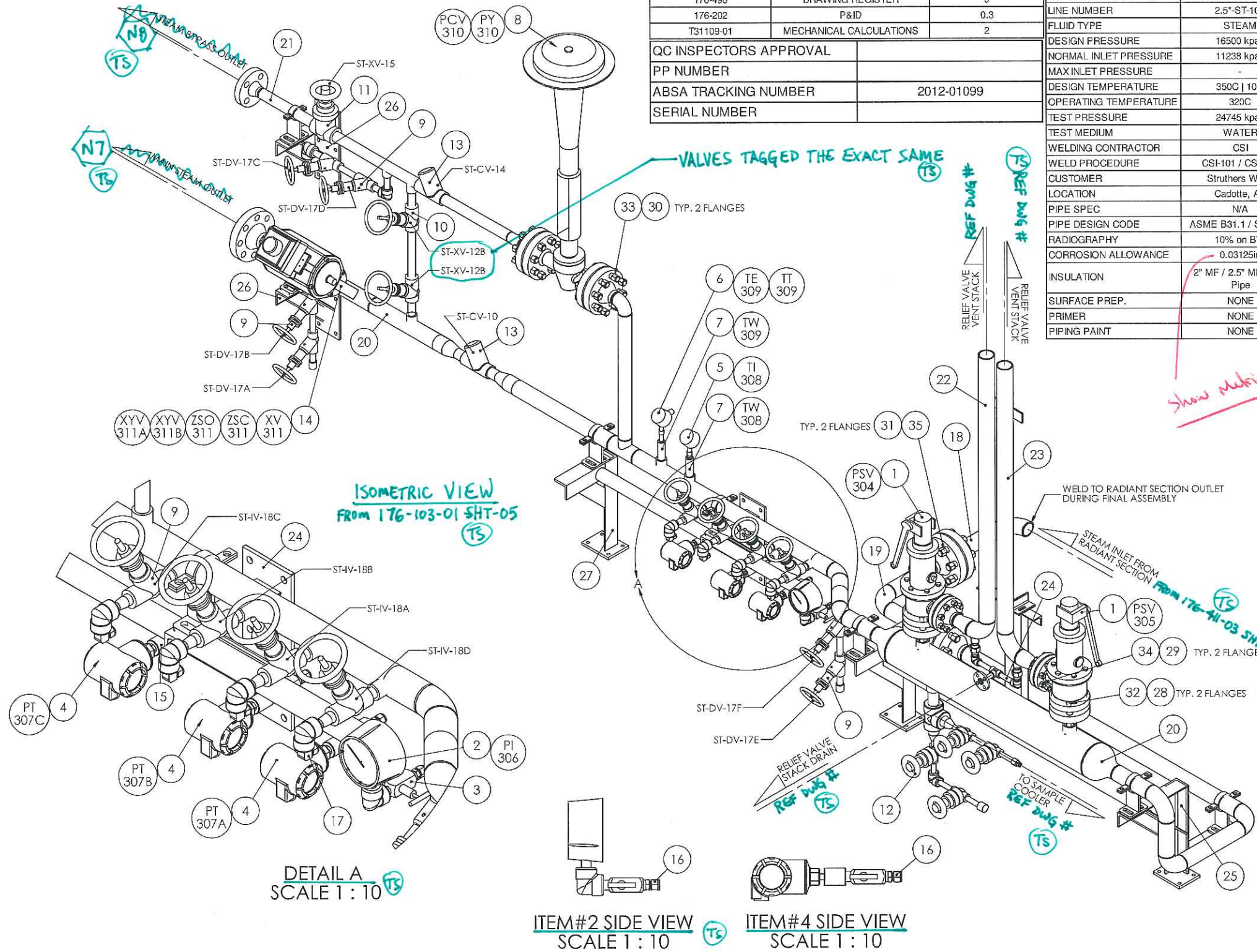
DOCUMENT DESCRIPTION: PKG-7000 Once Through Steam Generator Steam Isomet

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

REFERENCE DOCUMENTS		
DOCUMENT #	DESCRIPTION	REVISION
176-498	DRAWING REGISTER	0
176-202	P&ID	0.3
T31109-01	MECHANICAL CALCULATIONS	2

QC INSPECTORS APPROVAL	
PP NUMBER	
ABSA TRACKING NUMBER	2012-01099
SERIAL NUMBER	

PIPING CONSTRUCTION SPECIFICATIONS		ITEM	MAKE	DESCRIPTION	QTY.	MATERIAL
STEAM SERVICE	176	1	CONSOLIDATED	PRESSURE RELIEF VALVE, 1.5" CL1500 RF x 2" CL300 RF, m/n 1916-00D-P1-5-CC-3-RF-SS, PSV-305 SET AT 13445 kpag, PSV-306 SET AT 13100 kpag	2	SA216 Gr. WCC / 316SS
LINE NUMBER	2.5"-ST-101	2	WIKA	PRESSURE GAUGE 3/4" SW 233.34, 0-21000 kpag	1	316SS / PHENOL
FLUID TYPE	STEAM	3	PGI	MANIFOLD, 1/2" MNPT X 1/2" FNPT, m/n PV-614-S6G-P9	4	316SS
DESIGN PRESSURE	16500 kpag	4	FOXBORO	PRESSURE TRANSMITTER, 1/2" MNPT, m/n IGP10-T22E1C	3	316SS ELEMENT
NORMAL INLET PRESSURE	11238 kpag	5	WIKA	TEMPERATURE GAUGE, 1/2" MNPT, 5" DIAL, m/n TI.52, 150-750°F/C	1	304SS
MAX INLET PRESSURE	-	6	WIKA	RTD ASSEMBLY, 1/2" MNPT INSTRUMENT, 3/4" CONDUIT CONNECTION, EZ#55387080	1	ALUMINIUM CASE
DESIGN TEMPERATURE	350C 10C	7	WIKA	THERMOWELL, 1" SW PROCESS, 1/2" FNPT INSTRUMENT, EZ#55387357, U= 2", FOR 6" PROBE	2	SA105N
OPERATING TEMPERATURE	320C	8	DYNA-FLO	CONTROL VALVE, 2" CL1500 RF, m/n 391-2CF-W2N-MG, C/W SIEMENS 6DR5210-0EN00-0AA3 POSITIONER AND BELGAS P050 AIR REGULATOR	1	WCC BODY
TEST PRESSURE	24745 kpag	9	NEWCO	Y-PATTERN GLOBE VALVE, 3/4" CL1690 SW, m/n 216S-FS3-WB-Y	10	SA105N
TEST MEDIUM	WATER	10	NEWCO	Y-PATTERN GLOBE VALVE, 1" CL1690 SW, m/n 216S-FS3-WB-Y	2	SA105N
WELDING CONTRACTOR	CSI	11	NEWCO	WELDED BONNET GATE VALVE, 1.5" CL1500 SW, m/n 115S-FS3-WB-RP	1	SA105N
WELD PROCEDURE	CSI-101 / CSI-103	12	NEWCO	WELDED BONNET GATE VALVE, 1/2" CL1500 SW, m/n 115S-FS3-WB-RP-NC	4	SA105N
CUSTOMER	Struthers Wells	13	NEWCO	Y-PATTERN SPRING LOADED PISTON CHECK VALVE, 1.5" CL1500 SW, m/n 415S-FS3-WB-Y	2	SA105N
LOCATION	Cadotte, AB	14	VELAN/EMERSON/ASCO/TOPWORX	2 1/2" CL2800 VELAN POWERBALL, SCH.80 BORE c/w EMERSON QD600 FAIL LAST ACTUATOR; EV8551G322 24VDC, DUAL HEAD SOLENOID; DXP-L21 GNEB POSITION MONITOR	1	SA105N
PIPE SPEC	N/A	15	-	1/2" CL6000 FULL COUPLING, NPT	3	SA105N
PIPE DESIGN CODE	ASME B31.1 / Section I	16	-	1/2" TUBE x 1/2" MNPT STRAIGHT TUBE FITTING	4	316SS
RADIOGRAPHY	10% on BW	17	-	1/2" TUBE x 1/2" FNPT 90° TUBE FITTING	4	316SS
CORROSION ALLOWANCE	0.03125in	18	CSI	SPOOL 176-412-02-SP-01	1	-
INSULATION	2" MF / 2.5" MF for 6" Pipe	19	CSI	SPOOL 176-412-02-SP-02	1	-
SURFACE PREP.	NONE	20	CSI	SPOOL 176-412-02-SP-03	1	-
PRIMER	NONE	21	CSI	SPOOL 176-412-02-SP-04	1	-
PIPING PAINT	NONE	22	CSI	SPOOL 176-412-02-SP-05	1	-
		23	CSI	SPOOL 176-412-02-SP-06	1	-
		24	CSI	SPOOL 176-412-02-SP-06	1	-
		25	CSI	STEAM WATER CONDENSATE SUPPORT	1	A36
		26	CSI	STEAM LINE BOLT ON PIPE SUPPORT	2	A36
		27	CSI	STEAM LINE INSTRUMENT PIPE SUPPORT	1	A36
		28	-	1.5" 304SS-FLEX GRAPH S-WND CSOR CL1500 B13.20 GASKET c/w 304SS INNER RING AND WIRE	2	304SS
		29	-	2" 304SS-FLEX GRAPH S-WND CSOR CL 300 B13.20 GASKET c/w 304SS INNER RING AND WIRE	2	304SS
		30	-	2" 304SS-FLEX GRAPH S-WND CSOR CL1500 B13.20 GASKET c/w 304SS INNER RING AND WIRE	2	304SS
		31	-	2.5" 304SS-FLEX GRAPH S-WND CSOR CL1500 B13.20 GASKET c/w 304SS INNER RING AND WIRE	2	304SS
		32	-	1" X 5.50" A193 Gr. B7 STUD C/W 2X1" HVY HEX NUT A194 Gr. 2H	8	A193/A194
		33	-	7/8" X 5.75" A193 Gr. B7 STUD C/W 2X7/8" HVY HEX NUT A194 Gr. 2H	16	A193/A194
		34	-	5/8" X 3.50" A193 Gr. B7 STUD C/W 2X5/8" HVY HEX NUTS A194 Gr. 2H	16	A193/A194
		35	-	1" X 6.250" A193 Gr. B7 STUD C/W 2X1" HVY HEX NUT A194 Gr. 2H	16	A193/A194



- NOTES:
- PIPE SUPPORTS TO BE DETAILED ON DWG# 176-432-02, 176-432-03, 176-432-04, 176-432-05
 - DRAINS TO BE CAPPED WITH A 3/4" NPT CAP
 - RELIEF VALVE STACK DRAIN TO BE PIPED AWAY AND LEFT OPEN TO ALLOW THE WATER TO CONTINUALLY DRAIN OUT OF THE STACKS
 - CORROSION ALLOWANCE DOES NOT APPLY TO TUBING
 - TUBING NOT SHOWN AS PER INSTALLATION REQUIREMENTS. ENSURE TUBING IS SLOPED DOWN TOWARDS THE INSTRUMENT TO PREVENT TRAPPING OF GASES. TUBING MUST HAVE AT LEAST 24" BARE TUBING TO REDUCE THE PROCESS TEMPERATURE AT THE INSTRUMENT
 - ALL FITTINGS TO HAVE CRN#'S FOR ALBERTA
 - ALL MATERIALS TO HAVE HEAT NUMBERS AND MTRS
 - UNLESS OTHERWISE SPECIFIED ALL PIPE FLANGES AND FLANGED FITTINGS SHALL BE IN ACCORDANCE WITH ASME B16.5 (2009)
 - UNLESS OTHERWISE SPECIFIED ALL FACTORY-MADE BUTTWELDING FITTINGS SHALL BE IN ACCORDANCE WITH ASME B16.9 (2007)
 - UNLESS OTHERWISE SPECIFIED ALL FORGED FITTINGS, SOCKET-WELDING AND THREADED SHALL BE IN ACCORDANCE WITH ASME B16.11 (2009)

REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	REVISED FOR CONSTRUCTION	18-MAY-2012				
A	FOR APPROVAL	9-MARCH-2012	WA	WA	JN	

REVISIONS

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FOR:	STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD	PROJECT:	1780
DESC:	PKG-7000 ONCE THROUGH STEAM GENERATOR STEAM ISOMETRIC 1 OF 2	REV:	0
DWN. BY:	BB	DATE:	18/05/2012
CSI JOB NO.	176	SCALE:	1:20
		DRAWING NO.	176-412-02 SHT-01



CODE SHEET

VISTA Projects Limited			
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C	Not accepted. Revise as marked and resubmit drawing/document for review. Shipment will not be released, if any drawings/documents requiring approval, as per purchase order conditions, are at this code.		
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Reviewed only as to general conformity with the design concept and specifications provided. The engineer does not warrant or represent that the information contained on this drawing/document is either accurate or complete. Sole responsibility for correct design, detail and dimensions shall remain with the party submitting the drawing/document.			
SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
DM02	PKG-7000	<i>[Signature]</i>	JUN 25 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-412-02-2

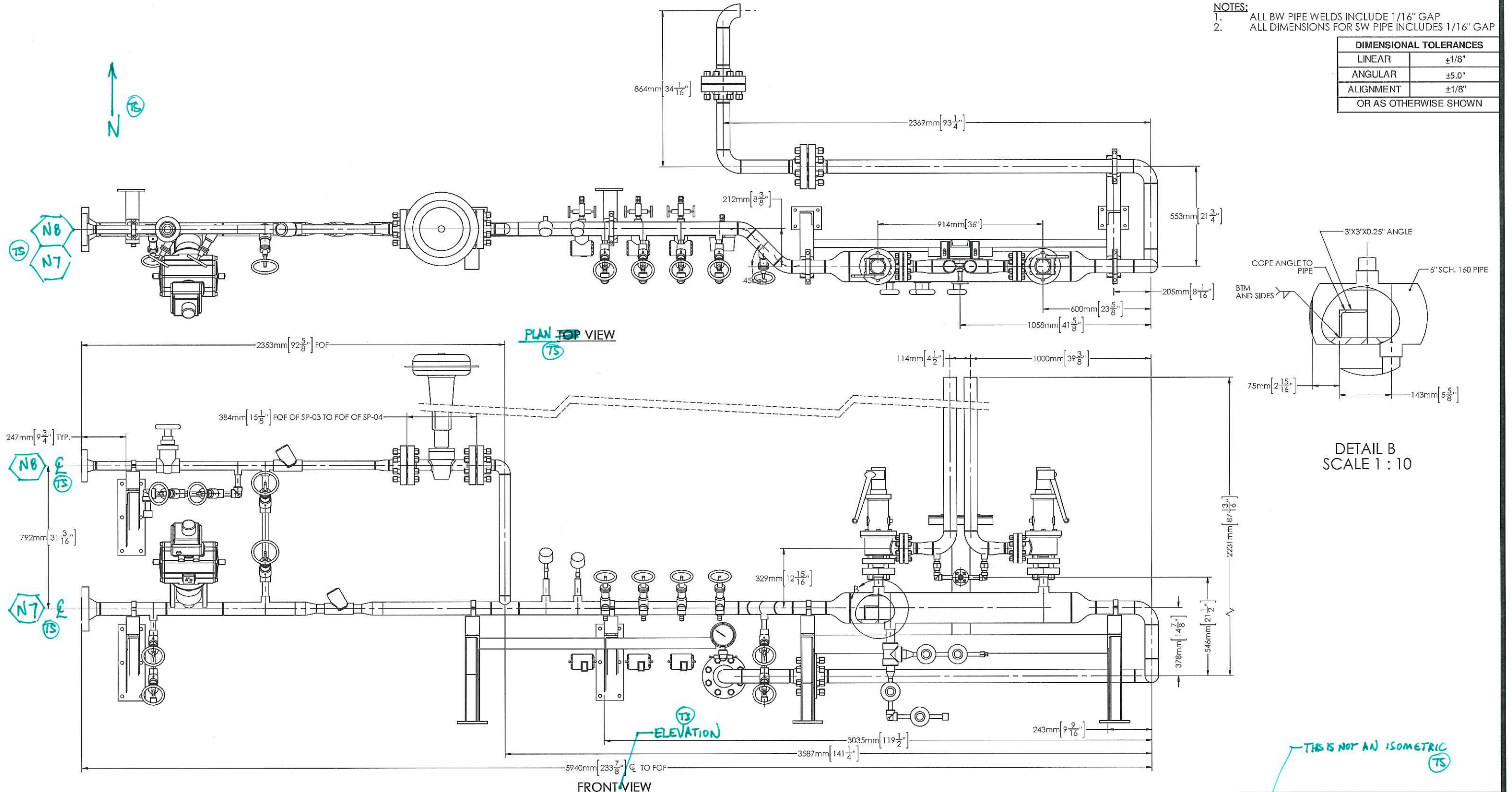
VENDOR REVISION: 0

DOCUMENT DESCRIPTION: PKG-7000 Once Through Steam Generator Steam Isomet

VENDOR TRANSMITTAL NUMBER: T31109-DTNG-085-00

- NOTES:
 1. ALL BW PIPE WELDS INCLUDE 1/16" GAP
 2. ALL DIMENSIONS FOR SW PIPE INCLUDES 1/16" GAP

DIMENSIONAL TOLERANCES	
LINEAR	±1/8"
ANGULAR	±5.0°
ALIGNMENT	±1/8"
OR AS OTHERWISE SHOWN	



REV	DESCRIPTION	DATE	DWN	DES	CHKD	APPD
0	REVISED FOR CONSTRUCTION	18-MAY-2012	BB	WA	WA	JS
A	FOR APPROVAL	9-MARCH-2012	WA	WA	JN	

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FOR:	STRUTHERS WELLS / MURPHY OIL COMPANY LTD CADOTT CSS PROJECT, VISTA PROJECTS LTD		PROJECT:	1780
DESC:	PKG-7000 ONCE THROUGH STEAM GENERATOR STEAM ISOMETRIC 2 OF 2		REV:	0
DWN. BY:	BB	DATE:	18/05/2012	DRAWING NO.
CSI JOB NO.	176	SCALE:	1:20	176-412-02 SHT-02



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C	Not accepted. Revise as marked and resubmit drawing/document for review. Shipment will not be released, if any drawings/documents requiring approval, as per purchase order conditions, are at this code.		
D	Not required for review. Received for information.		
Reviewed only as to general conformity with the design concept and specifications provided. The engineer does not warrant or represent that the information contained on this drawing/document is either accurate or complete. Sole responsibility for correct design, detail and dimensions shall remain with the party submitting the drawing/document.			
SDR CODE	EQUIPMENT TAG	REVIEWED BY	DATE
- DM 10	PKG-7000	<i>[Signature]</i>	JUL 03 2012

PROJECT NAME: Murphy Cadotte / 1780

VENDOR NAME: Thermal Engineering / 1780-001

DOCUMENT NUMBER: 176-413-01-1

VENDOR REVISION: 0

DOCUMENT DESCRIPTION: PKG-7000 Once Through Steam Generator Fuel Gas Isometric 1 of 3

VENDOR TRANSMITTAL NUMBER: _____