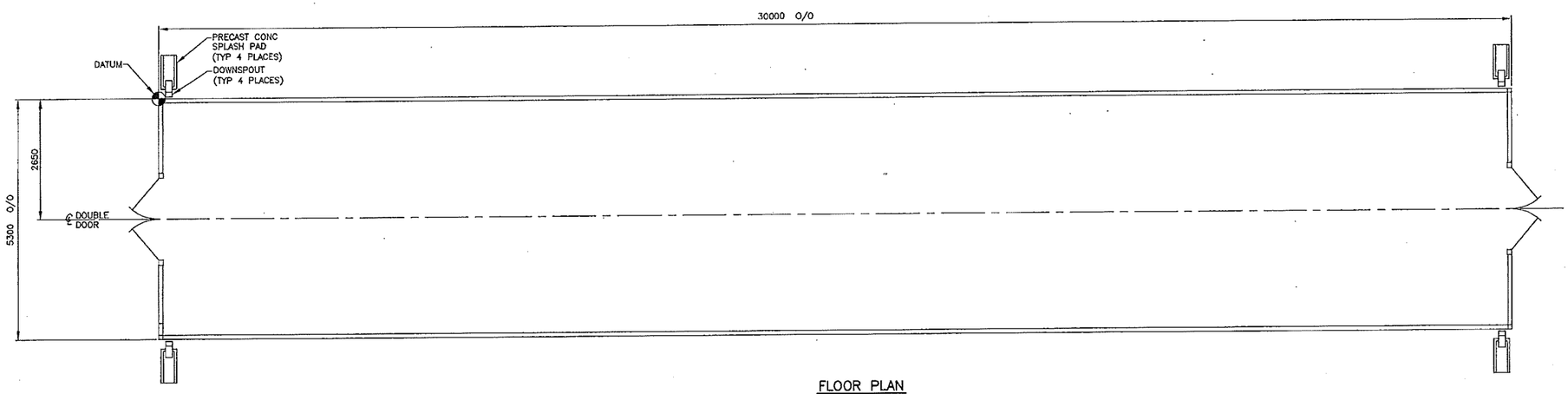
12 11 10 9 8 7 6 5 4 3 2 1

H G F E D C B A

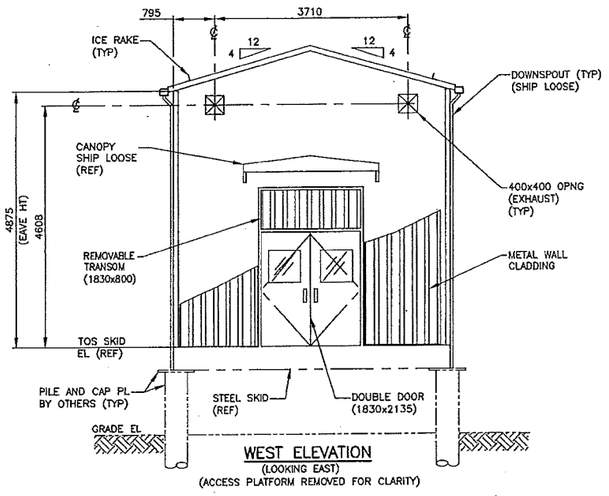
PLANT NORTH

NOTES:

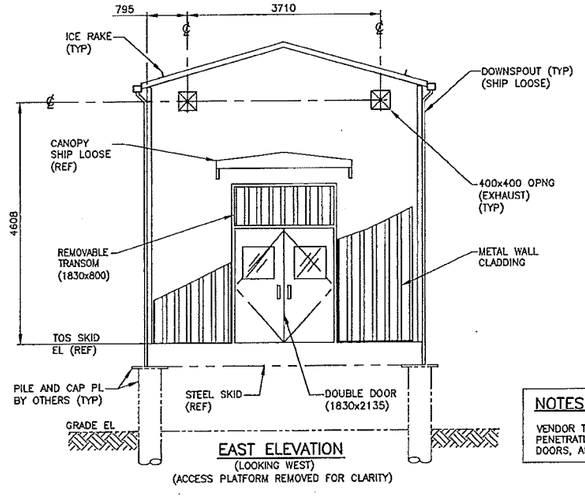
1. FOR BUILDING GENERAL NOTES REFER TO DWG No 4663-02-02-07-001.
2. FOR ELECTRICAL EQUIPMENT LAYOUT REFER TO DWG No 4663-06-02-03-031.
3. ACCESS PLATFORMS SHALL BE DESIGNED, FABRICATED AND INSTALLED BY OTHERS.
4. BUILDING HVAC SYSTEM SHALL BE DESIGNED, SUPPLIED AND INSTALLED BY OTHERS.



FLOOR PLAN
(ACCESS PLATFORM REMOVED FOR CLARITY)



WEST ELEVATION
(LOOKING EAST)
(ACCESS PLATFORM REMOVED FOR CLARITY)



EAST ELEVATION
(LOOKING WEST)
(ACCESS PLATFORM REMOVED FOR CLARITY)

NOTES:

VENDOR TO ADD CANOPIES OVER ALL WALL PENETRATIONS FOR CABLE TRAY, HVAC DUCTING, DOORS, AND REMOVABLE WALL PANELS

NOT FOR CONSTRUCTION

SDN#: 25472-130-A1-0000-P0003
UEL#: 2012016-1ED-ACH-000-0004-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-02-02-07-005	LOW VOLTAGE-EES-22 BUILDING - ELEVATIONS

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
0A	2013-05-09	ISSUED FOR REVIEW (UEL PROJ# 2012016)	2197104	ADB	JMS	CDU	KGS	DCB	UPSIDE
0B	2013-05-29	ISSUED FOR BID (UEL PROJ# 2012016)	2197104	ADB	JMS	CDU	KGS	DCB	UPSIDE
0C	2014-02-26	ISSUED FOR DESIGN (UEL PROJ# 2012016)	2197104	ADB	INFO	RDS	RGM	DCB	UPSIDE
				ADB		RDS		DCB	

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ALBERTA ROBERT MARRIOTT

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHANAGE: | DISCIPLINE # 02

LOW VOLTAGE-EES-22 BUILDING
PLAN AND ELEVATIONS

SCALE 1:50 | DRAWING No 4663-02-02-07-004 | REV 0C

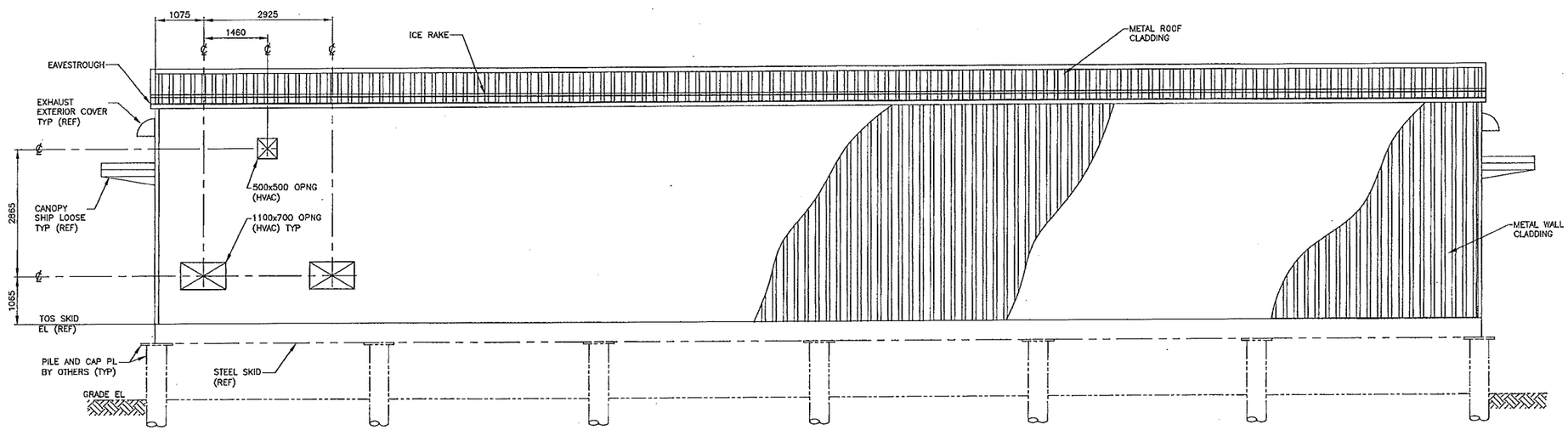
TIME DESIGNFILE

TC_A1_BR.DWG 594X841

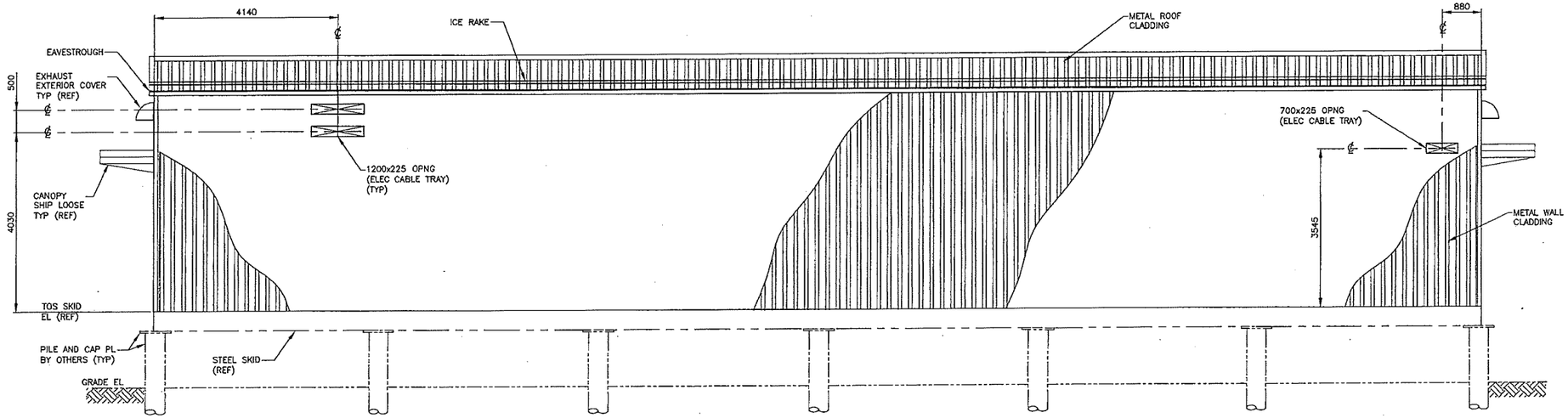
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

NOTES:

1. FOR BUILDING GENERAL NOTES REFER TO DWG No. 4663-02-02-07-001.
2. FOR ELECTRICAL EQUIPMENT LAYOUT REFER TO DWG No 4663-06-02-03-031.



SOUTH ELEVATION
(LOOKING NORTH)
(ACCESS PLATFORM REMOVED FOR CLARITY)



NORTH ELEVATION
(LOOKING SOUTH)
(ACCESS PLATFORM REMOVED FOR CLARITY)

NOT FOR CONSTRUCTION

SDN#: 25472-130-A2-0000-P0002
UEL#: 2012016-1ED-ACH-000-0005-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-02-02-07-004	LOW VOLTAGE-EES-22 BUILDING - PLAN AND ELEVATIONS

REVISION

REV No	DATE	DESCRIPTION
0A	2013-05-09	ISSUED FOR REVIEW (UEL PROJ# 2012016)
0B	2013-05-28	ISSUED FOR BID (UEL PROJ# 2012016)
0C	2014-02-26	ISSUED FOR DESIGN (UEL PROJ# 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	ADB	JVS	CDU	KGS	DCB	UPSIDE
2197104	ADB	JVS	CDU	KGS	DCB	UPSIDE
2197104	ADB	NRC	RDS	RGM	DCB	UPSIDE
	ADB	NRC	JVS	VM	DCB	

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ALBERTA ROBERT GARRETT

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

26-FEB-14

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # D2

LOW VOLTAGE-EES-22 BUILDING ELEVATIONS

SCALE 1:50 | DRAWING No 4663-02-02-07-005 | REV 0C

TIME DESIGNFILE

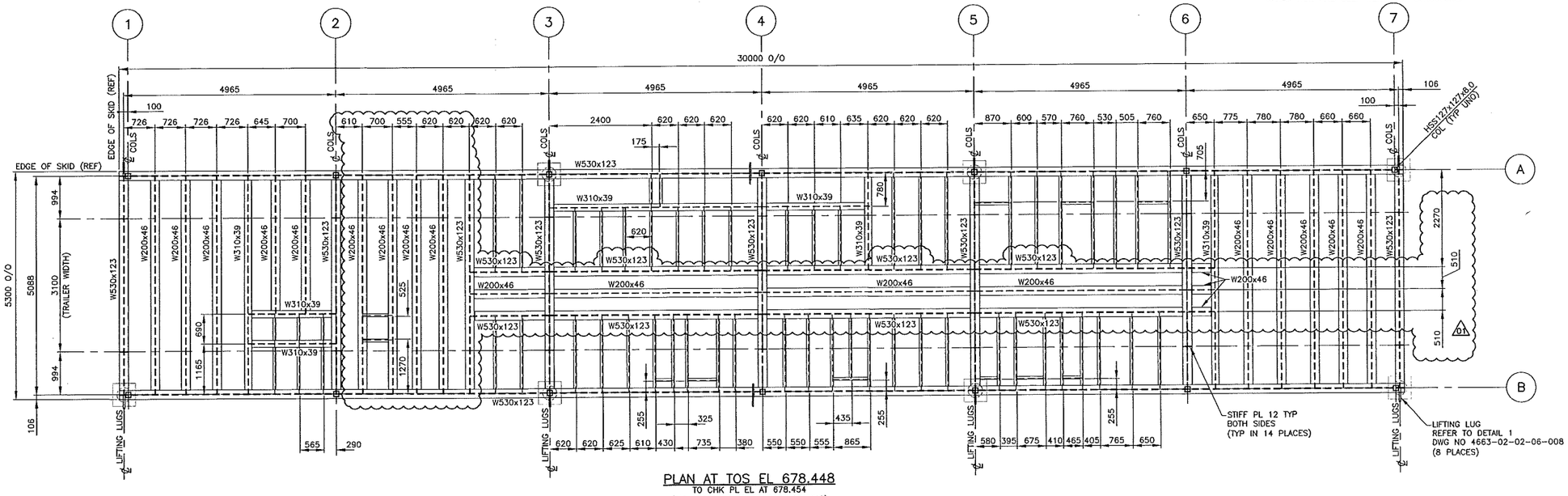
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

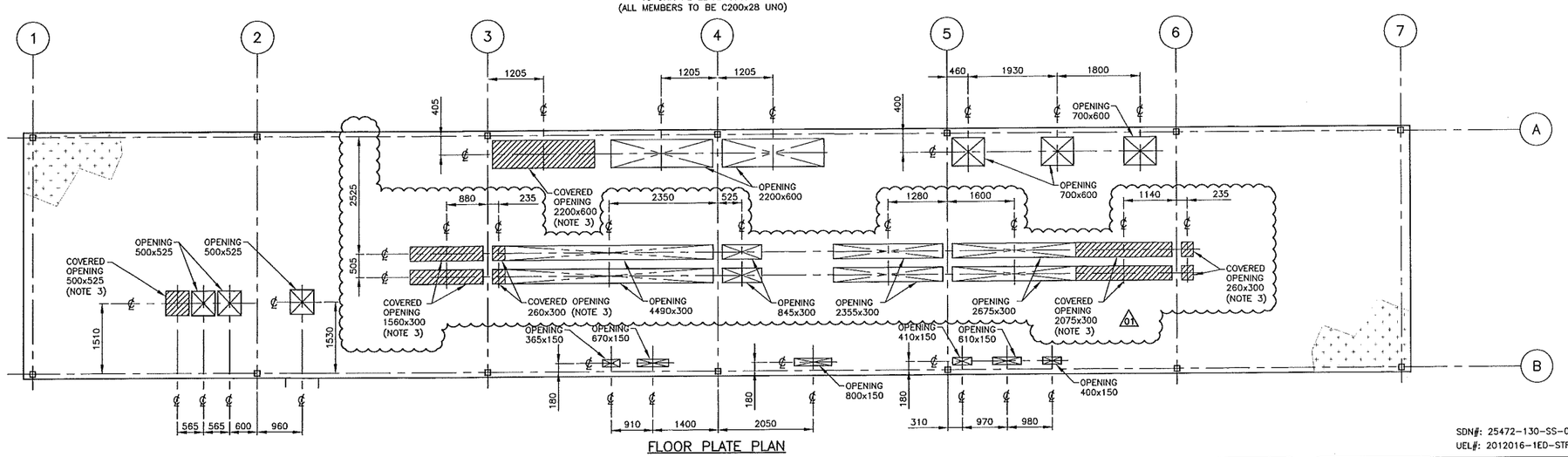
NOTES:

1. FOR STRUCTURAL STEEL GENERAL NOTES REFER TO DRAWING 4663-02-00-06-001.
2. FOR STRUCTURAL STEEL STANDARD FLOOR PLATE AND GRATING DETAILS REFER TO DRAWING 4663-02-00-06-005.
3. FOR REMOVABLE COVER PLATE DETAILS REFER TO DETAIL 13 ON DRAWING 4663-02-00-06-005.
4. ALL OPENINGS IN FLOOR PLATE TO BE VERIFIED BY VENDOR.
5. SKID DESIGNED FOR LIVE LOAD = 4.8 kPa. DEAD LOAD = WEIGHT OF EQUIPMENT, CABLE TRAY AND SELF WEIGHT OF STRUCTURE.

PLANT NORTH



PLAN AT TOS EL 678.448
TO CHK PL EL AT 678.454
(ALL MEMBERS TO BE C200x28 UNO)



FLOOR PLATE PLAN

SDN#: 25472-130-SS-0000-P0135
UEL#: 2012016-1ED-STR-000-0135-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-02-02-06-006	LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLANS
4663-02-02-06-007	LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLAN AND ELEVATION
4663-02-02-06-008	LOW VOLTAGE-EES-22 STRUCTURAL STEEL ELEVATIONS, SECTIONS AND DETAILS

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-02-26	ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)	2197104	ADB	NFC	RDS	RGM	DCB	UPSIDE
01	2014-09-26	RE-ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)	2197104	DDP	NFC	RDS	RGM	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ROBERT MARRIOTT ALBERTA

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

01 | 2014-SEP-26 | PERMIT NUMBER:
REV. NO. | DATE

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 02

LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLAN

SCALE 1:50 | DRAWING No 4663-02-02-06-005 | REV 01

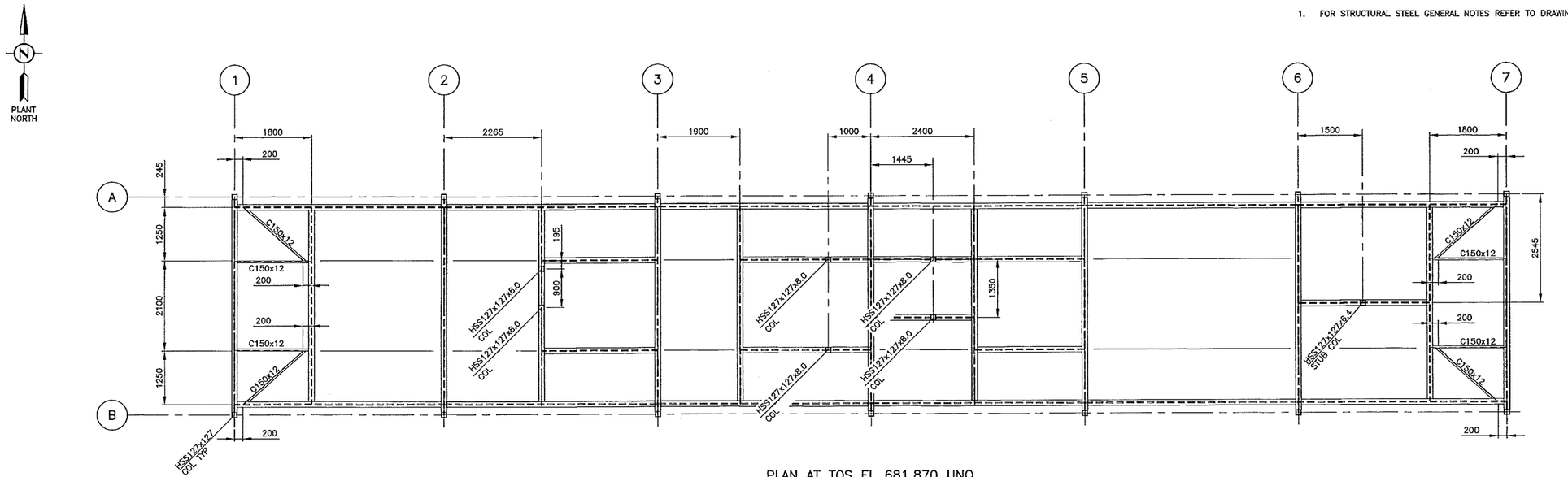
TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

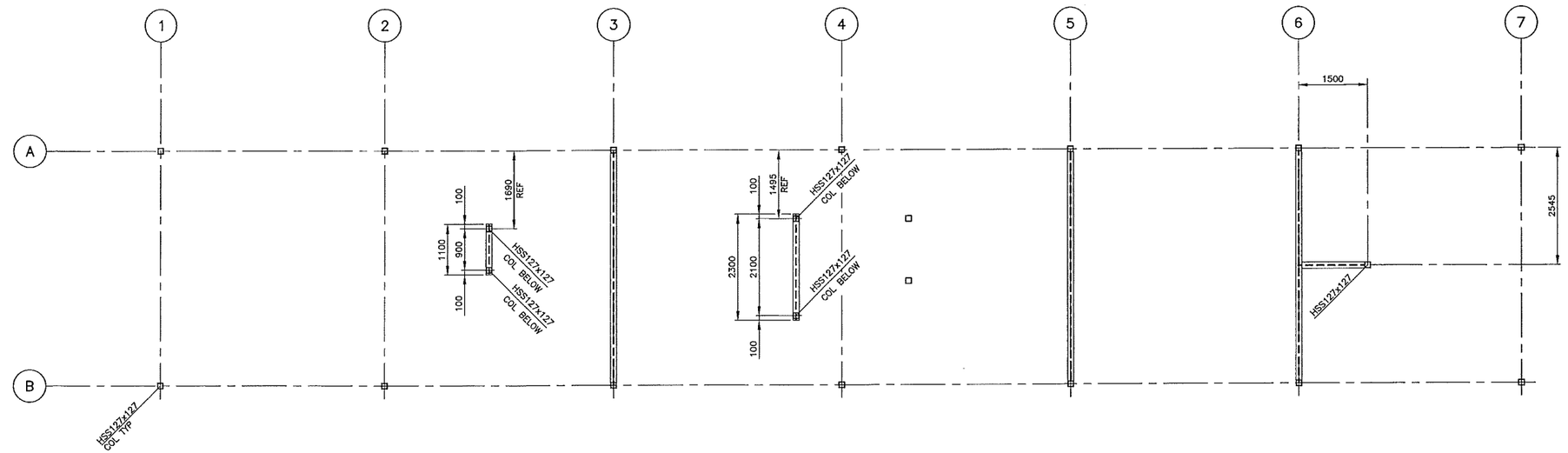
-TIME- -DESIGNFILE-

NOTES:

1. FOR STRUCTURAL STEEL GENERAL NOTES REFER TO DRAWING 4663-02-00-06-001.



PLAN AT TOS EL 681.870 UNO
(ALL MEMBERS TO BE W200x27 UNO)



PLAN AT TOS EL 682.380 UNO
(ALL MEMBERS TO BE W200x27 UNO)

SDN#: 25472-130-SS-0000-P0136
UEL#: 2012016-1ED-STR-000-0136-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-02-02-06-005	LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLAN
4663-02-02-06-008	LOW VOLTAGE-EES-22 STRUCTURAL STEEL ELEVATIONS, SECTIONS AND DETAILS

REVISION

REV No	DATE	DESCRIPTION
00	2014-02-26	ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	CMR	NFC	RDS	RGM	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA ROBERT GARRETT MARRIOTT

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 02

LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLANS

SCALE 1:50 | DRAWING No 4663-02-02-06-006 | REV 00

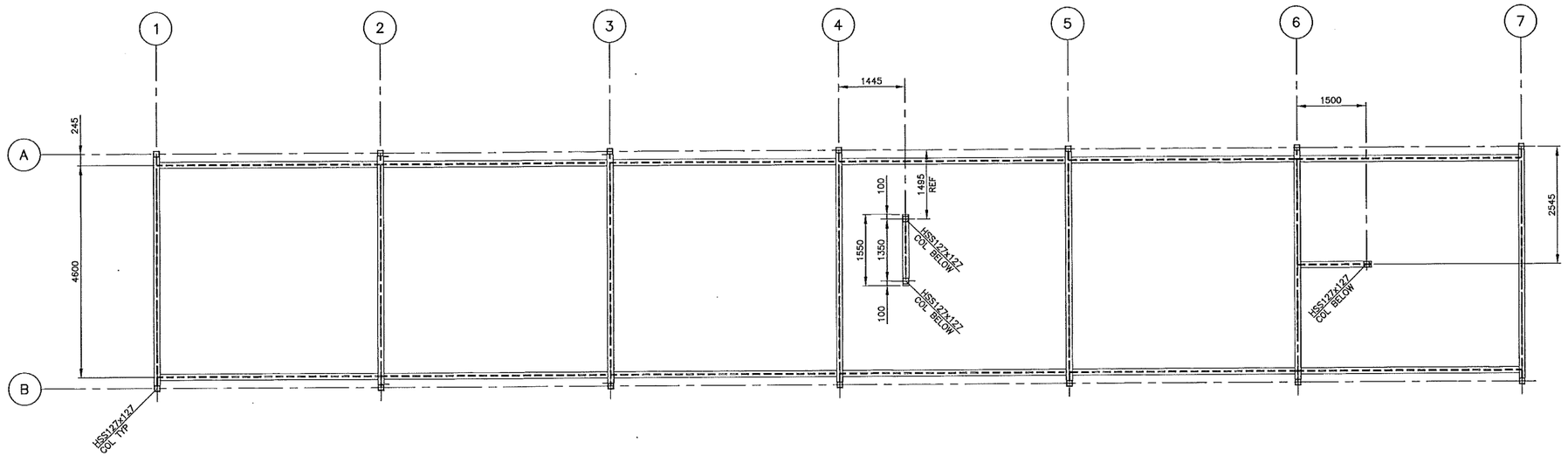
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CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

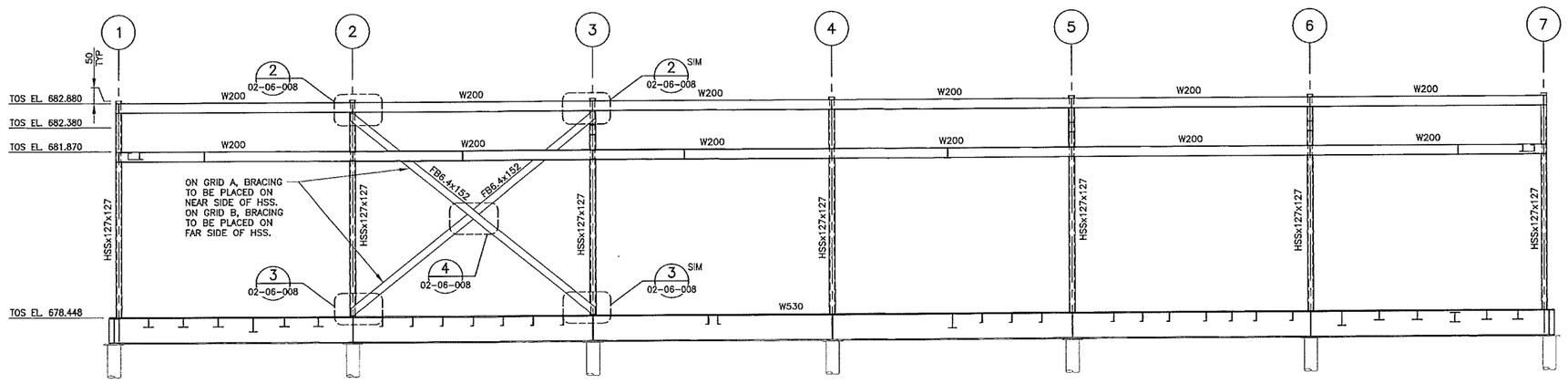
TIME---DESIGNFILE

NOTES:

1. FOR STRUCTURAL STEEL GENERAL NOTES REFER TO DRAWING 4663-02-00-06-001.



PLAN AT TOS EL 682.880 UNO
(ALL MEMBERS TO BE W200x27 UNO)



ELEVATION AT GRID A & B
(LOOKING NORTH)

SDN#: 25472-130-SS-0000-P0137
UEL#: 2012016-1ED-STR-000-0137-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-02-02-06-005	LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLAN
4663-02-02-06-008	LOW VOLTAGE-EES-22 STRUCTURAL STEEL ELEVATIONS, SECTIONS AND DETAILS

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-02-26	ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)	2197104	CMR	NFC	RDS	RGM	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA ROBERT MARRIOTT

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
in business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 02

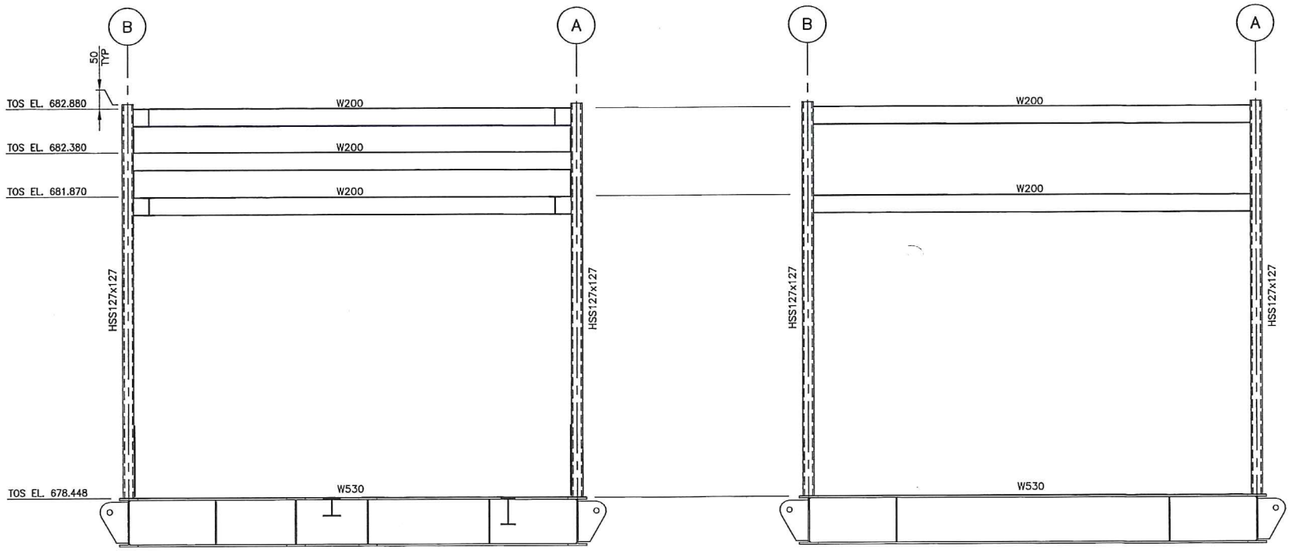
LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLAN AND ELEVATION

SCALE 1:50 | DRAWING No 4663-02-02-06-007 | REV 00

TIME DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

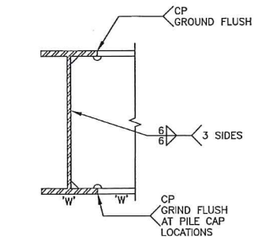


ELEVATION AT GRID 3,5 & 6
(LOOKING WEST)

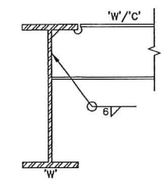
ELEVATION AT GRID 1,2,4 & 7
(LOOKING WEST)

NOTES:

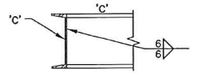
1. FOR STRUCTURAL STEEL GENERAL NOTES REFER TO DRAWING 4663-02-00-06-001.



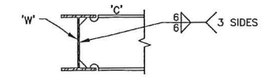
W530 TO W530
CONNECTION DETAIL
SCALE 1:10



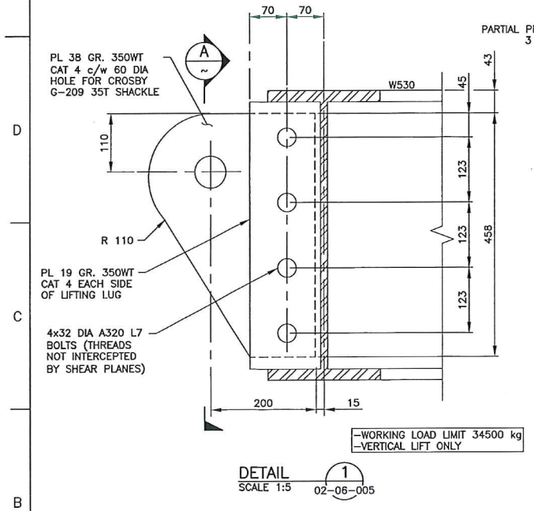
TYPICAL UNEQUAL DEPTH BEAM/CHANNEL
TO BEAM CONNECTION DETAIL
SCALE 1:10



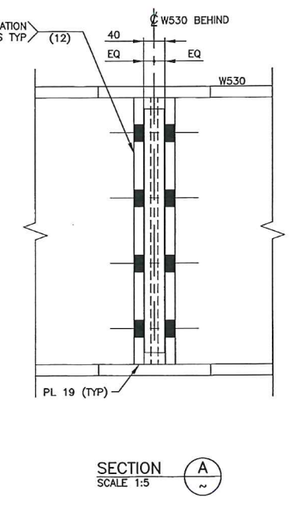
TYPICAL EQUAL DEPTH CHANNEL
TO CHANNEL CONNECTION DETAIL
SCALE 1:10



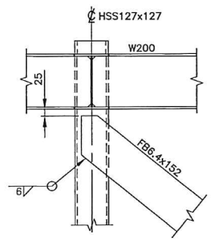
TYPICAL EQUAL DEPTH CHANNEL
TO BEAM CONNECTION DETAIL
SCALE 1:10



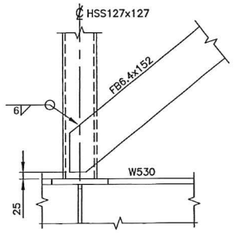
DETAIL 1
SCALE 1:5
02-06-005



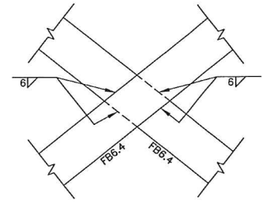
SECTION A
SCALE 1:5



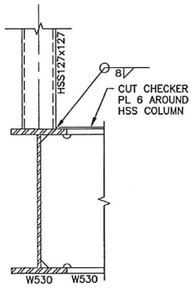
DETAIL 2
SCALE 1:10
02-06-003



DETAIL 3
SCALE 1:10
02-06-003



DETAIL 4
SCALE 1:10
02-06-003



TYPICAL HSS127x127 TO W530
CONNECTION
SCALE 1:10

SDN#: 25472-130-SS-0000-P0138
UEL#: 2012016-1ED-STR-000-0138-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-02-02-06-005	LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLAN

REVISION

REV No	DATE	DESCRIPTION
00	2014-02-26	ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	CMR	NFC	RDS	RGM	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ROBERT MARRIOTT ALBERTA

PERMIT TO PRACTICE JV
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

2014-Feb-26

TransCanada — In business to deliver

Upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 02

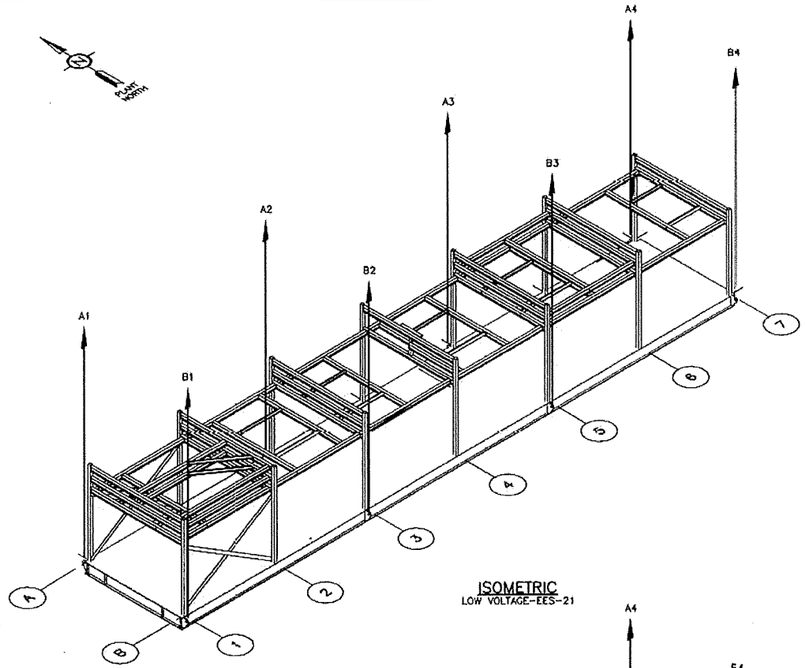
LOW VOLTAGE-EES-22
STRUCTURAL STEEL ELEVATIONS,
SECTIONS AND DETAILS

SCALE 1:100 | DRAWING No 4663-02-02-06-008 | REV 00

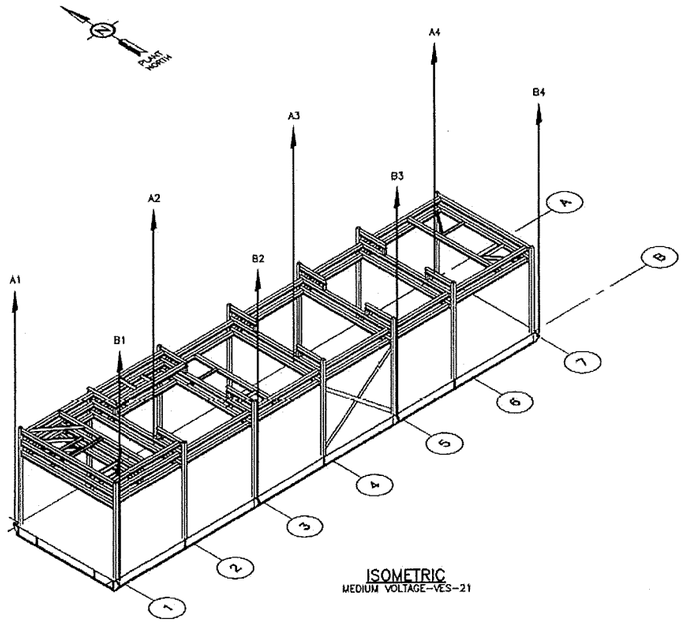
TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

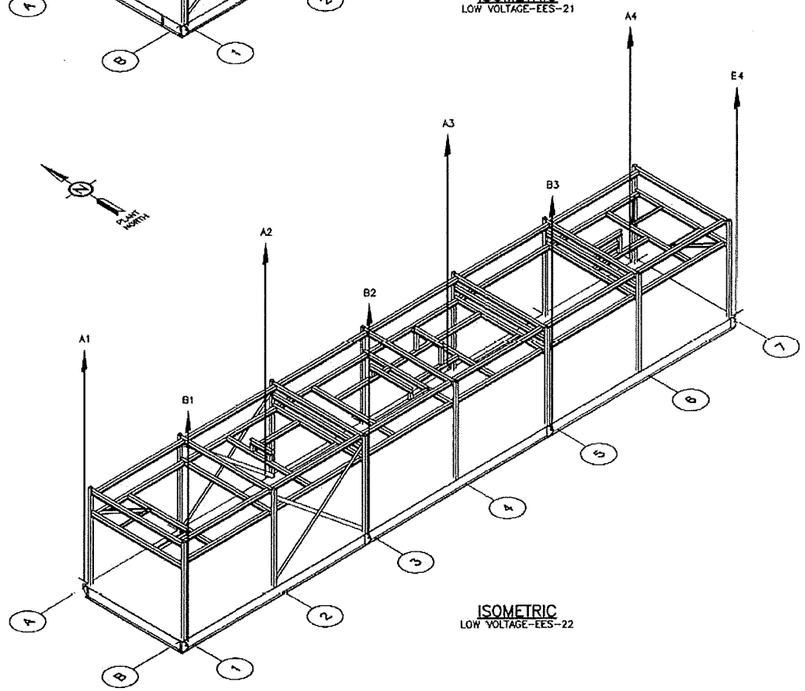
TIME — DESIGNFILE



ISOMETRIC
LOW VOLTAGE-EES-21



ISOMETRIC
MEDIUM VOLTAGE-VES-21



ISOMETRIC
LOW VOLTAGE-EES-22

LOW VOLTAGE-EES-21

ESTIMATED LIFTING LOADS	
LIFTING LUG	LIFTING LUG LOAD (kN)
A1	145
A2	340
A3	340
A4	125
B1	130
B2	305
B3	320
B4	125
TOTAL	1830

LOW VOLTAGE-EES-22

ESTIMATED LIFTING LOADS	
LIFTING LUG	LIFTING LUG LOAD (kN)
A1	125
A2	340
A3	340
A4	145
B1	125
B2	320
B3	305
B4	130
TOTAL	1830

MEDIUM VOLTAGE-VES-21

ESTIMATED LIFTING LOADS	
LIFTING LUG	LIFTING LUG LOAD (kN)
A1	55
A2	200
A3	225
A4	70
B1	55
B2	205
B3	180
B4	60
TOTAL	1050

NOTES:

2. ALL LOADS SPECIFIED (UNFACTORED).

NOT FOR CONSTRUCTION

SDN#: 25472-130-SS-0000-P0143
UEL#: 2012016-1ED-STR-000-0143-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-02-02-06-001	LOW VOLTAGE-EES-21 STRUCTURAL STEEL PLAN
4663-02-02-06-005	LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLAN
4663-02-02-06-009	MEDIUM VOLTAGE-VES-21 STRUCTURAL STEEL PLAN

REVISION

REV No	DATE	DESCRIPTION
0A	2014-04-14	ISSUED FOR DESIGN (UEL PROJ# 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	CMR	DDP	RDS	RGM	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ROBERT GRAHAM MARSHALL ALBERTA

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

0A | 2014-APR-14 | REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHANGE: | DISCIPLINE # 02

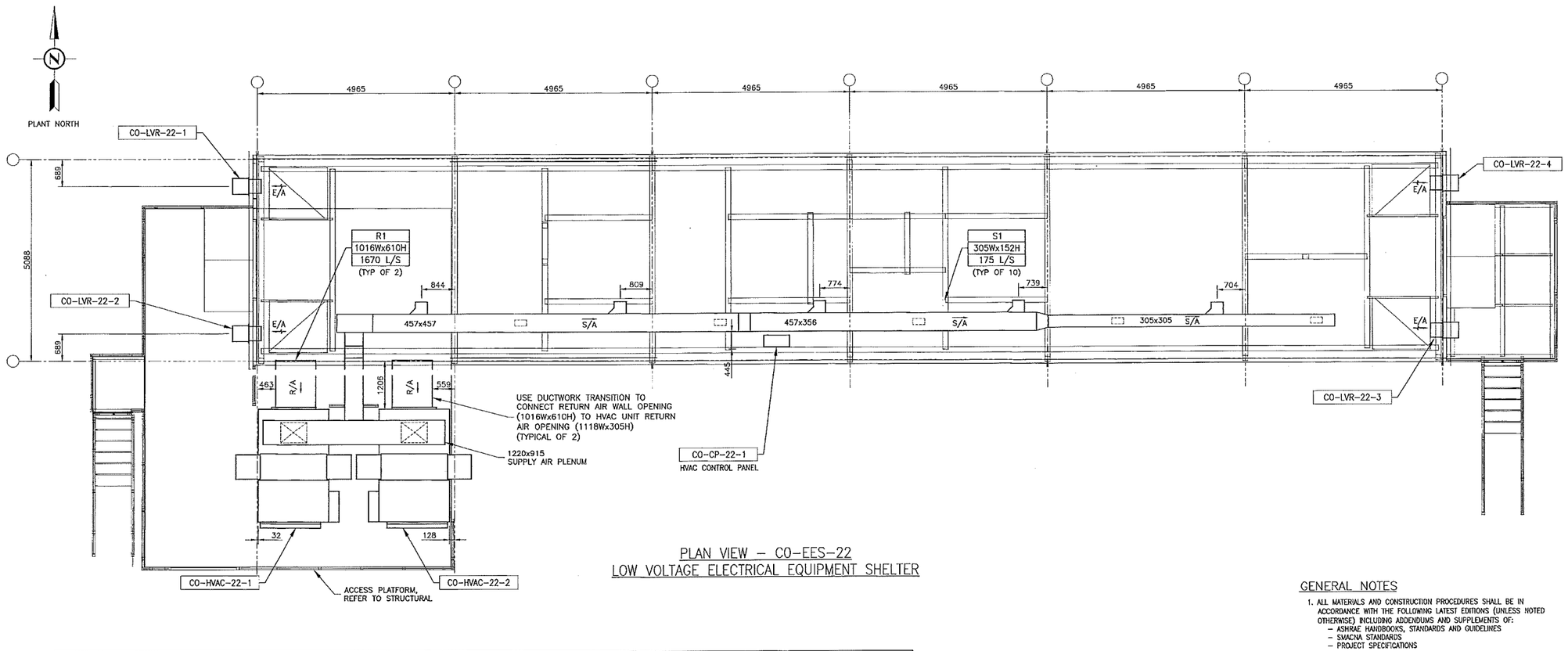
LOW VOLTAGE-EES AND MEDIUM VOLTAGE-VES
EES-21, EES-22, VES-21 - LIFTING LOADS DETAILS

SCALE 1:100 | DRAWING No 4663-02-02-06-013 | REV 0A

TC_A1_BR.DWG 59432841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TMC ——— DESIGNFILE



PLAN VIEW – CO-EES-22
LOW VOLTAGE ELECTRICAL EQUIPMENT SHELTER

HVAC EQUIPMENT SCHEDULE – LOW VOLTAGE EES (BUILDING CO-EES-22)

TAG	DESCRIPTION	QTY.	POWER	MOTOR	ELECTRIC HEAT	UNIT CURRENT	SUPPLY AIR FLOW	OUTSIDE AIR FLOW	ESP	COMMENTS
CO-HVAC-22-1/2	BUILDING HEATING/COOLING UNIT	2	480V/3 PHASE/60Hz	7.5 HP	20.0 KW	46.2A	1746 L/S	176 L/S	500Pa	7.5 TON R410A SCROLL COMPRESSOR, FULL ECONOMIZER, HERESITE COATED COILS, LOW AMBIENT OPERATION TO –40°C, HIGH EFFICIENCY FILTERS
CO-LVR-22-1/2/3/4	BUILDING PRESSURE RELIEF DAMPER	4	--	--	--	--	437 L/S	--	--	SIZE: 12"Hx12"W, SETTING: +0.1" W.C.

AIR DEVICE SCHEDULE – LOW VOLTAGE EES (BUILDING CO-EES-22)

EQUIPMENT No.	MANUFACTURER	DESCRIPTION
S1 305Wx152H 175 L/S	E.H. PRICE (OR EQUAL) INDUSTRIAL LOUVERED FACE SUPPLY MODEL No: 12x6/152G /L/A/R/B12	SIZE :– 12x6 BORDER STYLE :– SURFACE MOUNT, 32mm STANDARD BLADE ORIENTATION :– FRONT BLADE PARALLEL TO LONG DIMENSION FASTENING:– COUNTER SUNK SCREW HOLES BLADES :– INDIVIDUALLY ADJUSTABLE FRONT BLADES, GANGED REAR BLADES. FINISH :– B12 WHITE
R1 1016Wx610H 1670 L/S	RETURN AIR GRILLE 16 GAUGE, 40x24 GALVANIZED WIRE MESH	SIZE :– 40x24 MOUNTING FRAME:– 50mm 16 GAUGE GALVANIZED METAL U-FRAME, c/w WELDED MITERED CORNERS, GASKET SEAL BETWEEN FRAME AND DUCT. FASTENING:– SELF DRILLING AND TAPPING SHEET METAL SCREWS

GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES SHALL BE IN ACCORDANCE WITH THE FOLLOWING LATEST EDITIONS (UNLESS NOTED OTHERWISE) INCLUDING ADDENDUMS AND SUPPLEMENTS OF:
   – ASHRAE HANDBOOKS, STANDARDS AND GUIDELINES
   – SMACNA STANDARDS
   – PROJECT SPECIFICATIONS
2. IN CASE OF DISCREPANCY BETWEEN THESE NOTES, THE CONTRACT SCOPE DRAWINGS AND SPECIFICATIONS, CONSULT THE ENGINEER OF RECORD FOR CLARIFICATION.
3. ALL COORDINATES AND ELEVATIONS ARE METRIC MEASUREMENT.
4. PRIOR TO FABRICATION OF DUCTWORK, CHECK ALL AVAILABLE SPACES, HEIGHTS AND POSSIBLE CONFLICTS WITH OTHER TRADES.
5. DUCTWORK SIZES ARE FOR NET FREE AREA (INTERNAL). SHEETMETAL THICKNESS, INSULATION AND CLADDING MATERIALS SHALL BE ADDED TO ALL DIMENSIONS AND ELEVATIONS.
6. ALL HVAC ELEVATIONS ARE REFERENCED FROM TOP OF STRUCTURAL STEEL OR TO TOP OF FINISHED FLOOR UNLESS NOTED OTHERWISE.
7. OVERALL EQUIPMENT DIMENSIONS AND CONNECTION DIMENSIONS SHALL BE MEASURED AND VERIFIED WITH APPROVED IFC VENDOR DRAWINGS.
8. DUCTWORK PENETRATING BUILDING EXTERIOR WALLS & ROOF SHALL BE FRAMED OPENINGS c/w RAIN HOOD, CONTINUOUS SEALANT AND FLASHING. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS.
9. ICE FALL PROTECTION SHALL BE SUPPLIED AND INSTALLED ON ALL BUILDING EAVE ELEVATIONS (BY OWC) FOR THE FOLLOWING:
   – EXTERIOR SUPPLY, EXHAUST AND RETURN AIR DUCTWORK WITHIN 8'–0" OF BUILDING WALL PANELS.
10. ALL EXTERIOR DUCTWORK SHALL BE CONSTRUCTED WITH SLOPED TOP SIDE TO PREVENT SNOW ACCUMULATION.

SDN#: 25472-130-P1-0000-P0258
UEL#: 2012016-1EC-GAD-000-0258-01

REFERENCE DRAWINGS

DRAWING No	TITLE
--	--

REVISION

REV No	DATE	DESCRIPTION
00	2014-04-23	ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	KEW	MLC	MLC	RDS	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA MICHAEL CARRIERE 29380
2014-APR-24

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663	CHAINAGE:	DISCIPLINE # 02

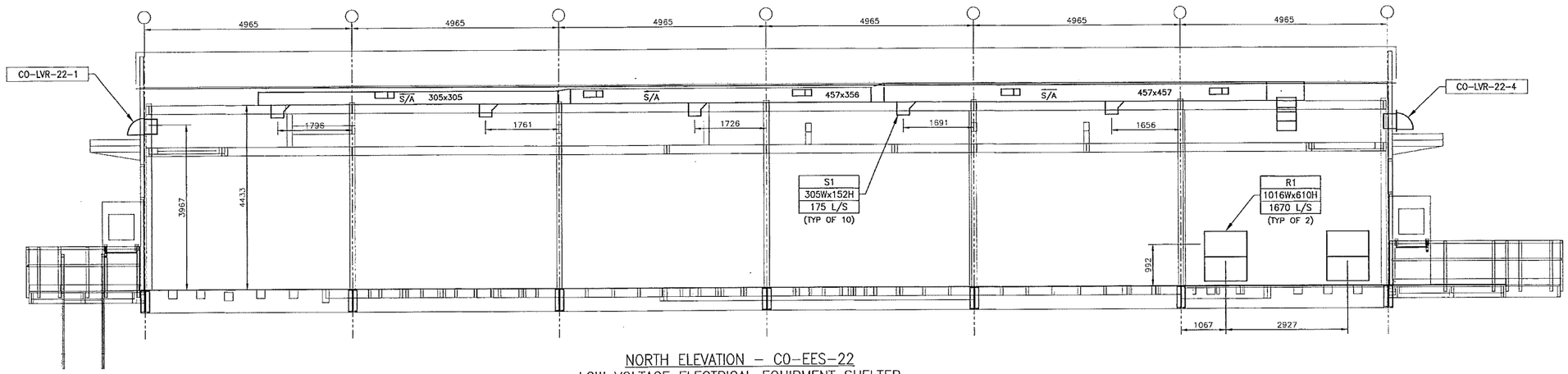
LOW VOLTAGE CO-EES-22 BUILDING
HVAC EQUIPMENT & DUCTWORK LAYOUT

SCALE 1:50	DRAWING No 4663-01-00-03-258	REV 00

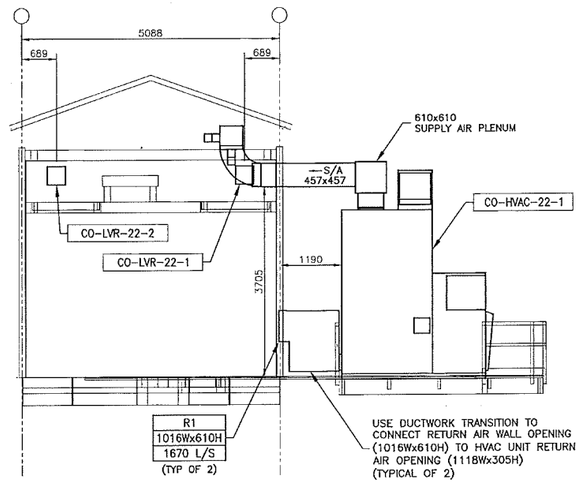
TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

DESIGNFILE – TIME –



NORTH ELEVATION – CO-EES-22
LOW VOLTAGE ELECTRICAL EQUIPMENT SHELTER



WEST ELEVATION – CO-EES-22
LOW VOLTAGE ELECTRICAL EQUIPMENT SHELTER

SDN#: 25472-130-P1-0000-P0259
UEL#: 2012016-1EC-GAD-000-0259-01

REFERENCE DRAWINGS

DRAWING No	TITLE
--	--

REVISION

REV No	DATE	DESCRIPTION
00	2014-04-23	ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	KEW	MLC	MLC	RDS	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA MICHEL CARRIERE 68918 2014-APR-24

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663	CHAINAGE:	DISCIPLINE # 02

LOW VOLTAGE CO-EES-22 BUILDING
HVAC EQUIPMENT & DUCTWORK LAYOUT

SCALE 1:50	DRAWING No 4663-01-00-03-259	REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TMC DESIGNFILE

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	MANUFACTURER	MODEL	TAG	SCOPE OF SUPPLY
1	1	NORMAL POWER, 480V SWITCHBOARD	EATON		CO-SWBD-03	OWNER
2	1	EMERGENCY POWER, 480V SWITCHBOARD	EATON		CO-SWBD-04	OWNER
3	1	NORMAL POWER MCC	EATON	FREEDOM 2100	CO-MCC-02	OWNER
4	1	EMERGENCY POWER MCC	EATON	FREEDOM 2100	CO-MCC-04	OWNER
5	2 (1)	PANEL, TERMINAL CONTROL	POLYPHASE		CO-HTCP-04 CO-HTCP-05 FUTURE	OWNER
6	1 (2)	PANEL, COMMUNICATION	POLYPHASE		CO-TCMP-04 FUTURE FUTURE	OWNER
7	1	PANEL, SERVICE ENTRANCE	POLYPHASE		CO-TCMP-24	OWNER
8	1	PANEL, HVAC CONTROL	SOUTHAMPTON-TRANE		CO-CP-22-1	OWNER
9	1	PANEL, SWITCHBOARD MIMIC			CO-MMP-12	OWNER
10	1	HMI SERVER C/W DISPLAY, KEYBOARD AND MOUSE				OWNER
11	1	HMI DESK				OWNER
12	1	PANEL, HEAT TRACING	THERMON	TC1818A	CO-EHTC-33	OWNER
13						
14						
15	1	PANELBOARD, 120 V, 100 A, 1ø, 3W, 42 CCT	AMETEK	FPB	CO-UACP-02	OWNER
16	1	PANELBOARD, 208/120 V, 100 A, 3ø, 4W, 42 CCT 225 A MAIN BREAKER	CUTLER-HAMMER	P1aB4C2-42ED	CO-ACP-12	BUILDING VENDOR
17	1	PANELBOARD, 480/277 V, 225 A, 3ø, 4W, 42 CCT	CUTLER-HAMMER	P2aL4C1-42	CO-LDP-11	BUILDING VENDOR
18						
19						
20	1	TRANSFORMER, 45 kVA, 480-480Y/277 V,	HAMMOND	NMK045KKC	CO-DT-11	BUILDING VENDOR
21	1	TRANSFORMER, 45 kVA, 480-208Y/120 V,	HAMMOND	NMK045KBC	CO-DT-12	BUILDING VENDOR
22	1	TRANSFORMER, 75 kVA, 480-480Y/277 V,	HAMMOND	NMK075KKC	CO-DT-33	BUILDING VENDOR
23	1	TRANSFORMER, 10 kVA, 480-120 V	SOLA	63-29-310-8	CO-DT-82	BUILDING VENDOR
24						
25	2	RECEPTACLE -- SINGLE, INTERIOR	CROUSE-HINDS HUBBELL	DS-21 HBL 5261I		
26	24	LIGHT, FLUORESCENT	METALUX	DMF-232-120V-EBB1		BUILDING VENDOR
27	7	LIGHT, HPS	LUMARK	HPWP-GL-70-MT-LL		BUILDING VENDOR
28	2	LIGHT, EMERGENCY/EXIT	LUMACELL	RG12S144E2MQ12W		BUILDING VENDOR
29	4	SWITCH, LIGHT -- 15 A, 3-WAY	CROUSE-HINDS CROUSE-HINDS HUBBELL	ENCLOSURE: FD BOX COVERPLATE: DS185 SWITCH: 1203I		BUILDING VENDOR
30	8	RECEPTACLE -- DUPLEX, INTERIOR	CROUSE-HINDS CROUSE-HINDS HUBBELL	ENCLOSURE: FD BOX COVERPLATE: ~~WRLD-1~~ DS-23 RECEPTACLE: HBL5262I 5362I		BUILDING VENDOR
31	2	RECEPTACLE -- DUPLEX, GFCI	CROUSE-HINDS CROUSE-HINDS HUBBELL	ENCLOSURE: FD BOX COVERPLATE: ~~WRLD-1~~ WP1010MXD RECEPTACLE: ~~GF15ILA~~ GF20ZLA		BUILDING VENDOR
32	3	GROUND BUS (EQUIPMENT)	BURNDY	BBB14412F		BUILDING VENDOR
33	2	GROUND BUS, ISOLATING (INSTRUMENT)	BURNDY	BBB14412F		BUILDING VENDOR
34	1	FOAM SYSTEM MCC	SABRE		CO-AJB-02	OWNER

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	MANUFACTURER	MODEL	TAG	SCOPE OF SUPPLY
35	4	SMOKE DETECTOR, COMPLETE WITH RELAY MODULE	KIDDE	P1235CA SM120X	CO-ASH-8690A CO-ASH-8690B CO-ASH-8690C CO-ASH-8690D	BUILDING VENDOR
36	4	HEAT DETECTOR, 140°F	FENWAL	12-X27120-000-140	CO-ASH-8690E CO-ASH-8690F CO-ASH-8690G CO-ASH-8690H	BUILDING VENDOR
37	1	ALARM STROBE, RED, 120 VAC	CROUSE-HINDS	XBL16UL12060RYNN	CO-YA-8690B	BUILDING VENDOR
38	2	DOOR SWITCH, REED TYPE	GRI	4400-A	CO-YS-8690A CO-YS-8690B	BUILDING VENDOR
39	1	TEMPERATURE TRANSMITTER (INSIDE)	ROSEMOUNT	644HAK6M5Q4G1 WITH INTEGRAL 3-WIRE RTD (PT-100) FOR AMBIENT TEMPERATURE MEASUREMENT	CO-TT-8690	BUILDING VENDOR
40						
41	1	ESD STATION, C/W CLEAR COVER GUARD	ALLEN-BRADLEY CRUSADER INDUSTRIES	ENCLOSURE: 800T-1TZ PUSHBUTTON: 800T-FXJT-6D2 CONTACT BLOCK: 800T-XD2 FRONT GUARD PUSHBUTTON STATION COVER	CO-HS-8690A	BUILDING VENDOR
42						
43						
44	2	PORTABLE CARBON DIOXIDE FIRE EXTINGUISHER		15LB ULC RATED 10-BC		BUILDING VENDOR
45	2	EMERGENCY HORN, 120 VAC	EDWARDS	5530M-120NS	CO-YA-8690C CO-YA-8690D	BUILDING VENDOR
46	1	UPS, 10 kVA, 480 V, 3ø, 3W INPUT, 120 V, 1ø, 2W, OUTPUT	AMETEK		CO-UPS-02	OWNER
47	1	BATTERY BANK, 60 MIN, 20 YEAR	AMETEK/EAST PENN	60AVR96-11SL	CO-BB-02	OWNER
48						
49						
50	2	ELECTRIC UNIT HEATER C/W REMOTE THERMOSTAT, ON/OFF SWITCH AND WALL MOUNT BRACKET	CALORITECH	GX307 AND WB1540	CO-HTR-22-1 CO-HTR-22-2	BUILDING VENDOR
51	2	60A DISCONNECT	CUTLER-HAMMER	THD362NF		
52						
53						
54						
55	AS REQ'D	LADDER TYPE ALUMINUM CABLE TRAY, STRAIGHT SECTION, 900 mm WIDE, 188 mm SIDE RAILS, 229 mm RUNG SPACING, NEMA VE 1, 20C+.	~~B-LINE~~ T&B	~~SERIES 57 OR EQUAL~~ AH 37 SERIES	-	BUILDING VENDOR
56	AS REQ'D	LADDER TYPE ALUMINUM CABLE TRY, STRAIGHT SECTION, 600 mm WIDE, 188 mm SIDE RAILS, 229 mm RUNG SPACING, NEMA VE 1, 20C+.	~~B-LINE~~ T&B	~~SERIES 57 OR EQUAL~~ AH 37 SERIES	-	BUILDING VENDOR
57	AS REQ'D	LADDER TYPE ALUMINUM CABLE TRAY, STRAIGHT SECTION, 450 mm WIDE, 188 mm SIDE RAILS, 229 mm RUNG SPACING, NEMA VE 1, 20C+.	~~B-LINE~~ T&B	~~SERIES 57 OR EQUAL~~ AH 37 SERIES	-	BUILDING VENDOR
58	2	90° HORIZONTAL ELBOW, LADDER TYPE TRAY, 900 mm WIDE, 188 mm SIDE RAILS, 600 mm BENDING RADIUS.	~~B-LINE~~ T&B	~~SERIES 57 OR EQUAL~~ AH 37 SERIES	-	BUILDING VENDOR
59	3	90° HORIZONTAL ELBOW, LADDER TYPE TRAY, 600 mm WIDE, 188 mm SIDE RAILS, 600 mm BENDING RADIUS.	~~B-LINE~~ T&B	~~SERIES 57 OR EQUAL~~ AH 37 SERIES	-	BUILDING VENDOR
60	~~0~~ 6	45° HORIZONTAL ELBOW, LADDER TYPE TRAY, 600 mm WIDE, 188 mm SIDE RAILS, 600 mm BENDING RADIUS.	~~B-LINE~~ T&B	~~SERIES 57 OR EQUAL~~ AH 37 SERIES	-	BUILDING VENDOR
61	4	90° VERTICAL OUTSIDE, LADDER TYPE TRAY, 900 mm WIDE, 188 mm SIDE RAILS, 600 mm BENDING RADIUS.	~~B-LINE~~ T&B	~~SERIES 57 OR EQUAL~~ AH 37 SERIES	-	BUILDING VENDOR
62	9	HORIZONTAL TEE, LADDER TYPE TRAY, 600 mm WIDE, 188 mm SIDE RAILS, 600 mm BENDING RADIUS	~~B-LINE~~ T&B	~~SERIES 57 OR EQUAL~~ AH 37 SERIES	-	BUILDING VENDOR

SDN#: 25472-130-E2-0000-P0032
UEL#: 2012016-1EF-ELD-000-0032-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-02-01-010 to 018	CO-MCC-02 480V SINGLE LINE DIAGRAM SHEETS 1 TO 9
4663-06-02-01-030 to 041	CO-MCC-04 480V SINGLE LINE DIAGRAM SHEETS 1 TO 12
4663-06-02-03-031	CO-EES-22 ELECTRICAL EQUIPMENT LAYOUT
4663-06-02-03-036	CO-EES-22 CABLE TRAY & GNDING LAYOUT, TRAYS AT EL.682.879 & 682.379
4663-06-02-03-037	CO-EES-22 CABLE TRAY & GNDING LAYOUT, TRAYS AT EL.681.279 & 681.673
4663-06-06-01-003	CO-SWBD-03 480V SINGLE LINE DIAGRAM NORMAL POWER SWITCHBOARD
4663-06-06-01-004	CO-SWBD-04 480V SINGLE LINE DIAGRAM EMERGENCY POWER SWITCHBOARD

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-09-27	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	SKC	PLR	MAB	JED	DCB	UPSIDE
01	2014-01-16	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	PLR	MAB	JED	DCB	UPSIDE
02	2014-04-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	MAA	PLR	MAB	JED	DCB	UPSIDE
03	2014-11-12	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	JIM	PLR	MSN	GSS	DCB	UPSIDE
04	2015-04-20	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	EDK EDC	MTM MTP	NJR NJR	VMA VMA	DCB DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER NIMA ROHANI 28819 ALBERTA

FOR REV 04 ONLY 2015-APR-23

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

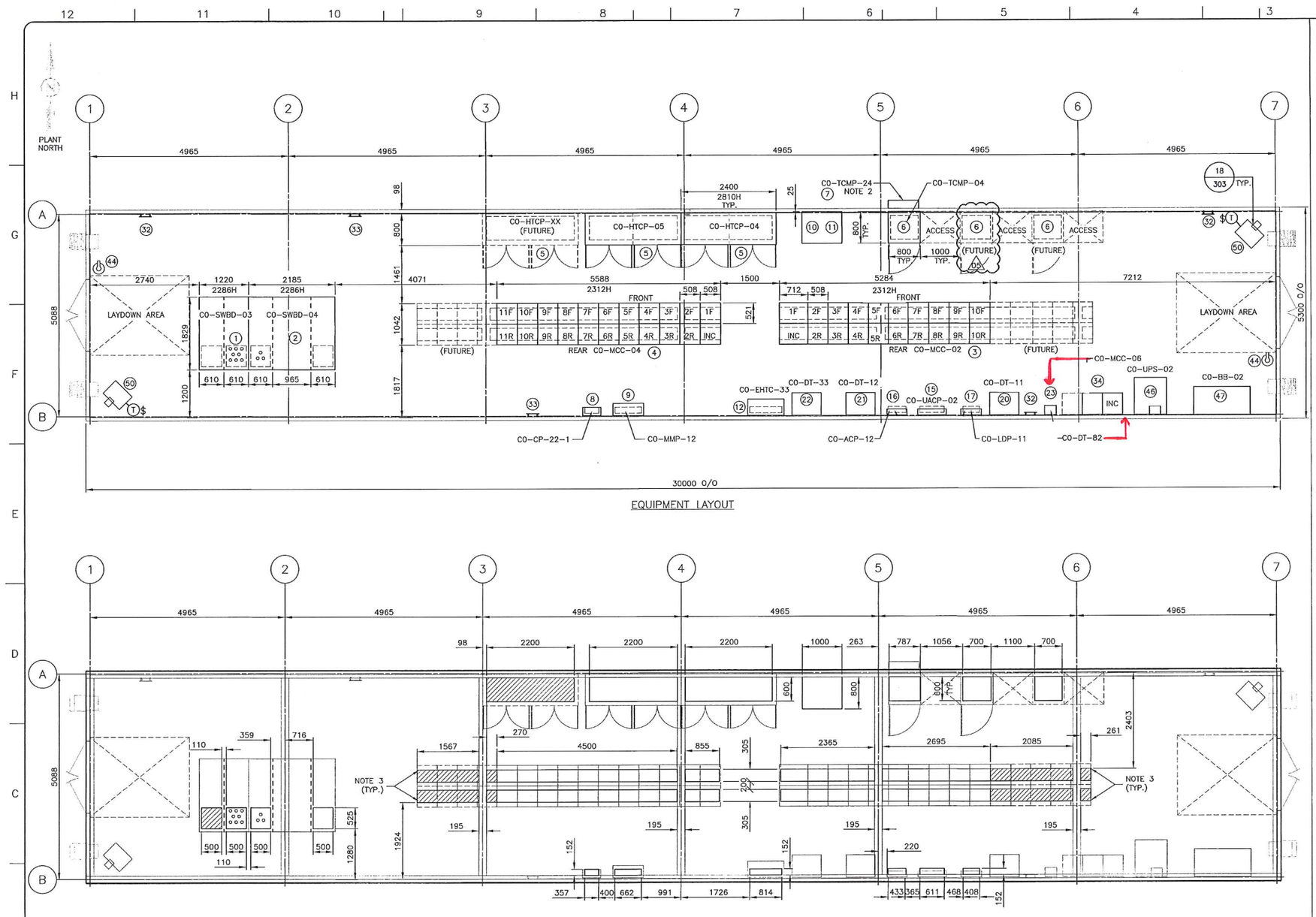
FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22
EQUIPMENT, CABLE TRAY, LTG & RECEPTACLES
BILL OF MATERIAL

SCALE N/A | DRAWING No 4663-06-02-03-032 | REV 04

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS



EQUIPMENT LAYOUT

FLOOR CUT-OUTS

1 0 METRES 1 2 3 4 5 6 7
0 FEET 5 10 15 20

SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. LOCATE BEHIND CO-TCMP-04 PANEL.
3. PROVIDE COVER PLATE OVER FLOOR CUTOUT FOR FUTURE EQUIPMENT.
4. PROVIDE REMOVABLE TRANSOM ABOVE DOOR.

SDN# 25472-130-E2-0000-P0031
UEL# 2012016-1EF-ELD-000-0031-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-02-03-032	CO-EES-22 ELECTRICAL EQUIPMENT BILL OF MATERIAL
4663-02-02-07-004	LOW VOLTAGE-EES-22 BUILDING - PLAN
4663-02-02-07-005	LOW VOLTAGE-EES-22 BUILDING - ELEVATIONS
4663-02-02-06-005	LOW VOLTAGE-EES-22 - STRUCTURAL STEEL PLAN
4663-02-02-06-006	LOW VOLTAGE-EES-22 - STRUCTURAL STEEL PLAN
4663-02-02-06-007	LOW VOLTAGE-EES-22 - STRUCTURAL STEEL ELEVATIONS

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-09-27	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)	2197104	SKC	PLR	SRL	JED	DCB	UPSIDE
01	2014-01-16	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)	2197104	MAF	PLR	SRL	JED	DCB	UPSIDE
02	2014-04-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)	2197104	MAA	PLR	SRL	JED	DCB	UPSIDE
03	2014-09-22	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)	2197104	BEM	LLL	DWC	JED	DCB	UPSIDE
04	2014-11-12	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	JIM	PLR	MSN	GSS	DCB	UPSIDE
05	2015-04-20	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	EDK	MTM	NJR	VMA	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER NIMA ROHANI ALBERTA

FOR REV 05 ONLY

2015-APR-23

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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TC_A1_BR.DWG 594X841

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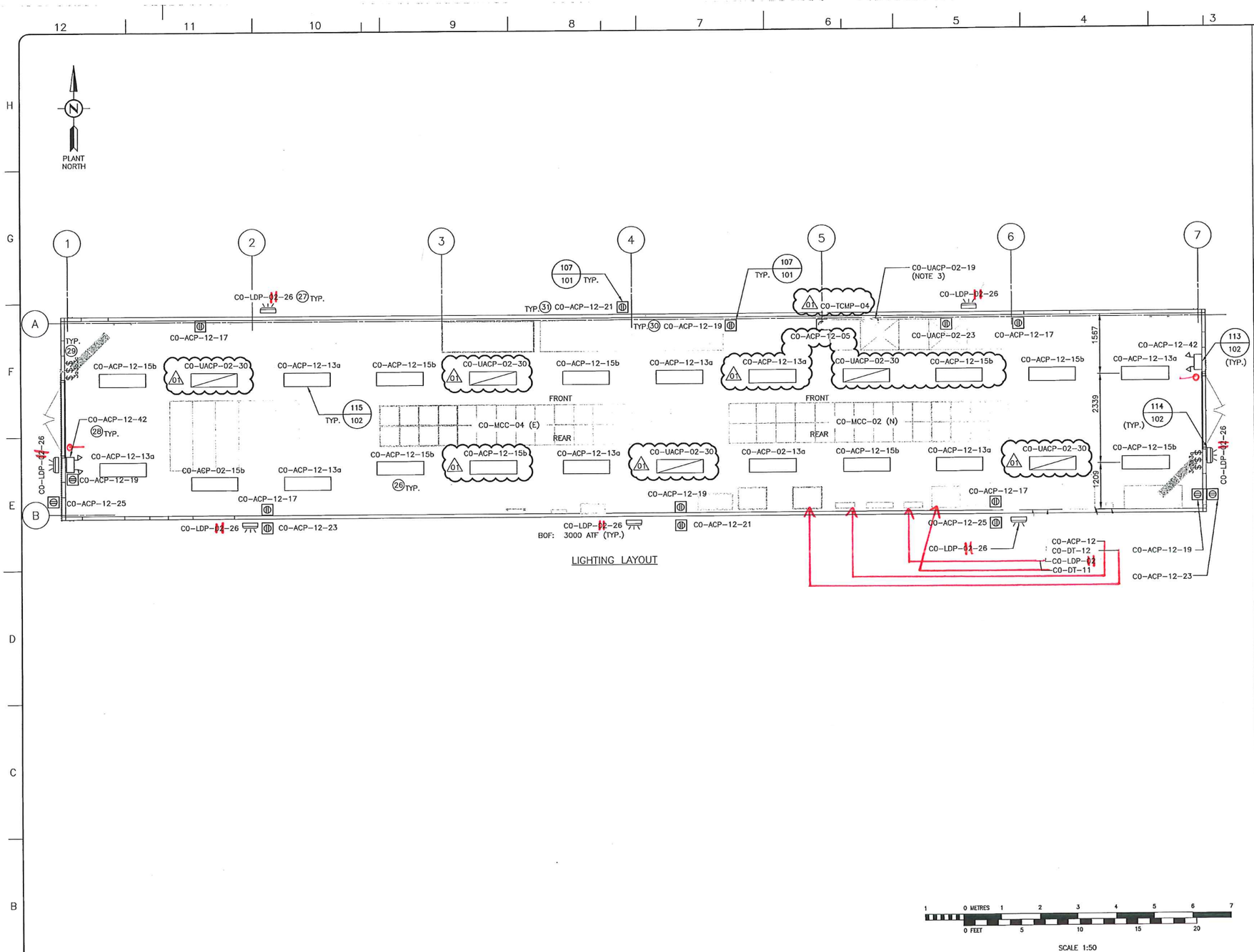
upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		06

CO-EES-22 ELECTRICAL EQUIPMENT LAYOUT

SCALE	DRAWING No	REV
1:50	4663-06-02-03-031	05



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. ALL ELECTRICAL INSTALLATION DETAIL DRAWING NUMBERS PRECEDED BY NO."4663-06-00-ID-".
3. PROVIDE 5-20R RECEPTACLE

LEGEND:

- FLUORESCENT LUMINAIRE (EMERGENCY)
- FLUORESCENT LUMINAIRE
- EXTERIOR LIGHTING (WALL MOUNTED)
- EMERGENCY LIGHTING FIXTURE (WALL MOUNTED)
- DUPLEX RECEPTACLE
- CO-LDP-01-01c: SWITCH # / CCT # / PANEL #
- ATF ABOVE TOP OF FLOOR
- BOF BOTTOM OF FIXTURE
- SINGLE RECEPTACLE

SCALE 1:50

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-06-00-05-002	CO-LDP-02, (480 V) LIGHTING DISTRIBUTION PANEL SCHEDULE
4663-06-00-05-005	CO-EES-22 CO-ACP-12, CO-UACP-02 DISTRIBUTION PANELS SCHEDULE
4663-06-02-03-045	CO-EES-22 ELEC. EQUIP. SHELTER (NORTH) ELEC. EQUIP. BILL OF MATERIAL

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-04-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	MJM	PLR	MJM	JED	DCB	UPSIDE
01	2014-10-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	LLL	JED	DCB	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-OCT-08

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

SDN# 25472-130-E2-0000-P0033
UEL# 2012016-1EF-ELD-000-0033-01

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KEYSTONE HARDISTY TANK TERMINAL

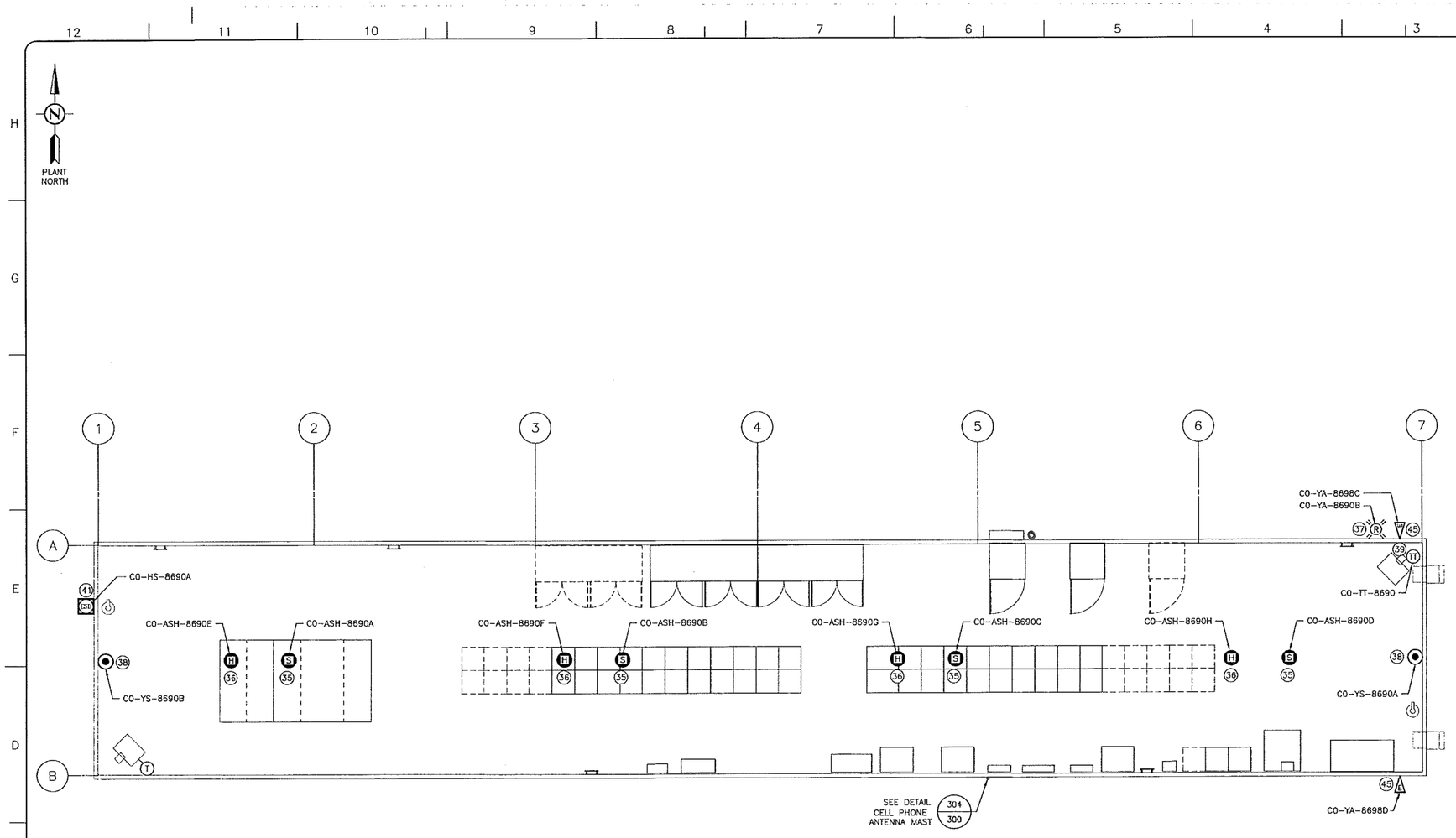
FIA #	CHAINAGE:	DISCIPLINE #
4663		06

CO-EES-22
LIGHTING AND LOW VOLTAGE UTILITIES LAYOUT

SCALE	DRAWING No	REV.
1:50	4663-06-02-03-033	01

TIME DESIGNFILE

TC_A1_BR.DWG 594X841



INSTRUMENTATION LAYOUT

1 0 METRES 1 2 3 4 5 6 7
0 FEET 5 10 15 20

SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-06-02-03-032	CO-EES-22 ELECTRICAL EQUIPMENT BILL OF MATERIAL
4663-05-03-SC-013	CO-HTCP-01, PLC-11/00 SLOT 09, DISCRETE INPUT, I/O WIRING DIAGRAM (SHEET 2 OF 2)
4663-05-03-SC-422	CO-HTCP-05, PLC-11/12 SLOT 11, DISCRETE INPUT, I/O WIRING DIAGRAM (SHEET 1 OF 2)
4663-05-03-SC-425	CO-HTCP-05, PLC-11/12 SLOT 12, DISCRETE INPUT, I/O WIRING DIAGRAM (SHEET 2 OF 2)
4663-05-03-SC-428	CO-HTCP-05, PLC-11/13 SLOT 04, DISCRETE OUTPUT - STATIC, I/O WIRING DIAGRAM
4663-05-03-SC-441	CO-HTCP-05, PLC-11/14 SLOT 05, ANALOG INPUT - SINGLE ENDED, I/O WIRING DIAGRAM

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-04-07	ISSUED FOR CONSTRUCTION (UEL PROJ.# 2012016)	2197104	MAA	PLR	SRL	AJED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-APR-07

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.

PERMIT NUMBER: P 5508

The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

SDN# 25472-130-E2-0000-P0035
UEL# 2012016-1EF-ELD-000-0035-01

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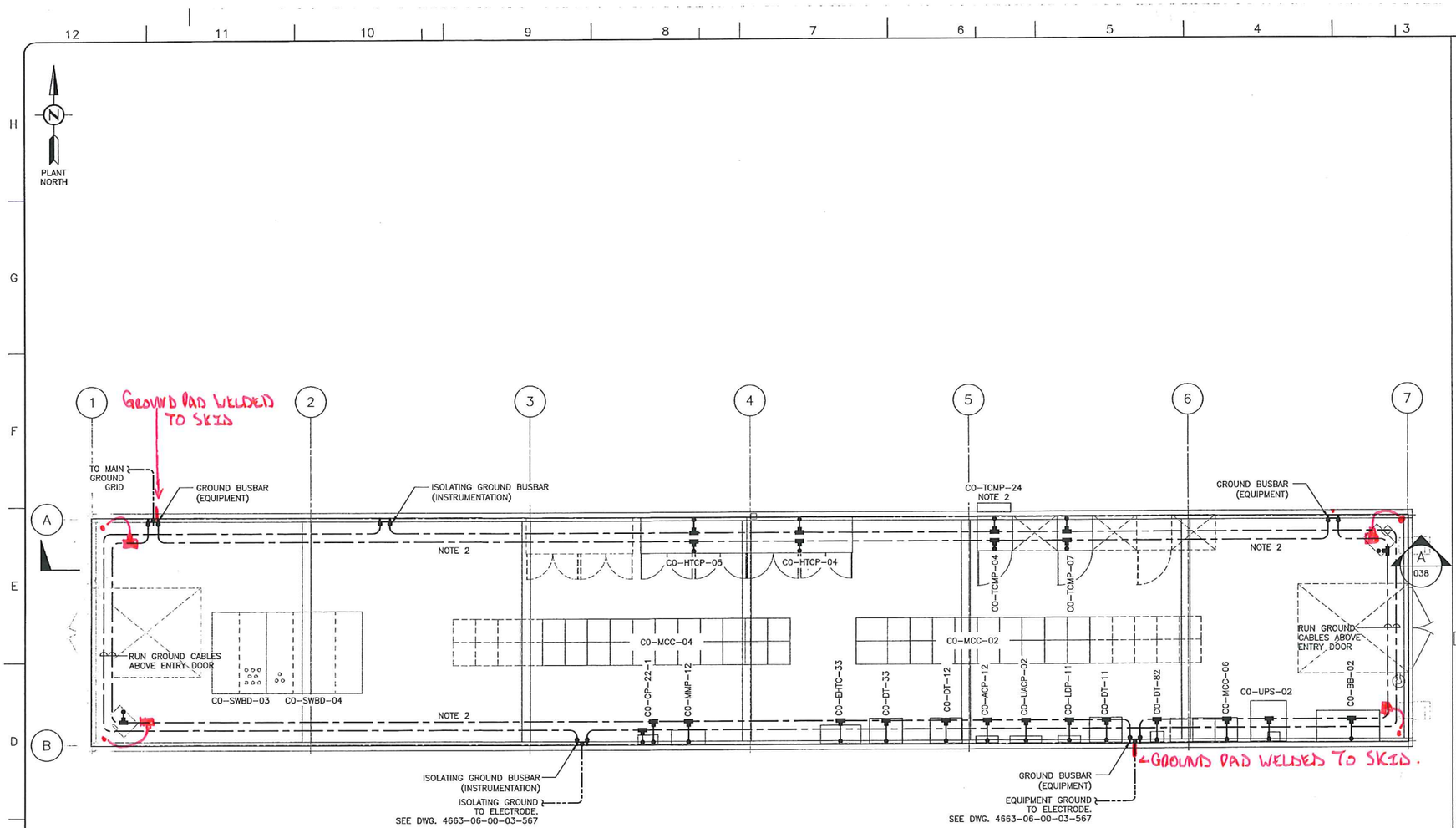
KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		06

CO-EES-22 INSTRUMENTATION DEVICES LAYOUT

SCALE	DRAWING No	REV
1:50	4663-06-02-03-035	00

TIME - DESIGNATE



EQUIPMENT LAYOUT

* EQUIPMENT GROUND LOOP IS CABLE TRAY GROUND LOOP
* ISOLATED GROUND LOOP TO BE RUN IN LOWER TRAY

SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. LOCATE BEHIND CO-TCMP-04 PANEL.
3. PROVIDE COVER PLATE OVER FLOOR CUTOUT FOR FUTURE EQUIPMENT.
4. PROVIDE REMOVABLE TRANSOM ABOVE DOOR.

BOND STEEL TO EQUIPMENT LOOP IN 4 CORNERS WITH 2/0.

GROUND PAD TO SUPPORT TWO "YGHA" OR EQUAL LUGS

SEE DETAIL 5 ON DRAWING 4663-06-00-ID-001

LEGEND:

- #4/0 UNDERGROUND GROUND GRID
- #2/0 CABLE TRAY GROUND
- #2 EQUIPMENT GROUND
- COMPRESSION TYPE CONNECTION
- 3-POINT GROUNDING CONDUCTOR CONNECTION
- 4-POINT GROUNDING CONDUCTOR CONNECTION
- GROUND BUS

CO-TRY-ABCC FHHG DDD.EEE

- TRAY TYPE: L=LADDER S=SOLID V=VENTILATED
- TRAY NOMINAL SIZE: 15=150MM 30=300MM 45=450MM 60=600MM 90=900MM
- G=WITH GROUND CABLE ()=NO GROUND CABLE
- ELEVATION: DDD=(M), EEE=(MM)
- SEQUENTIAL NUMBER: 01 TO 99
- DESTINATION AREA: 0=WITHIN EES/VES BUILDINGS 1=TK-21, 23, 25 2=TK-22, 24, 26 3=TK-27, 29, 31 4=TK-28, 30, 32 5=PUMPS 6=MATRIX EAST 7=MATRIX WEST 8=SWTHYARD NORTH 9=SWTHYARD SOUTH
- VOLTAGE: 1=ABOVE 4160V (SPACED) 2=4160V (SPACED) 3=480V FEEDER (SPACED) 4=24V (INSTRUMENTATION) 5=MIXED WITHOUT BARRIER (120V UP TO 480V) 6=MIXED WITH BARRIER
- EQUIPMENT TYPE: TRY=CABLE TRAY
- SITE DESIGNATION: CO=KHTT

NOTES:

1. ALL ELECTRICAL INSTALLATION DETAIL DRAWING NUMBERS PRECEDED BY N° 4663-06-00-ID.
2. ~~RUN #2/0 AWG GROUND VIA STEEL SUPPORT, SECURED TO WALL C/W CLAMP EVERY 3m INTERVALS, 300mm.~~

SDN# 25472-130-E2-0000-P0034
UEL# 2012016-1EF-ELD-000-0034-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-06-02-03-032	CO-EES-22 ELECTRICAL EQUIPMENT BILL OF MATERIAL
4663-02-02-07-004	LOW VOLTAGE-EES-22 BUILDING - PLAN
4663-02-02-07-005	LOW VOLTAGE-EES-22 BUILDING - ELEVATIONS
4663-02-02-06-005	LOW VOLTAGE-EES-22 - STRUCTURAL STEEL PLAN
4663-02-02-06-006	LOW VOLTAGE-EES-22 - STRUCTURAL STEEL PLAN
4663-02-02-06-007	LOW VOLTAGE-EES-22 - STRUCTURAL STEEL ELEVATIONS

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-04-07	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)	2197104	MAA	PLR	AAA	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER JAMES DOODY PRMD 2014-APR-07

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD. PERMIT NUMBER: P 5508 The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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KEYSTONE HARDISTY TANK TERMINAL

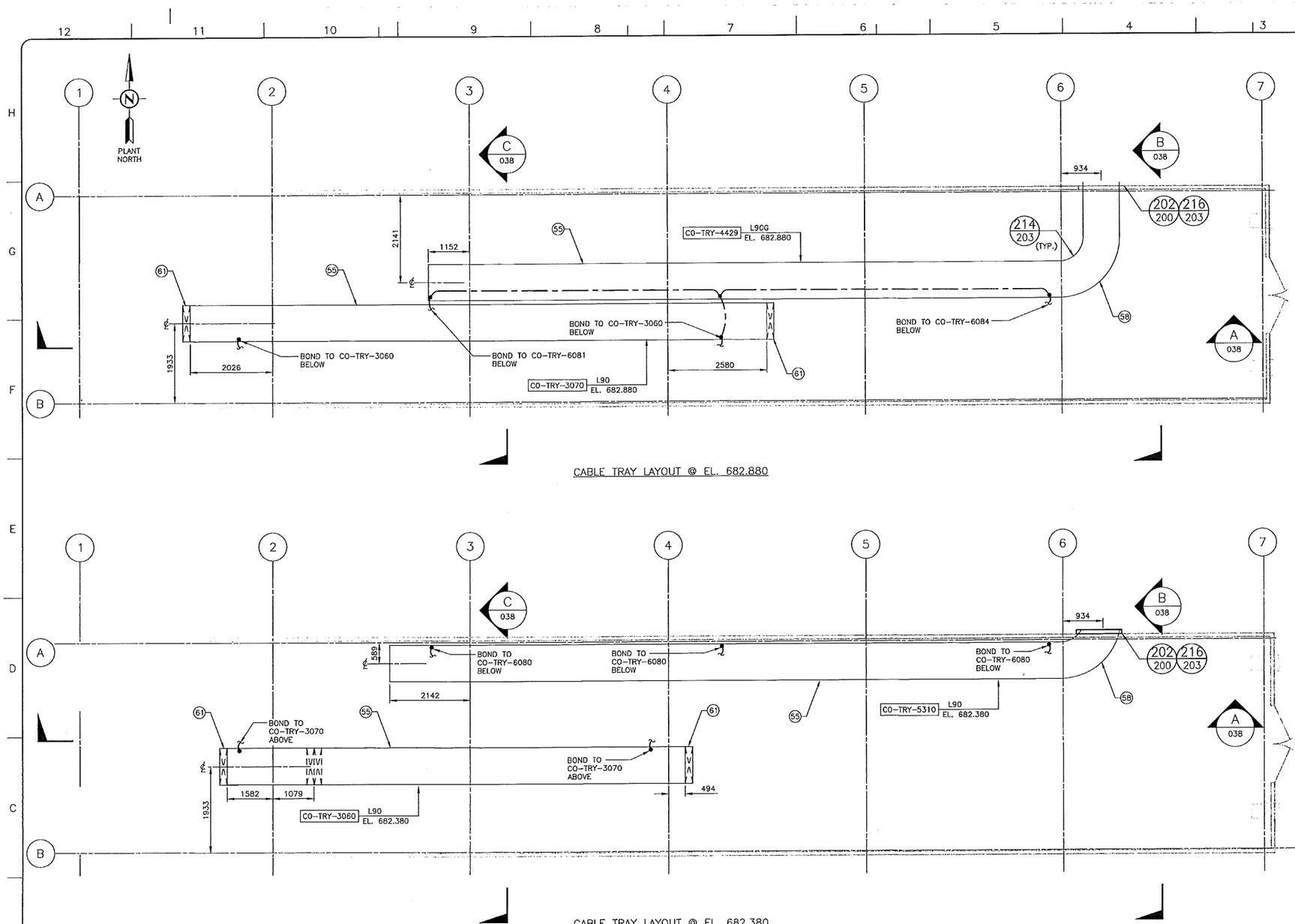
FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22 ELECTRICAL EQUIPMENT GROUNDING LAYOUT

SCALE 1:50 | DRAWING No 4663-06-02-03-034 | REV 00

TIME - DESIGNFILE

TC_A1_BR.DWG 594X841



LEGEND:

- #4/0 UNDERGROUND GROUND GRID
- #2/0 CABLE TRAY GROUND
- #2 EQUIPMENT GROUND
- COMPRESSION TYPE CONNECTION
- 3-POINT GROUNDING CONDUCTOR CONNECTION
- 4-POINT GROUNDING CONDUCTOR CONNECTION

CO-TRY-ABCC FHHG DDD.EEE

- TRAY TYPE: L=LADDER, S=SOLID, V=VENTILATED
- TRAY NOMINAL SIZE: 15=150MM, 30=300MM, 45=450MM, 60=600MM, 90=900MM
- G=WITH GROUND CABLE, ()=NO GROUND CABLE
- ELEVATION: DDD=(M), EEE=(MM)
- SEQUENTIAL NUMBER: 01 TO 99
- DESTINATION AREA: 0=WITHIN EES/VES BUILDINGS, 1=TK-21, 23, 25, 2=TK-22, 24, 26, 3=TK-27, 29, 31, 4=TK-28, 30, 32, 5=PUMPS, 6=MATRIX EAST, 7=MATRIX WEST, 8=SWTHYARD NORTH, 9=SWTHYARD SOUTH
- VOLTAGE: 1=ABOVE 416OV (SPACED), 2=416OV (SPACED), 3=480V FEEDER (SPACED), 4=24V (INSTRUMENTATION), 5=MIXED WITHOUT BARRIER (120V UP TO 480V), 6=MIXED WITH BARRIER
- EQUIPMENT TYPE: TRY=CABLE TRAY
- SITE DESIGNATION: CO=KHTT

NOTES:

1. ALL ELECTRICAL INSTALLATION DETAIL DRAWING NUMBERS PRECEDED BY N° 4663-06-00-ID.
2. ALL DIMENSIONS TO BE FROM CENTER LINE OF CABLE TRAY TO BUILDING GRID LINE AS SHOWN.

SDN#: 25472-130-E2-0000-P0136
UEL#: 2012016-1EF-ELD-000-136-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-02-03-035	CO-EES-22 CABLE TRAY LAYOUT ELEVATIONS, SETIONS AND DETAILS
4663-06-02-03-036	CO-EES-22 CABLE TRAY LAYOUT ELEVATIONS, SETIONS AND DETAILS
4663-06-02-03-037	CO-EES-22 CABLE TRAY LAYOUT ELEVATIONS, SETIONS AND DETAILS
4663-02-02-07-004	LOW VOLTAGE EES-22 BUILDING PLAN AND ELEVATIONS
4663-02-02-07-005	LOW VOLTAGE EES-22 BUILDING ELEVATIONS

REVISION

REV No	DATE	DESCRIPTION
00	2014-04-07	ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	MAA	PLR	AAA	GEDED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 2014-APR-07

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_ER.DWG 594X841

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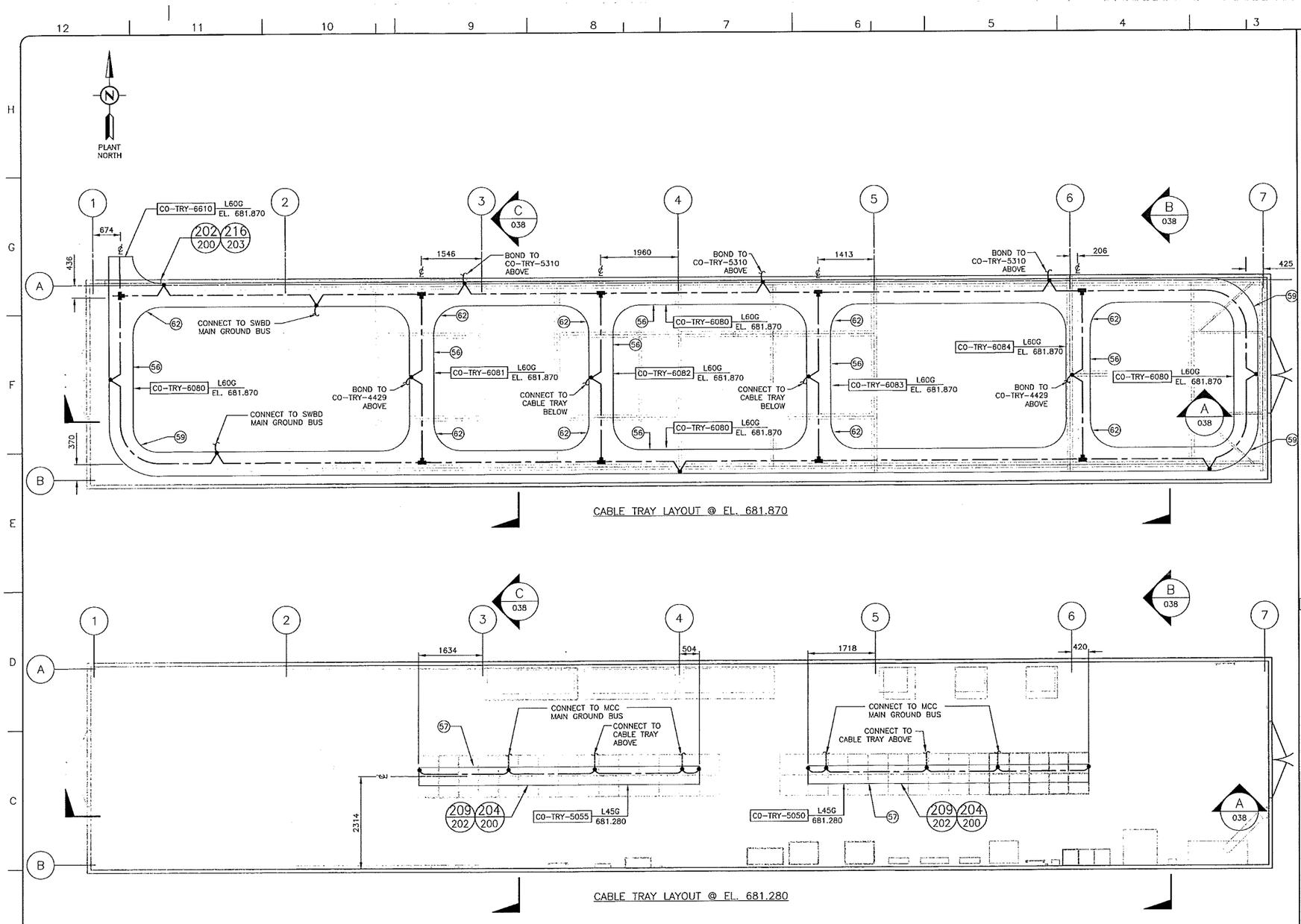
KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22
CABLE TRAY, CABLING & GROUNDING LAYOUT TRAYS AT EL.682.880 & EL.682.380

SCALE 1:50 | DRAWING No 4663-06-02-03-036 | REV 00

TIME — DESIGNFILE



LEGEND:

- #4/0 UNDERGROUND GROUND GRID
- #2/0 CABLE TRAY GROUND
- #2 EQUIPMENT GROUND
- COMPRESSION TYPE CONNECTION
- 3-POINT GROUNDING CONDUCTOR CONNECTION
- 4-POINT GROUNDING CONDUCTOR CONNECTION

CO-TRY-ABCC FHHG DDD.EEE

- TRAY TYPE: L=LADDER S=SOLID V=VENTILATED
- TRAY NOMINAL SIZE: 15=150MM 30=300MM 45=450MM 60=600MM 90=900MM
- G=WITH GROUND CABLE ()=NO GROUND CABLE
- ELEVATION: DDD=(M), EEE=(MM)
- SEQUENTIAL NUMBER: 01 TO 99
- DESTINATION AREA: 0=WITHIN EES/VES BUILDINGS 1=TK-21, 23, 25 2=TK-22, 24, 26 3=TK-27, 29, 31 4=TK-28, 30, 32 5=PUMPS 6=MATRIX EAST 7=MATRIX WEST 8=SWTHYARD NORTH 9=SWTHYARD SOUTH
- VOLTAGE: 1=ABOVE 4160V (SPACED) 2=4160V (SPACED) 3=480V FEEDER (SPACED) 4=24V (INSTRUMENTATION) 5=MIXED WITHOUT BARRIER (120V UP TO 480V) 6=MIXED WITH BARRIER
- EQUIPMENT TYPE: TRY=CABLE TRAY
- SITE DESIGNATION: CO=KHTT

NOTES:

1. ALL ELECTRICAL INSTALLATION DETAIL DRAWING NUMBERS PRECEDED BY N° 4663-06-00-ID.
2. ALL DIMENSIONS TO BE FROM CENTER LINE OF CABLE TRAY TO BUILDING GRID LINE AS SHOWN.

SDN#: 25472-130-E2-0000-P0037
UEL#: 2012016-1EF-ELD-000-0037-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-06-02-03-046	CO-EES-22 ELECTRICAL EQUIPMENT LAYOUT
4663-06-02-03-047	CO-EES-22 CABLE TRAY & GNDING BILL OF MATERIAL
4663-06-02-03-036	CO-EES-22 CABLE TRAY & GNDING LAYOUT, TRAYS AT EL.682.879 & 682.379
4663-06-02-03-038	CO-EES-22 CABLE TRAY & GNDING LAYOUT, ELEVATIONS, SECTIONS & DETAILS
4663-02-02-06-005	LOW VOLTAGE-EES-22 STRUCTURAL STEEL PLAN
4663-02-02-07-004	LOW VOLTAGE-EES-22 BUILDING PLAN AND ELEVATIONS
4663-02-02-07-005	LOW VOLTAGE-EES-22 BUILDING ELEVATIONS

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-04-07	ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)	2197104	MAA	PLR	AA	for DCB	for DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-APR-07

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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KEYSTONE HARDISTY TANK TERMINAL

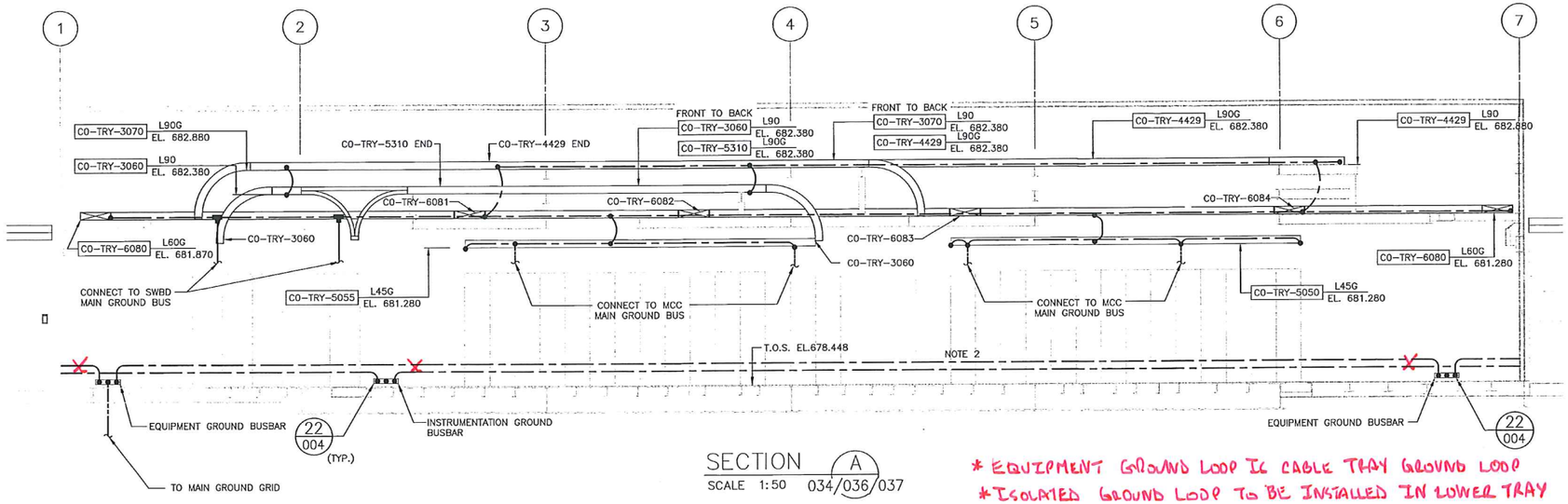
FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22
CABLE TRAY, CABLING AND GROUNDING LAYOUT CABLE TRAY AT EL.681.870 AND EL.681.280

SCALE 1:50 | DRAWING No 4663-06-02-03-037 | REV 00

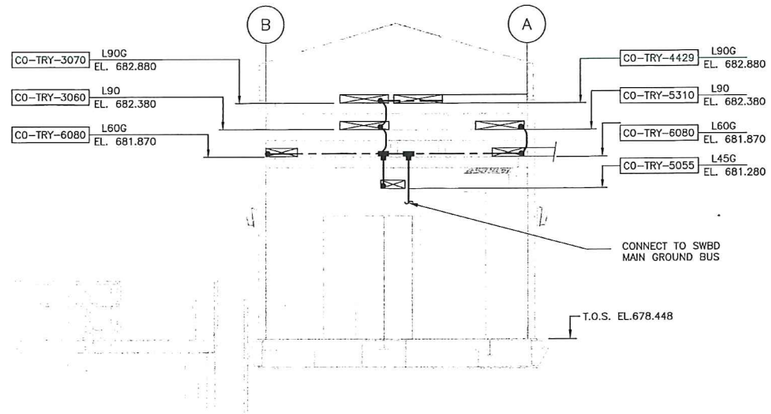
TC_A1_BR.DWG 594X841

TIME — DESIGNATE

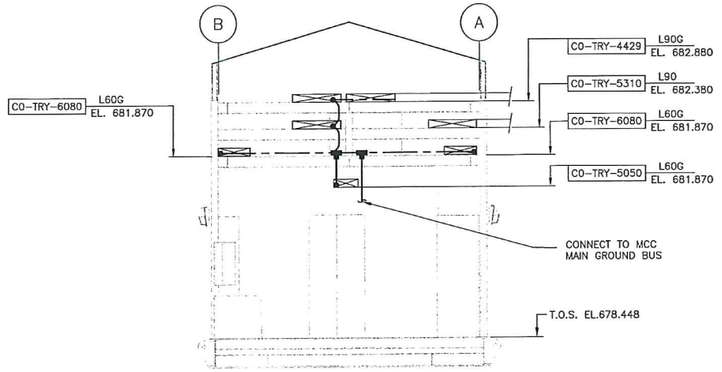


SECTION A
SCALE 1:50 034/036/037

* EQUIPMENT GROUND LOOP IS CABLE TRAY GROUND LOOP
* ISOLATED GROUND LOOP TO BE INSTALLED IN LOWER TRAY



SECTION C
SCALE 1:50 036/037



SECTION B
SCALE 1:50 036/037

1 0 METRES 1 2 3 4 5 6 7
0 FEET 5 10 15 20
SCALE 1:50

* ALL TRAY TO TRAY JUMPERS ARE TORE 2/0.
* BOND STEEL IN 4 CORNERS WITH 2/0.

LEGEND:

- #4/0 UNDERGROUND GROUND GRID
- #2/0 CABLE TRAY GROUND
- #2 EQUIPMENT GROUND
- COMPRESSION TYPE CONNECTION
- 3-POINT GROUNDING CONDUCTOR CONNECTION
- 4-POINT GROUNDING CONDUCTOR CONNECTION

CO-TRY-ABCC FHHG DDD.EEE

- TRAY TYPE: L=LADDER, S=SOLID, V=VENTILATED
- TRAY NOMINAL SIZE: 15=150MM, 30=300MM, 45=450MM, 60=600MM, 90=900MM
- G=WITH GROUND CABLE, ()=NO GROUND CABLE
- ELEVATION: DDD=(M), EEE=(MM)
- SEQUENTIAL NUMBER: 01 TO 99
- DESTINATION AREA: 0=WITHIN EES/VES BUILDINGS, 1=TK-21, 23, 25, 2=TK-22, 24, 26, 3=TK-27, 29, 31, 4=TK-28, 30, 32, 5=PUMPS, 6=MATRIX EAST, 7=MATRIX WEST, 8=SWTHYARD NORTH, 9=SWTHYARD SOUTH
- VOLTAGE: 1=ABOVE 4160V (SPACED), 2=4160V (SPACED), 3=480V FEEDER (SPACED), 4=24V (INSTRUMENTATION), 5=MIXED WITHOUT BARRIER (120V UP TO 480V), 6=MIXED WITH BARRIER
- EQUIPMENT TYPE: TRY=CABLE TRAY
- SITE DESIGNATION: CO=KHTT

NOTES:

1. ALL ELECTRICAL INSTALLATION DETAIL DRAWING NUMBERS PRECEDED BY N° 4663-06-00-ID.
2. ~~RUN #2/0 AWG GROUND VIA STEEL SUPPORT, SECURED TO WALL c/w CLAMP EVERY 3 m INTERVALS, 300 mm ABOVE FINISHED FLOOR.~~
3. ALL DIMENSIONS TO BE FROM CENTER LINE OF CABLE TRAY TO BUILDING GRID LINE AS SHOWN.

SDN#: 25472-130-E2-0000-P0038
UEL#: 2012016-1EF-ELD-000-0038-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-02-03-036	CO-EES-22 CABLE TRAY & GNDING LAYOUT, TRAYS AT EL.682.879 & 682.379
4663-06-02-03-037	CO-EES-22 CABLE TRAY & GNDING LAYOUT, TRAYS AT EL.681.673 & 681.279

REVISION

REV No	DATE	DESCRIPTION
00	2014-04-07	ISSUED FOR CONSTRUCTION (UEL PROJ# 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	MAA	PLR	AAA	JED	JACB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 2014-APR-07

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22
CABLE TRAY, CABLING AND GROUNDING LAYOUT ELEVATIONS, SECTIONS AND DETAILS

SCALE 1:50 | DRAWING No 4663-06-02-03-038 | REV 00

TIME - DESIGNFILE

NAME: CO-UACP-02	PHASES: 1	BUS SIZE: 100 A	LOCATION: CO-EES-22	MAIN BREAKER: N/A
VOLTAGE: 120 V	WIRES: 2	MOUNTING: SURFACE		FEEDER: 2#3, 1#6, GND 27mm EMT (CO-P-3200)

DESCRIPTION	LOAD (WATTS)	FUSE SIZE (AMPS)	BRKR SIZE (AMPS)	CCT NO.	CCT NO.	BRKR SIZE (AMPS)	FUSE SIZE (AMPS)	LOAD (WATTS)	DESCRIPTION
CO-HTCP-04 CONTROL POWER	200	20	30	1	2	30	20	0	SPARE
CO-HTCP-05 CONTROL POWER	230	20	30	3	4	30	20	50	CO-HTCP-05 (FIRE/BEACON SUPPLY)
SPARE	0	20	30	5	6	30	20	0	SPARE
CO-EJB-27-2 CONTROL POWER	50	20	30	7	8	30	20	0	SPARE
CO-EJB-28-2 CONTROL POWER	50	20	30	9	10	30	20	0	SPARE
CO-EJB-29-2 CONTROL POWER (FUTURE)	50	20	30	11	12	30	20	0	SPARE
CO-EJB-30-2 CONTROL POWER (FUTURE)	50	20	30	13	14	30	20	0	SPARE
CO-EJB-31-2 CONTROL POWER (FUTURE)	50	20	30	15	16	30	20	0	SPARE
CO-EJB-32-2 CONTROL POWER (FUTURE)	50	20	30	17	18	30	20	0	SPARE
CO-TCMP-04 CONTROL POWER	160	20	30	19	20	30	20	0	SPARE
CO-TCMP-~~03~~ CONTROL POWER (CCTV TOWER 11)	140	20	30	21	22	30	20	0	IJB-50 REMOTE TRIPPING PANEL
SPARE	0	15	15	23	24	30	20	200	CO-CP-22-1
CO-SWBD-03 CONTROL POWER	20	20	30	25	26	30	20	50	CO-T-12 TRANSFORMER CONTROL POWER
CO-SWBD-04 CONTROL POWER	20	20	30	27	28	30	20	40	SMOKE DETECTORS (CO-EES-22)
CO-MCC-02 CONTROL POWER	20	20	30	29	30	30	20	360	INTERIOR EMERGENCY LIGHTS (CO-EES-22)
CO-MCC-04 CONTROL POWER	20	20	30	31	32	30	30	2800	FOAM SYSTEM PANEL CO - AJB-02
SPARE	0	20	30	33	34	40	40	1500	CO-UACP-04
SPARE	50	20	30	35					
LEFT SIDE (WATTS): 1160				TOTAL (WATTS): 6160				5000	RIGHT SIDE (WATTS)

NAME: CO-ACP-12	PHASES: 3	BUS SIZE: 225 A	LOCATION: CO-EES-22	MAIN BREAKER: 225 A
VOLTAGE: 120/208 V	WIRES: 4	MOUNTING: SURFACE		FEEDER: 4C # 2/0

DESCRIPTION	LOAD (WATTS) A	LOAD (WATTS) B	LOAD (WATTS) C	BRKR SIZE (AMPS)	CCT NO.	CCT NO.	BRKR SIZE (AMPS)	LOAD (WATTS) A	LOAD (WATTS) B	LOAD (WATTS) C	DESCRIPTION
CO-HTCP-04 POWER	200			15	1	2	15	40			CO-HTCP-04 CABINET LIGHTS
CO-HTCP-05 POWER		230		15	3	4	15		40		CO-HTCP-05 CABINET LIGHTS
CO-TCMP-04 POWER			200	15	5	6	15			0	SPARE
CO-TCMP-11 HEATER POWER	100			15	7	8	15	0			SPARE
SPARE		0		15	9	10	15		0		SPARE
SPARE			0	15	11	12	15			0	SPARE
CO-EES-22 INTERIOR LIGHTS	710			15	13	14	15	0			SPARE
CO-EES-22 INTERIOR LIGHTS		640		15	15	16	15		0		SPARE
CO-EES-22 INTERIOR RECEPTACLE			500	20 ~~15~~	17	18	15			0	SPARE
CO-EES-22 INTERIOR RECEPTACLE	500	01		20 ~~15~~	19	20	15	0			SPARE
CO-EES-22 EXTERIOR RECEPTACLE		200		20 ~~15~~	21	22	15		0		SPARE
CO-EES-22 EXTERIOR RECEPTACLE			200	20 ~~15~~	23	24	15			0	SPARE
CO-EES-22 EXTERIOR RECEPTACLE	200			20 ~~15~~	25	26	15	200			SITE RECEPTACLE
CO-EJB-07 EXTERIOR RECEPTACLE		400		15	27	28	15		200		SITE RECEPTACLE (FUTURE)
CO-RPL-01 BOOSTER AREA RECEPTACLE			200	15	29	30	15			200	SITE RECEPTACLE (FUTURE)
SPARE	0			15	31	32	15	0			SPARE
SPARE		0		15	33	34	15		0		SPARE
SPARE			0	15	35	36	15			0	SPARE
SPARE	0			15	37	38	15	0			SPARE
SPARE		0		15	39	40	20		1650		CO-T-12 CABINET HEATERS
SPARE			0	15	41	42	15			20	EMERGENCY EXIT LIGHT BATTERY PACK
01 LEFT SIDE (WATTS) 4280	1710	1470	1100	TOTAL (WATTS): 6630				240	1890	220	2350 RIGHT SIDE (WATTS)

NOTES:

1. ALL EQUIPMENT & CABLE TAGS SHALL BEGIN WITH 130-KSHTT-CO-...

SDN# 25472-130-EC-0000-P0005
UEL# 2012016-1EF-CAB-000-0039-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-02-03-031	CO-EES-22 ELECTRICAL EQUIPMENT LAYOUT
4663-06-02-03-032	CO-EES-22 ELECTRICAL EQUIPMENT BILL OF MATERIAL
4663-06-02-03-033	CO-EES-22 LIGHTING AND LOW VOLTAGE UTILITIES LAYOUT

REVISION

REV No	DATE	DESCRIPTION
00	2014-04-07	ISSUED FOR CONSTRUCTION (UEL PROJ # 2012016)
01	2014-10-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ # 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	MAA	PLR	MJM	JED	DCB	UPSIDE
2197104	BEM	LLL	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-OCT-08

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver
upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663	CHAINAGE:	DISCIPLINE # 06

CO-EES-22
CO-ACP-12 AND CO-UACP-02
DISTRIBUTION PANEL SCHEDULES

SCALE N.T.S.	DRAWING No 4663-06-00-05-005	REV 01

TIME — DESIGN FILE

ID

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

LIGHTING DISTRIBUTION PANEL CO-LDP-11

NAME	CO-LDP-11	PHASES	3	HERTZ	60	INT. CAP	14 KA	MAIN BUS	100 A	LOCATION	CO-EES-22
VOLTAGE	277VAC/480VAC	WIRES	4	FEEDER SIZE		NOTE 1		MAIN BREAKER	N/A	MOUNTING	SURFACE

DESCRIPTION	WATTS A	WATTS B	WATTS C	BRKR SIZE (AMPS)	CCT NO.	A B C	CCT NO.	BRKR SIZE (AMPS)	WATTS A	WATTS B	WATTS C	DESCRIPTION
CO-TK-27 AREA, GAUGE, PLATFORM AND STAIRS LIGHTING	645			15A/3P	1		2	15A/3P	1664			CO-TK-28 AREA, GAUGE, PLATFORM AND STAIRS LIGHTING
		738			3		4			1730		
			738		5		6				1697	
WEST PROCESS AREA, GAUGE, PLATFORM AND STAIRS LIGHTING	933			15A/3P	7		8	15A/3P	1003			EAST PROCESS AREA, GAUGE, PLATFORM AND STAIRS LIGHTING
		933			9		10			1073		
			933		11		12				1073	
SPARE				15A/3P	13		14					
					15		16	15A/3P				SPARE
					17		18					
SPARE				15A/3P	19		20					
					21		22	15A/3P				SPARE
					23		24					
SPARE				15A/3P	25		26	15A/1P	588			CO-EES-22 EXTERIOR LIGHTING
					27		28	15A/1P				SPARE
					29		30	15A/1P				SPARE
SPARE				15A/1P	31		32	15A/1P				SPARE
SPARE				15A/1P	33		34	15A/1P				SPARE
SPARE				15A/1P	35		36	15A/1P				SPARE
SPARE				15A/1P	37		38	20A/1P				SPARE
SPARE				15A/1P	39		40	20A/1P				SPARE
SPARE				15A/1P	41		42	20A/1P				SPARE
LEFT SIDE (WATTS)	02 4920	1578	1671	1671	TOTAL WATTS: 13748				3255	2803	2770	8828 02 RIGHT SIDE (WATTS)

COMMENTS

1 REFER TO CABLE SCHEDULE

NOTES:

1. ALL EQUIPMENT & CABLE TAGS SHALL BEGIN WITH 130-KSHTT-CO-...

SDN# 25472-130-EC-0000-P0002
UEL# 2012016-1EF-CAB-000-0004-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-04	ISSUED FOR CONSTRUCTION (UEL PROJ # 2012016)
01	2014-04-17	RE-ISSUED FOR CONSTRUCTION (UEL PROJ # 2012016)
02	2014-10-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ # 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	MJM	PLR	MJM	JED	DCB	UPSIDE
2197104	BEM	PLR	MAB	JED	DCB	UPSIDE
2197104	BEM	LLL	HMY	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-OCT-08

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-LDP-11 (480 V) LIGHTING DISTRIBUTION PANEL SCHEDULES

SCALE N.T.S. | DRAWING No 4663-06-00-05-002 | REV 02

TIME ----- DESIGNFILE

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

REV	CABLE NUMBER	DESCRIPTION				APPLICATION	SYSTEM VOLTAGE (VOLT)	ROUTE			LENGTH	COMMENTS
		CONDUCTORS		RATING (VOLT)	TYPE			FROM	VIA	TO	(m)	
		QTY.	SIZE								NOTE 1	
00	CO-CS-3010	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 SCADA SWITCH SW1301, CO-EES-22	CABLE TRAY	CO-MFR-B-15 CO-SWBD-03, PQMII, CO-EES-22	35	
00	CO-CS-3011	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 SCADA SWITCH SW1301, CO-EES-22	CABLE TRAY	CO-MFR-B-16 CO-SWBD-04, PQMII, CO-EES-22	33	
00	CO-CS-3012	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 SCADA SWITCH SW1301, CO-EES-22	CABLE TRAY	CO-MFR-B-17 CO-MCC-02, PQMII, CO-EES-22	28	
00	CO-CS-3013	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 SCADA SWITCH SW1301, CO-EES-22	CABLE TRAY	CO-MFR-B-18 CO-MCC-04, PQMII, CO-EES-22	35	
00	CO-CS-3025	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 RIO SWITCH SW1331, CO-EES-22	CABLE TRAY	CO-HTCP-04 TERMINAL CONTROL PANEL, CO-EES-22	21	
00	CO-CS-3026	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 RIO SWITCH SW1331, CO-EES-22	CABLE TRAY	CO-HTCP-04 TERMINAL CONTROL PANEL, CO-EES-22	21	
00	CO-CS-3030	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 RIO SWITCH SW1331, CO-EES-22	CABLE TRAY	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	23	
00	CO-CS-3031	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 RIO SWITCH SW1331, CO-EES-22	CABLE TRAY	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	23	
00	CO-CS-3070	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 BUSINESS SWITCH SW1311, CO-EES-22	CABLE TRAY	WORKSTATION OUTLET CO-EES-22	17	NO WORK STATION NOT INSTALLED
00	CO-CS-3071	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 BUSINESS SWITCH SW1311, CO-EES-22	CABLE TRAY	WORKSTATION OUTLET CO-EES-22	17	NO WORK STATION NOT INSTALLED
00	CO-CS-3072	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 BUSINESS SWITCH SW1311, CO-EES-22	CABLE TRAY	WORKSTATION OUTLET CO-EES-22	17	NO WORK STATION NOT INSTALLED
00	CO-CS-3073	4PR	#23 AWG	300	BELDEN 121872A	COMMUNICATIONS	24 VDC	CO-TCMP-04 BUSINESS SWITCH SW1311, CO-EES-22	CABLE TRAY	WORKSTATION OUTLET CO-EES-22	17	NO WORK STATION NOT INSTALLED
00	CO-CS-3100	–	–	–	LMR 400, ULTRAFLEX	CELL	N/A	CO-TCMP-24 SERVICE ENTRANCE BOX, CO-EES-22	CONDUIT	EXTERIOR YAGI ANTENNA CO-EES-22	20	CABLE CONNECTOR: N-MALE
00	CO-CS-3101	–	–	–	RG-400	CELL	N/A	CO-TCMP-24 SERVICE ENTRANCE BOX, CO-EES-22	CONDUIT	CO-TCMP-04 CELLPHONE SIGNAL BOOSTER, CO-EES-22	22	CABLE CONNECTORS: N-MALE, TNC-MALE
00	CO-CS-3102	–	–	–	RG-400	CELL	N/A	CO-TCMP-04 CELLPHONE SIGNAL BOOSTER, CO-EES-22	CONDUIT	INTERIOR CELL ANTENNA CO-EES-22	20	CABLE CONNECTORS: N-MALE, TNC-MALE
00	CO-I-3201	1PR	#16 AWG	300	ACIC	INSTRUMENTATION	24 VDC	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-TT-8690 INTERIOR AMBIENT TEMPERATURE TRANSMITTER, CO-EES-22	23	
00	CO-CS-3243	2PR	#22 AWG	300	BELDEN 123107A	COMMUNICATIONS	24 VDC	CO-HTCP-05 TB-COM-RJ45-1, CO-EES-22	CABLE TRAY	CO-MFR-B-15 CO-SWBD-03, PQMII, CO-EES-22	30	
00	CO-CS-3244	2PR	#22 AWG	300	BELDEN 123107A	COMMUNICATIONS	24 VDC	CO-MFR-B-15 CO-SWBD-03, PQMII, CO-EES-22	CABLE TRAY	CO-MFR-B-16 CO-SWBD-03, PQMII, CO-EES-22	29	

NOTES:

1. CABLE LENGTHS ARE FOR ENGINEERING PURPOSES ONLY AND SHALL NOT BE USED FOR BIDDING ESTIMATING, MEASUREMENT OR CUTTING OF CABLE
2. ALL CABLE TAGS SHALL BE PREFIXED BY "130-KSHTT-"

multinet

SDN#: 25472-130-EW-0000-P0430
UEL#: 2012016-1EF-CBS-000-0430-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-28	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	PLR	IRM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOD 2014-MAR-31

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22 BUILDING INSTRUMENTATION CABLE SCHEDULE SHEET 1

SCALE N/A | DRAWING No 4663-06-03-04-031 | REV 00

TIME-DESIGNATE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

REV	CABLE NUMBER	DESCRIPTION				APPLICATION	SYSTEM VOLTAGE (VOLT)	ROUTE			LENGTH (m) NOTE 1	COMMENTS
		CONDUCTORS		RATING (VOLT)	TYPE			FROM	VIA	TO		
		QTY.	SIZE									
00	CO-CS-3245	2PR	#22 AWG	300	BELDEN 123107A	COMMUNICATIONS	24 VDC	CO-MFR-B-16 CO-SWBD-03, PQMII, CO-EES-22	CABLE TRAY	CO-MFR-B-17 CO-MCC-02, PQMII, CO-EES-22	35	
00	CO-CS-3246	2PR	#22 AWG	300	BELDEN 123107A	COMMUNICATIONS	24 VDC	CO-MFR-B-17 CO-MCC-02, PQMII, CO-EES-22	CABLE TRAY	CO-MFR-B-18 CO-MCC-04, PQMII, CO-EES-22	29	
00	CO-I-3270	1TR	#16 AWG	300	IS	INSTRUMENTATION	24 VDC	CO-EHTC-33 EHT CONTROL PANEL, CO-EES-22	CONDUIT	CO-RTD-03 AMBIENT RTD, CO-EES-22	20	
00	CO-I-3670	6PR	#16 AWG	300	ISOS	INSTRUMENTATION	24 VDC	CO-CP-22-1 HVAC CONTROLL PANEL, CO-EES-22	CABLE TRAY	CO-HVAC-22-1 CO-EES-22	25	
00	CO-I-3671	6PR	#16 AWG	300	ISOS	INSTRUMENTATION	24 VDC	CO-CP-22-1 HVAC CONTROLL PANEL, CO-EES-22	CABLE TRAY	CO-HVAC-22-1 CO-EES-22	25	
00	CO-I-3675	6PR	#16 AWG	300	ISOS	INSTRUMENTATION	24 VDC	CO-CP-22-1 HVAC CONTROLL PANEL, CO-EES-22	CABLE TRAY	CO-HVAC-22-2 CO-EES-22	25	
00	CO-I-3676	6PR	#16 AWG	300	ISOS	INSTRUMENTATION	24 VDC	CO-CP-22-1 HVAC CONTROLL PANEL, CO-EES-22	CABLE TRAY	CO-HVAC-22-2 CO-EES-22	25	

NOTES:

1. CABLE LENGTHS ARE FOR ENGINEERING PURPOSES ONLY AND SHALL NOT BE USED FOR BIDDING ESTIMATING, MEASUREMENT OR CUTTING OF CABLE
2. ALL CABLE TAGS SHALL BE PREFIXED BY "130-KSHTT-"

SDN#: 25472-130-EW-0000-P0431
UEL#: 2012016-1EF-CBS-000-0431-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-28	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	PLR	IRM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY

2014-MAR-31

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.

PERMIT NUMBER: P 5508

The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TransCanada
In business to deliver

Upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22 BUILDING INSTRUMENTATION CABLE SCHEDULE SHEET 2

SCALE N/A | DRAWING No 4663-06-03-04-032 | REV 00

TIME — DESIGNFILE

REV	CABLE NUMBER	DESCRIPTION				APPLICATION	SYSTEM VOLTAGE (VOLT)	ROUTE			LENGTH (m) NOTE 1	COMMENTS
		CONDUCTORS QTY.	CONDUCTORS SIZE	RATING (VOLT)	TYPE			FROM	VIA	TO		
00	CO-P-3000-1	3	500 kcmil	1000	TECK90	POWER	480 Vac	CO-SWBD-03 480 V SWITCH BOARD, CO-EES-22	CABLE TRAY	CO-MCC-02 NORMAL POWER MCC, CO-EES-22	40	ALLOW 100% CABLE SPACING
00	CO-P-3000-2	3	500 kcmil	1000	TECK90	POWER	480 Vac	CO-SWBD-03 480 V SWITCH BOARD, CO-EES-22	CABLE TRAY	CO-MCC-02 NORMAL POWER MCC, CO-EES-22	40	ALLOW 100% CABLE SPACING
00	CO-P-3000-3	3	500 kcmil	1000	TECK90	POWER	480 Vac	CO-SWBD-03 480 V SWITCH BOARD, CO-EES-22	CABLE TRAY	CO-MCC-02 NORMAL POWER MCC, CO-EES-22	40	ALLOW 100% CABLE SPACING
00	CO-P-3000-4	3	500 kcmil	1000	TECK90	POWER	480 Vac	CO-SWBD-03 480 V SWITCH BOARD, CO-EES-22	CABLE TRAY	CO-MCC-02 NORMAL POWER MCC, CO-EES-22	40	ALLOW 100% CABLE SPACING
00	CO-P-3000-5	3	500 kcmil	1000	TECK90	POWER	480 Vac	CO-SWBD-03 480 V SWITCH BOARD, CO-EES-22	CABLE TRAY	CO-MCC-02 NORMAL POWER MCC, CO-EES-22	40	ALLOW 100% CABLE SPACING
00	CO-C-3000	8	#14 AWG	600	TECK90	CONTROL	120 Vac	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-SWBD-03 BREAKER SHUNT TRIP, CO-EES-22	30	
00	CO-C-3001	20	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-SWBD-03 BREAKER STATUS, CO-EES-22	30	
00	CO-P-3001-1	3	500 kcmil	1000	~~TECK90~~ RW90	POWER	480 Vac	CO-SWBD-03 480 V SWITCH BOARD, CO-EES-22	~~CABLE TRAY~~ CONDUIT	CO-SWBD-04 480 V SWITCHBOARD, CO-EES-22	20	ALLOW 100% CABLE SPACING AND CONNECT TO AUTOMATIC TRANSFER SWITCH CO-ATS-02
00	CO-P-3001-2	3	500 kcmil	1000	~~TECK90~~ RW90	POWER	480 Vac	CO-SWBD-03 480 V SWITCH BOARD, CO-EES-22	~~CABLE TRAY~~ CONDUIT	CO-SWBD-04 480 V SWITCHBOARD, CO-EES-22	20	ALLOW 100% CABLE SPACING AND CONNECT TO AUTOMATIC TRANSFER SWITCH CO-ATS-02
00	CO-P-3001-3	3	500 kcmil	1000	~~TECK90~~ RW90	POWER	480 Vac	CO-SWBD-03 480 V SWITCH BOARD, CO-EES-22	~~CABLE TRAY~~ CONDUIT	CO-SWBD-04 480 V SWITCHBOARD, CO-EES-22	20	ALLOW 100% CABLE SPACING AND CONNECT TO AUTOMATIC TRANSFER SWITCH CO-ATS-02
01	CO-C-3004	6 (01)	#14 AWG	600	TECK90	CONTROL	120 Vac	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-SWBD-04, CO-MBKR-16 BREAKER SHUNT TRIP, CO-EES-22	29	
00	CO-P-3005-1	3	500 kcmil	1000	TECK90	POWER	480 Vac	CO-SWBD-04 480 V SWITCH BOARD, CO-EES-22	CABLE TRAY	CO-MCC-04 NORMAL POWER MCC, CO-EES-22	35	ALLOW 100% CABLE SPACING
00	CO-P-3005-2	3	500 kcmil	1000	TECK90	POWER	480 Vac	CO-SWBD-04 480 V SWITCH BOARD, CO-EES-22	CABLE TRAY	CO-MCC-04 NORMAL POWER MCC, CO-EES-22	35	ALLOW 100% CABLE SPACING
00	CO-P-3005-3	3	500 kcmil	1000	TECK90	POWER	480 Vac	CO-SWBD-04 480 V SWITCH BOARD, CO-EES-22	CABLE TRAY	CO-MCC-04 NORMAL POWER MCC, CO-EES-22	35	ALLOW 100% CABLE SPACING
00	CO-C-3005	30	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-SWBD-04, CO-MBKR-16 BREAKER STATUS, CO-EES-22	29	
00	CO-P-3020	3	#4 AWG	1000	TECK90	POWER	480 Vac	CO-MCC-04 CO-EES-22	CABLE TRAY	CO-DT-11 45 kVA TRANSFORMER, CO-EES-22	30	
00	CO-P-3021	3	#4 AWG	1000	TECK90	POWER	480 Vac	CO-MCC-04 CO-EES-22	CABLE TRAY	CO-DT-12 45 kVA TRANSFORMER, CO-EES-22	27	CO-EES-22 INTERIOR LIGHTING TRANSFORMER
00	CO-C-3022	4	#14 AWG	600	TECK90	CONTROL	120 Vac	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-LDP-11 NORTH TANK YARD LIGHITNG DISTRIBUTION PANEL CONTACTOR, CO-EES-22	30	

NOTES:

1. CABLE LENGTHS ARE FOR ENGINEERING PURPOSES ONLY AND SHALL NOT BE USED FOR BIDDING ESTIMATING, MEASUREMENT OR CUTTING OF CABLE
2. ALL CABLE TAGS SHALL BE PREFIXED BY "130-KSHTT-"

SDN#: 25472-130-EW-0000-P0230
UEL#: 2012016-1EF-CBS-000-0230-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-28	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)
01	2014-10-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	PLR	IRM	JED	DCB	UPSIDE
2197104	BEM	LLL	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER ALBERTA — JAMES DOODY — 2014-OCT-08

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22 BUILDING POWER AND CONTROL CABLE SCHEDULE SHEET 1

SCALE N/A | DRAWING No 4663-06-02-04-031 | REV 01

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TIME — DESIGNFILE

REV	CABLE NUMBER	DESCRIPTION				APPLICATION	SYSTEM VOLTAGE (VOLT)	ROUTE			LENGTH (m) NOTE 1	COMMENTS
		CONDUCTORS QTY.	CONDUCTORS SIZE	RATING (VOLT)	TYPE			FROM	VIA	TO		
00	CO-P-3033	3	#2 AWG	1000	TECK90	POWER	480 Vac	CO-MCC-02 CO-EES-22	CABLE TRAY	CO-DT-33 75 kVA TRANSFORMER, CO-EES-22	25	
00	CO-P-3041	3	#10 AWG	600	TECK90	POWER	480 Vac	CO-MCC-04 CO-EES-22	CABLE TRAY	CO-UPS-02 10 kVA UPS, CO-EES-22	38	
00	CO-C-3041	12	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-UPS-02 10 kVA UPS ALARM & STATUS, CO-EES-22	35	
00	CO-P-3042	3	#10 AWG	600	TECK90	POWER	480 Vac	CO-MCC-02 CO-EES-22	CABLE TRAY	CO-DT-82 15 kVA TRANSFORMER, CO-EES-22	28	
00	CO-C-3045	8	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-MFR-B-17 CO-MCC-02 MULTIFUNCTION RELAY, CO-EES-22	30	
00	CO-C-3046	8	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-MFR-B-18 CO-MCC-04 MULTIFUNCTION RELAY, CO-EES-22	24	
00	CO-P-3051	3	#8 AWG	600	TECK90	POWER	480 Vac	CO-MCC-04 CO-EES-22	CABLE TRAY	CO-HTR-22-1 EAST BUILDING HEATER, CO-EES-22	35	
00	CO-P-3052	3	#8 AWG	600	TECK90	POWER	480 Vac	CO-MCC-04 CO-EES-22	CABLE TRAY	CO-HTR-22-2 WEST BUILDING HEATER, CO-EES-22	32	
00	CO-C-3062	2	#14 AWG	600	TECK90	CONTROL	120 Vac	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-YA-8698C EVACUATION HORN CMD, CO-EES-22	28	
00	CO-C-3063	2	#14 AWG	600	TECK90	CONTROL	120 Vac	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-YA-8698D EVACUATION HORN CMD, CO-EES-22	34	
00	CO-C-3065	2	#14 AWG	600	TECK90	CONTROL	120 Vac	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-YA-8690B FIRE BEACON, CO-EES-22	28	
00	CO-C-3070	2	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-YS-8690A INTRUSION ALARM STATUS, CO-EES-22	32	
00	CO-C-3071	2	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-YS-8690B INTRUSION ALARM STATUS, CO-EES-22	30	
00	CO-C-3090	8	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-TCMP-04 CO-TCMP-04 ALARM STATUS, CO-EES-22	20	
00	CO-P-3120	4	#4 AWG	1000	~~TECK90~~ RW90	POWER	480 Vac	CO-DT-11 45 kVA TRANSFORMER, CO-EES-22	~~SURFACE~~ CONDUIT	CO-LDP-11 NORTH TANK YARD LIGHITNG DISTRIBUTION PANEL, CO-EES-22	15	
01	CO-P-3120-1	2	#12 AWG	600	01 RW90	POWER	277 Vac	CO-LDP-11 NORTH TANK YARD LIGHITNG DISTRIBUTION PANEL, CO-EES-22	~~SURFACE~~ CONDUIT	EXTERIOR LIGHTING CO-EES-22	65	
00	CO-P-3121	4	#2/0 AWG	1000	~~TECK90~~ RW90	POWER	208 Vac	CO-DT-12 45 kVA TRANSFORMER, CO-EES-22	~~SURFACE~~ CONDUIT	CO-ACP-12 AC DISTRIBUTION PANEL, CO-EES-22	15	ALLOW 100% CABLE SPACING
01	CO-P-3121-1	6	#12 AWG	600	01 RW90	POWER	120 Vac	CO-ACP-12 AC DISTRIBUTION PANEL, CO-EES-22	CONDUIT	SWITCH BANK WEST CO-EES-22	35	

NOTES:

1. CABLE LENGTHS ARE FOR ENGINEERING PURPOSES ONLY AND SHALL NOT BE USED FOR BIDDING ESTIMATING, MEASUREMENT OR CUTTING OF CABLE
2. ALL CABLE TAGS SHALL BE PREFIXED BY "130-KSHIT-"

SDN#: 25472-130-EW-0000-P0231
UEL#: 2012016-1EF-CBS-000-0231-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-28	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)
01	2014-10-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	PLR	IRM	JED	DCB	UPSIDE
2197104	BEM	LLL	IRM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-OCT-08

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TransCanada — In business to deliver

Upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22 BUILDING
POWER AND CONTROL CABLE SCHEDULE
SHEET 2

SCALE N/A | DRAWING No 4663-06-02-04-032 | REV 01

TIME-DESIGNFILE

REV	CABLE NUMBER	DESCRIPTION				APPLICATION	SYSTEM	ROUTE			LENGTH	COMMENTS
		CONDUCTORS		RATING	TYPE		VOLTAGE	FROM	VIA	TO	(m)	
		QTY.	SIZE	(VOLT)			(VOLT)				NOTE 1	
01	CO-P-3121-2	9	#12 AWG	600	RW90 △01	POWER	120 Vac	SWITCH BANK WEST CO-EES-22	CONDUIT	SWITCH BANK EAST CO-EES-22	40	
01	CO-P-3121-3	6	#12 AWG	600	RW90	POWER	120 Vac	SWITCH BANK EAST CO-EES-22	CONDUIT	INTERIOR LIGHTING CO-EES-22	60	
01	CO-P-3122	2	#12 AWG	600	RW90	POWER	120 Vac	CO-ACP-12 AC DISTRIBUTION PANEL, CO-EES-22	CONDUIT	EMERGENCY LIGHTS CO-EES-22	45	
01	CO-P-3125	2	#12 AWG	600	RW90	POWER	120 Vac	CO-ACP-12 AC DISTRIBUTION PANEL, CO-EES-22	CONDUIT	EXTERIOR RECEPTACLE CO-EES-22	35	
01	CO-P-3126	4	#12 AWG	600	RW90	POWER	120 Vac	CO-ACP-12 AC DISTRIBUTION PANEL, CO-EES-22	CONDUIT	INTERIOR RECEPTACLE EAST CO-EES-22	15	
01	CO-P-3127	4	#12 AWG	600	RW90	POWER	120 Vac	CO-ACP-12 AC DISTRIBUTION PANEL, CO-EES-22	CONDUIT	INTERIOR RECEPTACLE WEST CO-EES-22	65	
00	CO-C-3131	2	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-EHTC-33 NORTH TANK AREA EHTC TROUBLE ALARM,CO-EES-22	20	
00	CO-P-3133	4	#2 AWG	1000	~~TECK90~~ RW90	POWER	480 Vac	CO-DT-33 75 kVA TRANSFORMER, CO-EES-22	~~CABLE TRAY~~ CONDUIT	CO-EHTC-33, CO-ACP-33 HEAT TRACING PANEL, CO-EES-22	20	
00	CO-P-3142	3	~~#6~~ AWG #3	1000	~~TECK90~~ RW90	POWER	480 Vac	CO-DT-82 10 kVA TRANSFORMER, CO-EES-22	~~CABLE TRAY~~ CONDUIT	CO-MTS-02 MANUAL BYPASS SWITCH, CO-EES-22	15	
01	CO-P-3161	4 △01	#12 AWG	600	TECK90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	CO-CP-22-1 PANEL POWER,SERVICE BOX SB-01A, CO-EES-22	25	
00	CO-C-3161	8	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-CP-22-1 STATUS CO-EES-22	25	
00	CO-C-3163	2	#14 AWG	600	TECK90	CONTROL	120 Vac	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-YA-8691 CO-CP-22-1 TRIP CMD, CO-EES-22	25	
00	CO-P-3190	4	#12 AWG	600	TECK90	POWER	120 Vac	CO-ACP-12 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	CO-HTCP-04 TERMINAL CONTROL PANEL, CO-EES-22	25	
00	CO-P-3191	4	#12 AWG	600	TECK90	POWER	120 Vac	CO-ACP-12 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	28	
00	CO-P-3194	2	#12 AWG	600	TECK 90	POWER	120 Vac	CO-ACP-12 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	CO-TCMP-04 COMMUNICATION PANEL, CO-EES-22	20	~~CONNECT TO RECEPTACLE MOUNTED ON CO-TCMP-04~~
00	CO-P-3200	3	#3 AWG	1000	~~TECK90~~ RW90	POWER	120 Vac	CO-UPS-02 480 V UPS, CO-EES-22	~~CABLE TRAY~~ CONDUIT	CO-UACP-02 120 V UPS PANELBOARD, CO-EES-22	20	
00	CO-P-3201	4	#12 AWG	600	~~TECK90~~ RW90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	~~CABLE TRAY~~ CONDUIT	CO-HTCP-04 TERMINAL CONTROL PANEL, CO-EES-22	25	
00	CO-P-3205	2	#12 AWG	600	~~TECK90~~ RW90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	~~CABLE TRAY~~ CONDUIT	CO-TCMP-04 COMMUNICATION PANEL, CO-EES-22	25	~~CONNECT TO RECEPTACLE MOUNTED ON CO-TCMP-04~~

NOTES:

1. CABLE LENGTHS ARE FOR ENGINEERING PURPOSES ONLY AND SHALL NOT BE USED FOR BIDDING ESTIMATING, MEASUREMENT OR CUTTING OF CABLE
2. ALL CABLE TAGS SHALL BE PREFIXED BY "130-KSHTT-"

SDN#: 25472-130-EW-0000-P0232
UEL#: 2012016-1EF-CBS-000-0232-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-28	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)
01	2014-10-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	PLR	IRM	JED	DCB	UPSIDE
2197104	BEM	LLL	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-OCT-08

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22 BUILDING
POWER AND CONTROL CABLE SCHEDULE
SHEET 3

SCALE N/A | DRAWING No 4663-06-02-04-033 | REV 01

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

DESIGNFILE — TIME

REV	CABLE NUMBER	DESCRIPTION				APPLICATION	SYSTEM VOLTAGE (VOLT)	ROUTE			LENGTH (m) NOTE 1	COMMENTS
		CONDUCTORS QTY.	CONDUCTORS SIZE	RATING (VOLT)	TYPE			FROM	VIA	TO		
00	CO-P-3221	20	#12 AWG	600	TECK90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	28	UPS POWER TO HTCP-05 FOR INSTRUMENTS TANK-27/28/29
00	CO-P-3243	2	#12 AWG	600	TECK90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	CO-SWBD-03 POWER MONITOR MULTILIN PQMII, CO-EES-22	34	
00	CO-P-3244	2	#12 AWG	600	TECK90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	CO-SWBD-04 POWER MONITOR MULTILIN PQMII, CO-EES-22	36	
00	CO-P-3245	2	#12 AWG	600	TECK90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	CO-MCC-02 POWER MONITOR MULTILIN PQMII, CO-EES-22	20	
00	CO-P-3246	2	#12 AWG	600	TECK90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	CO-MCC-04 POWER MONITOR MULTILIN PQMII, CO-EES-22	30	
01	CO-P-3247	2 (01)	#8 AWG	600	TECK90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	CABLE TRAY	~~CO-MCC-08~~ P18-02 CO-EES-22	15	
00	CO-P-3254-1	2	#12 AWG	600	~~TECK90~~ RW90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	~~CABLE TRAY~~ CONDUIT	SWITCH BANK WEST CO-EES-22	35	
01	CO-P-3254-2	3	#12 AWG	600	RW90 (01)	POWER	120 Vac	SWITCH BANK WEST CO-EES-22	CONDUIT	SWITCH BANK EAST CO-EES-22	40	
01	CO-P-3254-3	2	#12 AWG	600	RW90	POWER	120 Vac	SWITCH BANK EAST CO-EES-22	CONDUIT	INTERIOR LIGHTING CO-EES-22	60	
01	CO-P-3256-1	2	#1 AWG	1000	PRVU90 COPPER	POWER	130 Vdc	CB2 BATTERY INPUT CIRCUIT BREAKER CO-UPS-02, CO-EES-22	CONDUIT	CO-BB-02 BATTERY BANK, CO-EES-22	15	FLEXIBLE CABLE, MIN. TEMP. 90°C, HEAT RESISTANT AND FLAME RETARDANT NOT INSTALLED
01	CO-P-3256-2	2	#1 AWG	1000	PRVU90 COPPER	POWER	130 Vdc	CB2 BATTERY INPUT CIRCUIT BREAKER CO-UPS-02, CO-EES-22	CONDUIT	CO-BB-02 BATTERY BANK, CO-EES-22	15	FLEXIBLE CABLE, MIN. TEMP. 90°C, HEAT RESISTANT AND FLAME RETARDANT NOT INSTALLED
01	CO-P-3261	2	#12 AWG	600	RW90	POWER	120 Vac	CO-UACP-02 AC DISTRIBUTION PANEL, CO-EES-22	CONDUIT	CO-ASH-8690A SMOKE DETECTOR, CO-EES-22	30	
01	CO-P-3262	2	#12 AWG	600	RW90	POWER	120 Vac	CO-ASH-8690A SMOKE DETECTOR, CO-EES-22	CONDUIT	CO-ASH-8690B SMOKE DETECTOR, CO-EES-22	25	
01	CO-P-3263	2	#12 AWG	600	RW90	POWER	120 Vac	CO-ASH-8690B SMOKE DETECTOR, CO-EES-22	CONDUIT	CO-ASH-8690C SMOKE DETECTOR, CO-EES-22	20	
01	CO-P-3264	2	#12 AWG	600	RW90	POWER	120 Vac	CO-ASH-8690C SMOKE DETECTOR, CO-EES-22	CONDUIT	CO-ASH-8690D SMOKE DETECTOR, CO-EES-22	15	
00	CO-C-3300	20	#14 AWG	600	TECK90	CONTROL	120 Vac	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-MCC-02 CO-MXM-27-1/27-2/27-3 TANK MIXER 1 MIXER START/STOP CMD, CO-EES-22	25	
00	CO-C-3301	20	#14 AWG	600	TECK90	CONTROL	24 Vdc	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-MCC-02 CO-MXM-27-1/27-2/27-3 TANK MIXER 1 MIXER RUN STATUS, CO-EES-22	25	
00	CO-C-3302	20	#14 AWG	600	TECK90	CONTROL	120 Vac	CO-HTCP-05 TERMINAL CONTROL PANEL, CO-EES-22	CABLE TRAY	CO-MCC-02 CO-MXM-28-1/28-2/28-3 TANK MIXER 1 MIXER START/STOP CMD, CO-EES-22	25	

NOTES:

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SDN#: 25472-130-EW-0000-P0233
UEL#: 2012016-1EF-CBS-000-0233-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REV No	DATE	DESCRIPTION
00	2014-03-28	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)
01	2014-10-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	PLR	IRM	JED	DCB	UPSIDE
2197104	BEM	LLL	HMM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ALBERTA — JAMES DOOLEY — 2014-OCT-08

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

Upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22 BUILDING POWER AND CONTROL CABLE SCHEDULE SHEET 4

SCALE N/A | DRAWING No 4663-06-02-04-034 | REV 01

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

REV	CABLE NUMBER	DESCRIPTION				APPLICATION	SYSTEM VOLTAGE (VOLT)	ROUTE			LENGTH (m) NOTE 1	COMMENTS
		CONDUCTORS QTY.	CONDUCTORS SIZE	RATING (VOLT)	TYPE			FROM	VIA	TO		
00	C0-C-3303	20	#14 AWG	600	TECK90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	CABLE TRAY	C0-MCC-02 C0-MXM-28-1/28-2/28-3 TANK MIXER 1 MIXER RUN STATUS, C0-EES-22	25	
00	C0-C-3555	30	#14 AWG	600	TECK90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	CABLE TRAY	AJB-02 C0-M66-68- C0-EES-22	30	
00	C0-C-3556	20	#14 AWG	600	TECK90	CONTROL	24 Vdc	C0-HTCP-04 TERMINAL CONTROL PANEL, C0-EES-22	CABLE TRAY	AJB-01 C0-M66-68- TANK FIRE FOAM STATUS, C0-EES-22	28	
01	–	–	–	–	–	–	–	–	–	–	–	01
01	–	–	–	–	–	–	–	–	–	–	–	
01	–	–	–	–	–	–	–	–	–	–	–	
01	–	–	–	–	–	–	–	–	–	–	–	
01	–	–	–	–	–	–	–	–	–	–	–	
01	–	–	–	–	–	–	–	–	–	–	–	
00	C0-C-3690	2	#14 AWG	600	~~TECK90~~ RW90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	~~CABLE TRAY~~ CONDUIT	C0-ASH-8690A SMOKE DETECTOR, C0-EES-22	20	
00	C0-C-3691	2	#14 AWG	600	~~TECK90~~ RW90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	~~CABLE TRAY~~ CONDUIT	C0-ASH-8690B SMOKE DETECTOR, C0-EES-22	15	
00	C0-C-3692	2	#14 AWG	600	~~TECK90~~ RW90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	~~CABLE TRAY~~ CONDUIT	C0-ASH-8690C SMOKE DETECTOR, C0-EES-22	10	
00	C0-C-3693	2	#14 AWG	600	~~TECK90~~ RW90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	~~CABLE TRAY~~ CONDUIT	C0-ASH-8690D SMOKE DETECTOR, C0-EES-22	15	
00	C0-C-3694	2	#14 AWG	600	~~TECK90~~ RW90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	~~CABLE TRAY~~ CONDUIT	C0-ASH-8690E HEAT DETECTOR, C0-EES-22	20	
00	C0-C-3695	2	#14 AWG	600	~~TECK90~~ RW90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	~~CABLE TRAY~~ CONDUIT	C0-ASH-8690F HEAT DETECTOR, C0-EES-22	15	
00	C0-C-3696	2	#14 AWG	600	~~TECK90~~ RW90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	~~CABLE TRAY~~ CONDUIT	C0-ASH-8690G HEAT DETECTOR, C0-EES-22	10	
00	C0-C-3697	2	#14 AWG	600	~~TECK90~~ RW90	CONTROL	24 Vdc	C0-HTCP-05 TERMINAL CONTROL PANEL, C0-EES-22	~~CABLE TRAY~~ CONDUIT	C0-ASH-8690H HEAT DETECTOR, C0-EES-22	15	

NOTES:

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2. ALL CABLE TAGS SHALL BE PREFIXED BY "130-KSHTT-"

SDN#: 25472-130-EW-0000-P0234
UEL#: 2012016-1EF-CBS-000-0234-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-28	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)	2197104	BEM	PLR	IRM	JED	DCB	UPSIDE
01	2014-10-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)	2197104	BEM	LLL	IRM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-OCT-08

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, and Geoscientists of Alberta

PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

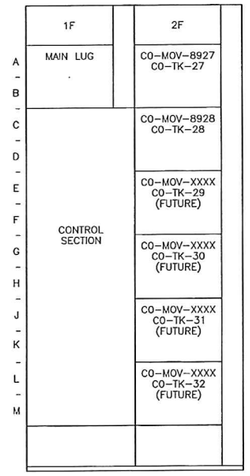
FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

C0-EES-22 BUILDING POWER AND CONTROL CABLE SCHEDULE SHEET 5

SCALE N/A | DRAWING No 4663-06-02-04-035 | REV 01

TC_A1_BR.DWG 594X841

TIME---DESIGNFILE



AJB - 02

CO-~~MCC-06~~ (FRONT)
IN BUILDING CO-EES-22

NOTES:

1. ALL TAGS ON THIS DRAWING TO BE PREFIXED WITH "130-KSHIT-".

SDN# 25472-130-E2-0000-P0072
UEL# 2012016-1EF-ELD-000-0082-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
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REVISION								
REV No	DATE	DESCRIPTION	APPROVAL					
			PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-04-04	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	MAF 2014	PLR	DRHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA
JAMES DOODY
2014-APR-07

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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KEYSTONE HARDISTY TANK TERMINAL

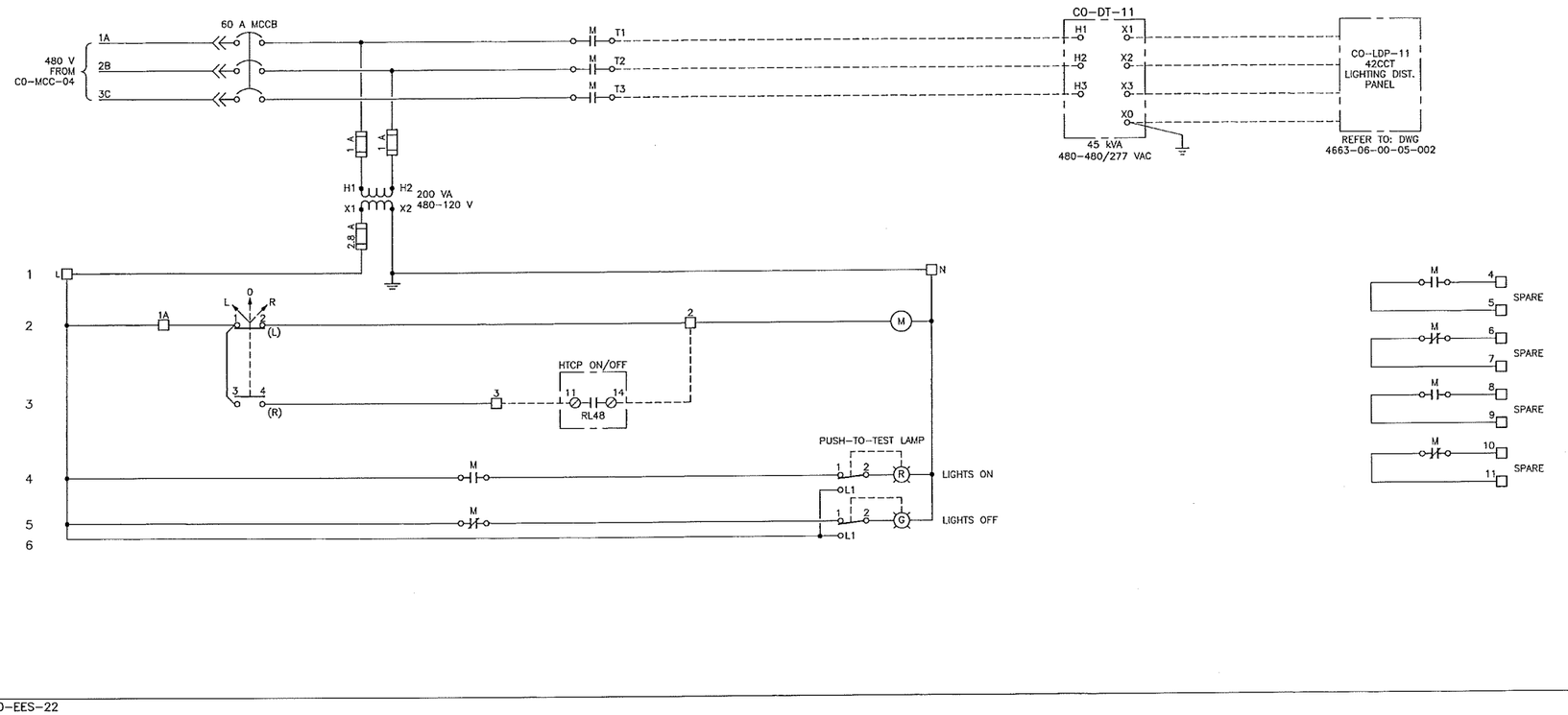
FIA # 4663	CHAINAGE:	DISCIPLINE # 06

CO-MCC-06
ELEVATION

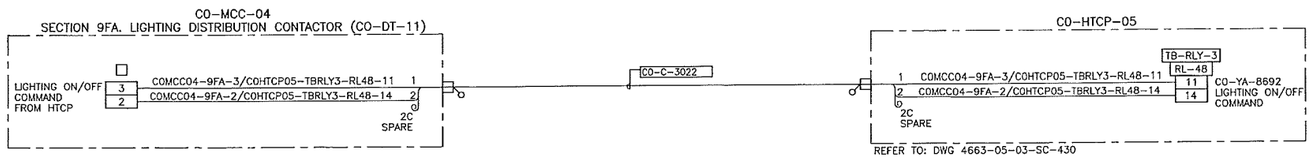
SCALE N.T.S.	DRAWING No 4663-06-02-03-072	REV 00

TIME---DESIGNFILE

TC_A1_BR.DWG 594X841



CO–EES–22



NOTES:

1. ALL TAG NUMBERS SHALL BE PREFIXED WITH "130–KHTT–".

LEGEND:

⊘	HTCP TERMINAL
□	MCC TERMINAL
○	DEVICE TERMINAL
(M)	MAGNETIC CONTACTOR COIL
(R)	INDICATING PILOT LIGHTS (LED) R – RED G – GREEN
----	FIELD WIRING
MCC	MOTOR CONTROL CENTER
EES	ELECTRICAL EQUIPMENT SHELTER
RL	RELAY
HTCP	TERMINAL CONTROL PANEL
TB	TERMINAL BLOCK
LOR	LOCAL OFF REMOTE
□◔	TECK CABLE CONNECTOR FOR HAZARDOUS AREA
□○	TECK CABLE CONNECTOR FOR NON–HAZARDOUS AREA

SDN# 25472–130–E7–0000–P0150
UEL# 2012016–1EF–EWD–000–0180–01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663–06–02–01–039	CO–MCC–04 480V SINGLE LINE DIAGRAM – SHEET 10

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014–04–04	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	JAP	TAE	NHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 2014–APR–04

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO–LDP–11
NORTH AREA LIGHTING DISTRIBUTION PANEL SCHEMATIC & INTERCONNECTING WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663–06–02–06–150 | REV 00

TC_A1_BR.DWG 594X841

—TIME— —DESIGNFILE—

CO-EES-22

CO-CP-22-1

H	(BK)	COCP221-H/COUACP02-24L	
N	(W)	COCP221-N/COUACP02-24N	
			2C SPARE

REFER TO SOUTHAMPTONTRANE DWG ES12073-RP-EES22

CO-P-3161

CO-TCMP-04

TB2			
L	(BK)	COTCMP04-TB2-L/COUACP02-19L	
6	(W)	COTCMP04-TB2-6/COUACP02-19N	

REFER TO DWG 4663-04-03-WD-301

CO-P-3205

L5-20R

WIRE DIRECTLY TO PANEL

CO-HTCP-04

TB-UACP			
1	(BK)	COHTCP04-TBUACP-1/COUACP02-01L	
5	(W)	COHTCP04-TBUACP-5/COUACP02-01N	
			2C SPARE

REFER TO DWG 4663-05-03-SC-301

CO-P-3201

CO-HTCP-05

TB-UACP			
1		COHTCP05-TBUACP-1/COUACP02-03L	1
5		COHTCP05-TBUACP-5/COUACP02-03N	2
TB-TK-27			
1		COHTCP05-TBTK27-1/COUACP02-07L	3
5		COHTCP05-TBTK27-5/COUACP02-07N	4
TB-TK-28			
1		COHTCP05-TBTK28-1/COUACP02-09L	5
5		COHTCP05-TBTK28-5/COUACP02-09N	6
TB-TK-29			
1		COHTCP05-TBTK29-1/COUACP02-11L	7
5		COHTCP05-TBTK29-5/COUACP02-11N	8
TB-TK-30			
1		COHTCP05-TBTK30-1/COUACP02-13L	9
5		COHTCP05-TBTK30-5/COUACP02-13N	10
TB-TK-31			
1		COHTCP05-TBTK31-1/COUACP02-15L	11
5		COHTCP05-TBTK31-5/COUACP02-15N	12
TB-TK-32			
1		COHTCP05-TBTK32-1/COUACP02-17L	13
5		COHTCP05-TBTK32-5/COUACP02-17N	14
TB-AUX			
1		COHTCP05-TBAUX-1/COUACP02-04L	15
11		COHTCP05-TBAUX-11/COUACP02-04N	16
			4C SPARE

REFER TO DWG 4663-05-03-SC-401
REFER TO DWG 4663-05-03-SC-402

CO-P-3221

CO-UACP-02 (120 V AC, 1ø UPS SUPPLY)

	COCP221-H/COUACP02-24L	(BK)	20 A	CCT #24 30A	L
	COCP221-N/COUACP02-24N	(W)			N
2C SPARE					
	COTCMP04-TB2-L/COUACP02-19L	(BK)	20 A	CCT #19 30A	L
	COTCMP04-TB2-6/COUACP02-19N	(W)			N
	COHTCP04-TBUACP-1/COUACP02-01L	(BK)	20 A	CCT #01 30A	L
	COHTCP04-TBUACP-5/COUACP02-01N	(W)			N
2C SPARE					
1	COHTCP05-TBUACP-1/COUACP02-03L		20 A	CCT #03 30A	L
2	COHTCP05-TBUACP-5/COUACP02-03N				N
3	COHTCP05-TBTK27-1/COUACP02-07L		20 A	CCT #07 30A	L
4	COHTCP05-TBTK27-5/COUACP02-07N				N
5	COHTCP05-TBTK28-1/COUACP02-09L		20 A	CCT #09 30A	L
6	COHTCP05-TBTK28-5/COUACP02-09N				N
7	COHTCP05-TBTK29-1/COUACP02-11L		20 A	CCT #11 30A	L
8	COHTCP05-TBTK29-5/COUACP02-11N				N
9	COHTCP05-TBTK30-1/COUACP02-13L		20 A	CCT #13 30A	L
10	COHTCP05-TBTK30-5/COUACP02-13N				N
11	COHTCP05-TBTK31-1/COUACP02-15L		20 A	CCT #15 30A	L
12	COHTCP05-TBTK31-5/COUACP02-15N				N
13	COHTCP05-TBTK32-1/COUACP02-17L		20 A	CCT #17 30A	L
14	COHTCP05-TBTK32-5/COUACP02-17N				N
15	COHTCP05-TBAUX-1/COUACP02-04L		20 A	CCT #04 30A	L
16	COHTCP05-TBAUX-11/COUACP02-04N				N
4C SPARE					

REFER TO DWG 4663-06-00-05-005

NOTES:

1. ALL TAGS SHALL BE PREFIXED WITH "130-KSHTT".

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
	CABLE CONNECTOR FOR NON-CLASSIFIED AREA

COXXXX-XX-XX/COACP01-XXL

- CIRCUIT NUMBER (L)LINE/(N)NEUTRAL
- DISTRIBUTION PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-E7-0000-P0630
UEL# 2012016-1EF-EWD-000-0630-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-00-05-003	CO-EES-22 CO-ACP-12, CO-UACP-02 DISTRIBUTION PANEL SCHEDULES
4663-06-02-03-031	CO-EES-22 ELECTRICAL EQUIPMENT LAYOUT

REVISION

REV No	DATE	DESCRIPTION
00	2014-04-04	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	TAE	HHM	DCB	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 9889
2014-APR-04

PERMIT/ ENG. APPROVAL — DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

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KEYSTONE HARDISTY TANK TERMINAL

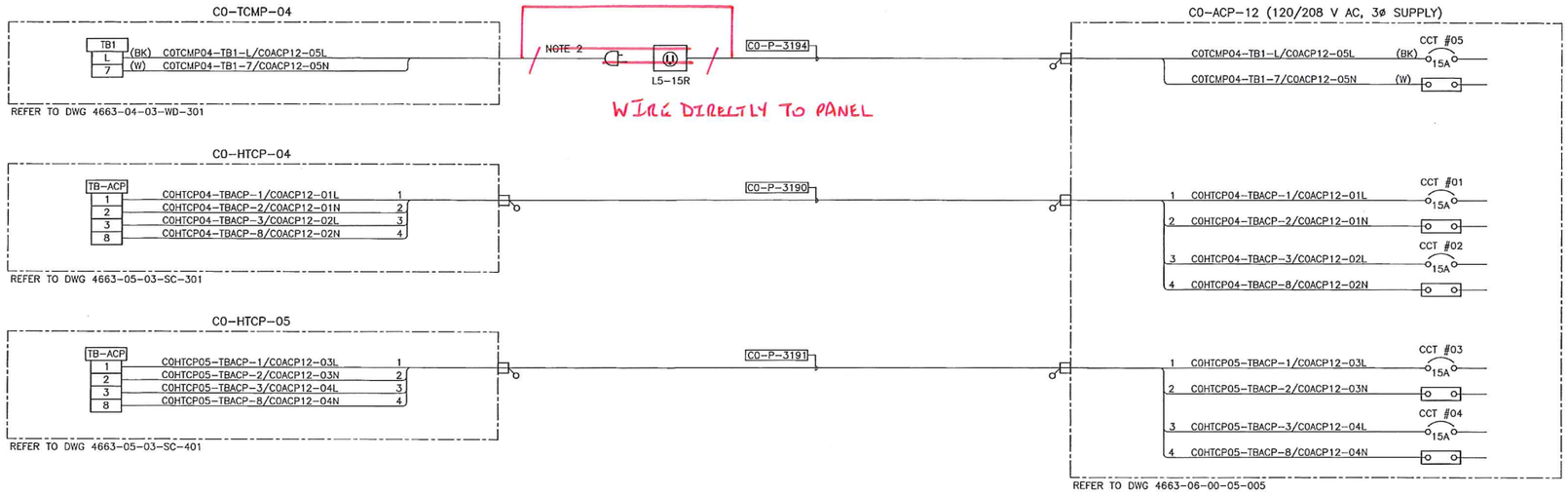
FIA # 4663	CHAINAGE:	DISCIPLINE # 06

CO-EES-22
UPS SUPPLIES TO TCMP/HTCP INTERCONNECTION WIRING DIAGRAM

SCALE N.T.S.	DRAWING No 4663-06-02-07-020	REV 00

TIME — DESIGNFILE

C0-EES-22



NOTES:

1. ALL TAGS SHALL BE PREFIXED WITH "130-KSHTT".
2. BY PANEL VENDOR.

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
	CABLE CONNECTOR FOR NON-CLASSIFIED AREA

COXXXX-XX-XX/COACP01-XXL

- CIRCUIT NUMBER (L)INE/(N)EUTRAL
- DISTRIBUTION PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-E7-0000-P0631
UEL# 2012016-1EF-EWD-000-0631-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-06-00-05-005	C0-EES-22 C0-ACP-12, C0-UACP-02 DISTRIBUTION PANEL SCHEDULES

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-19	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	JIM	TAE	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-MAR-21

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

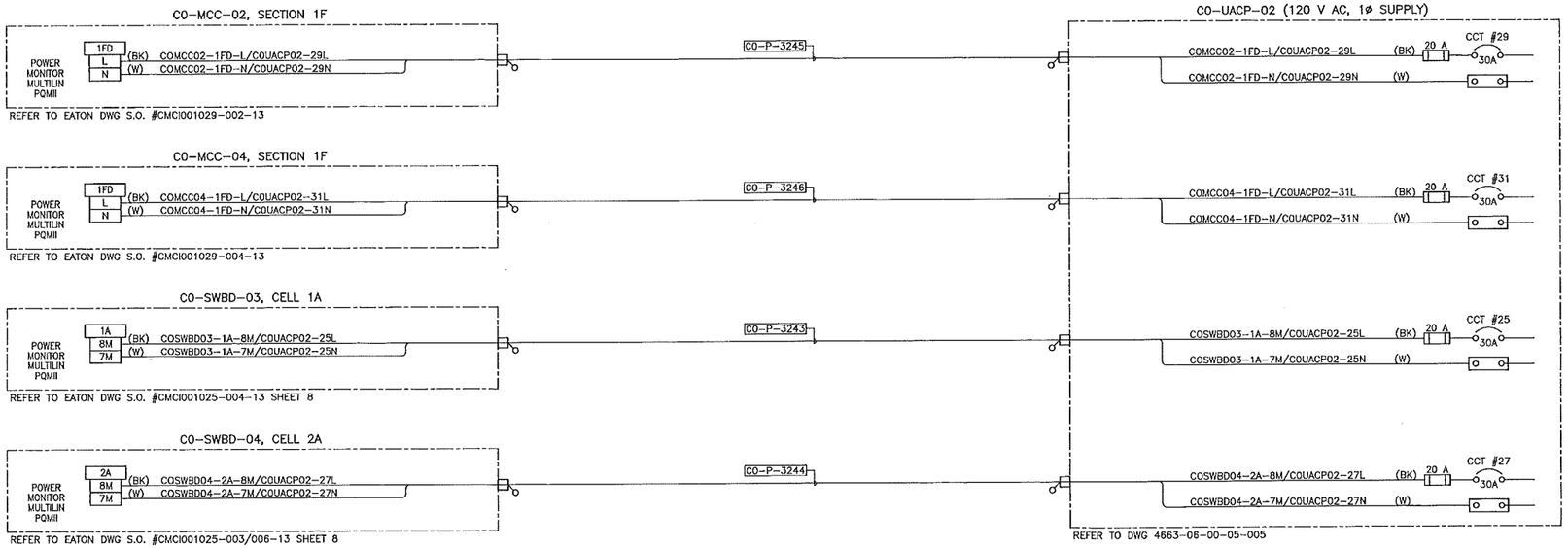
C0-EES-22
UTILITY SUPPLIES TO TCMP/HTCP INTERCONNECTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-06-02-07-021 | REV 00

TIME----DESIGNFILE----

TC_A1_BR.DWG 594X841

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NOTES:

1. ALL TAGS SHALL BE PREFIXED WITH "130-KSHTT".

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
	CABLE CONNECTOR FOR NON-CLASSIFIED AREA

COXXXX-XX-XX/COACP01-XXL

- CIRCUIT NUMBER (L)LINE/(N)NEUTRAL
- DISTRIBUTION PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-E7-0000-P0632
UEL# 2012016-1EF-EWD-000-0632-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-00-05-005	CO-EES-22 CO-ACP-12, CO-UACP-02 DISTRIBUTION PANEL SCHEDULES
4663-06-02-03-031	CO-EES-22 ELECTRICAL EQUIPMENT LAYOUT
4663-09-00-01-004	KHTT SAFETY PLAN BUILDINGS CO-EES-21, CO-EES-22, CO-VES-21 LAYOUT

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-04-04	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	TAE	HNM	MED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-APR-04

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

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UPS DE ENGINEERING LTD.
PERMIT NUMBER: P 5508
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PERMIT NUMBER:

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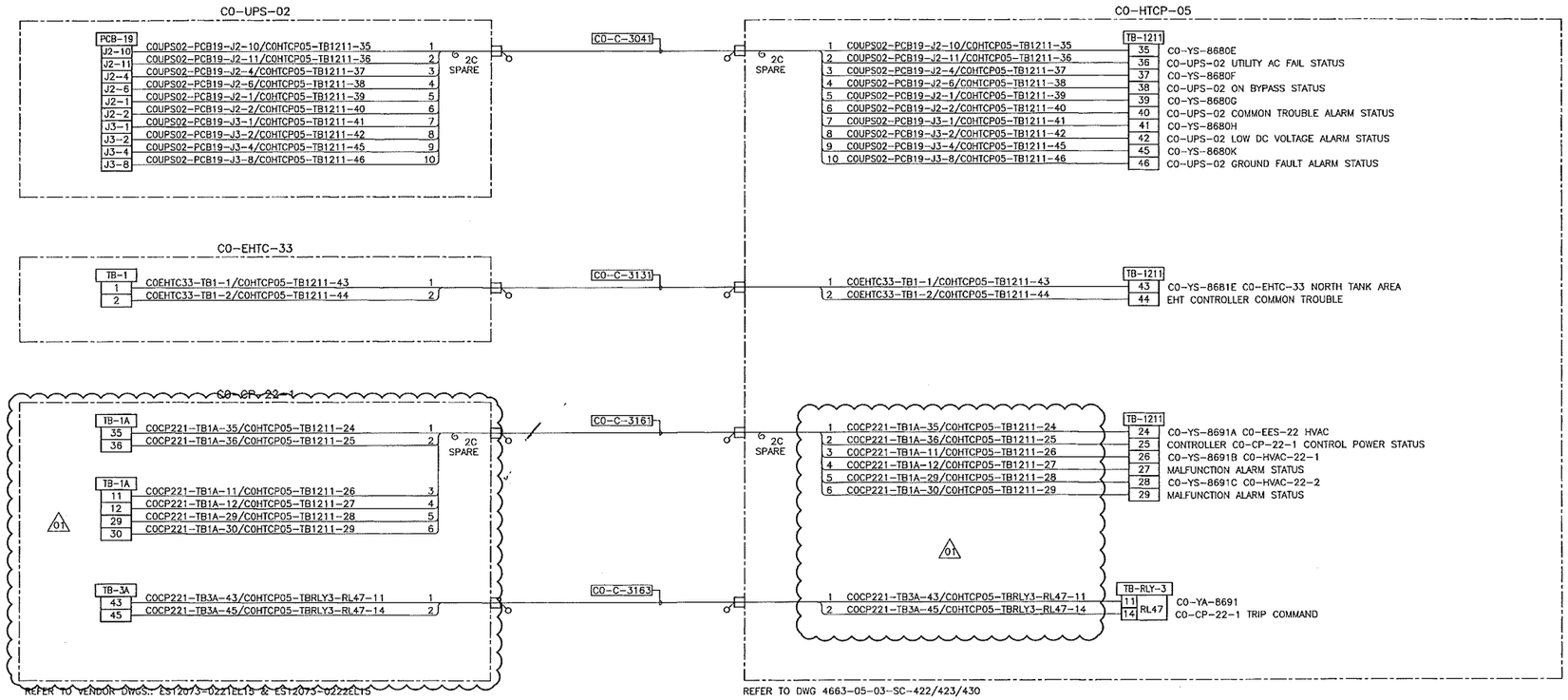
KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22
UPS SUPPLIES TO MCC & SWBD INTERCONNECTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-06-02-07-022 | REV 00

TIME — DESIGNFILE



NOTES:

1. ALL TAGS ON THIS DRAWING TO BE PREFIXED WITH "130 KSHTT-" UNLESS SPECIFIED OTHERWISE.

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
TCMP	TELECOMMUNICATION PANEL
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR

CABLE CONNECTOR FOR NON-CLASSIFIED AREA

C0XXXX-XX-XX/C0HTCPXX-TBXX-XX
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- CONTROL PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-EJ-0000-P0146
UEL# 2012016-1EF-CAB-000-0246-01

REFERENCE DRAWINGS

DRAWING No	TITLE
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REV No	DATE	DESCRIPTION
00	2014-03-19	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
01	2014-04-11	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	2197104	JM	TAE	HHM	JED	DCB	UPSIDE
	2197104	MP	PLR	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 22-APR-11

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

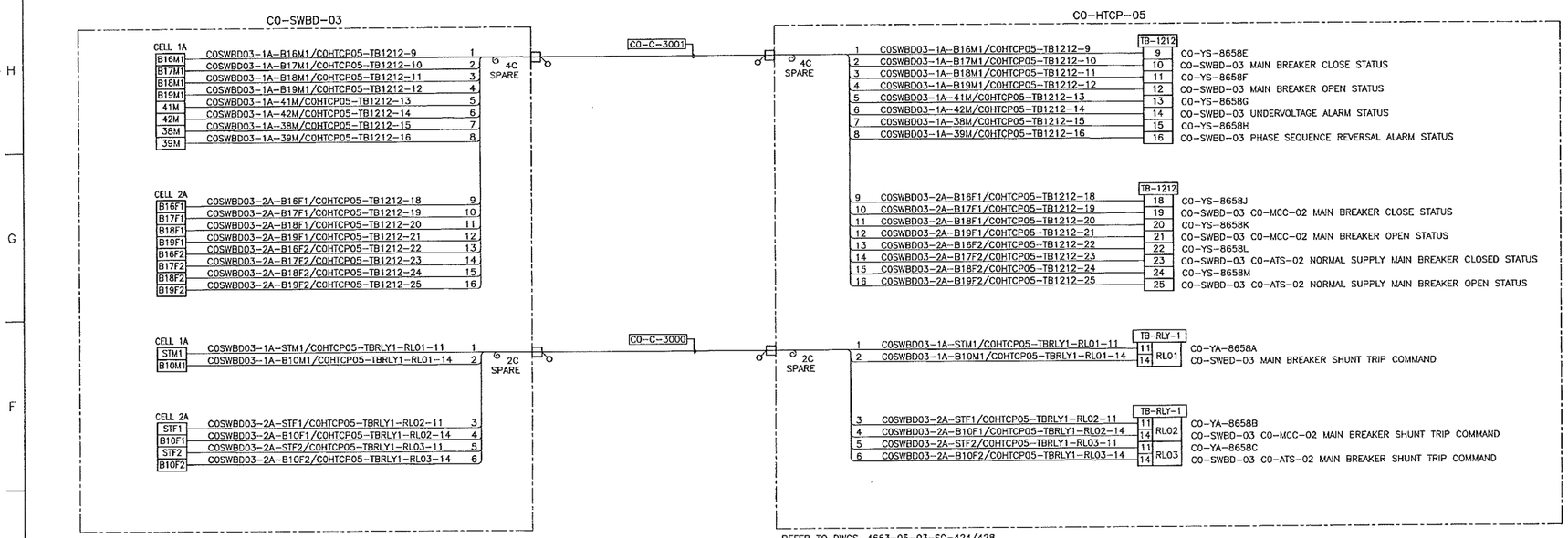
C0-EES-22
C0-UPS-02, C0-EHTC-33 & C0-CP-22-1 TO C0-HTCP-01 INTERCONNECTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-06-02-07-146 | REV 01

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS



NOTES:

1. ALL TAGS ON THIS DRAWING TO BE PREFIXED WITH "130 KSHTT-" UNLESS SPECIFIED OTHERWISE.

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
TCMP	TELECOMMUNICATION PANEL
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR

CABLE CONNECTOR FOR NON-CLASSIFIED AREA

C0XXXX-XX-XX/C0HTCPXX-TBXX-XX
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- CONTROL PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-EJ-0000-P0155
UEL# 2012016-1EF-CAB-000-0255-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-05-02-03-031	C0-EES-22 ELECTRICAL EQUIPMENT LAYOUT

REVISION								
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-04-04	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	JAP	TAE	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOCKRILL 2014-APR-07

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		06

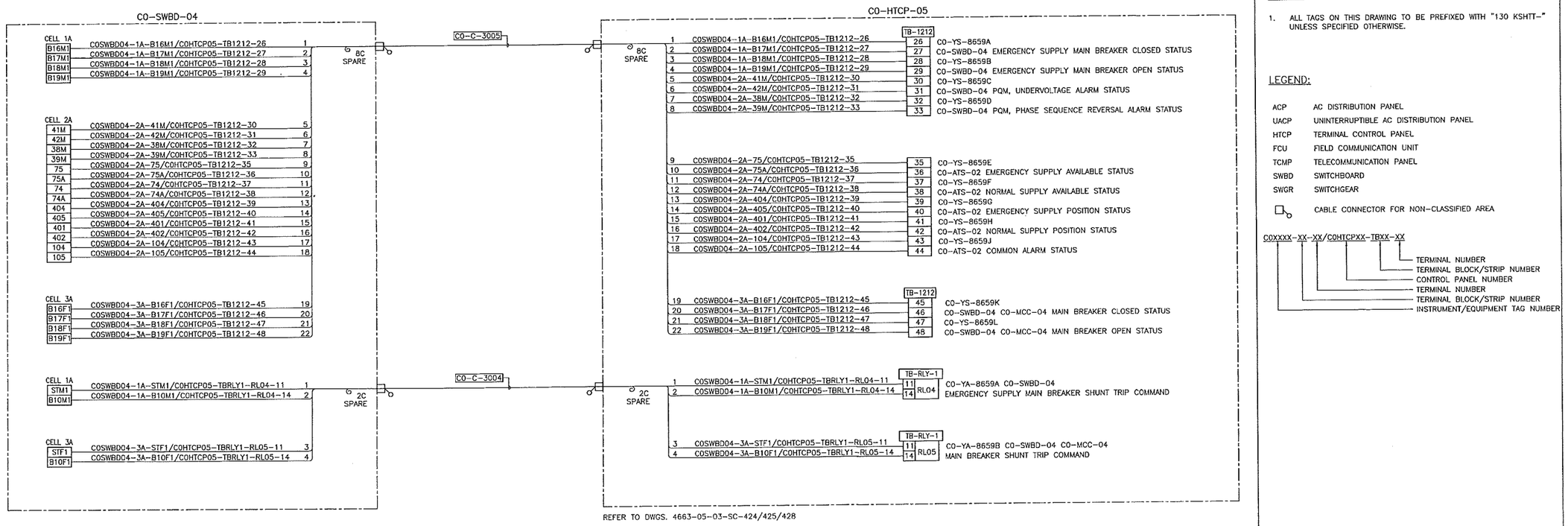
C0-EES-22
C0-SWBD-03 TO C0-HTCP-05
INTERCONNECTION WIRING DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663-06-02-07-155	00

TIME---DESIGNFILE

TC_A1_BR.DWG 594X841

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REFER TO DWGS. 4663-05-03-SC-424/425/428

NOTES:

1. ALL TAGS ON THIS DRAWING TO BE PREFIXED WITH "130 KSHTT-" UNLESS SPECIFIED OTHERWISE.

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
TCMP	TELECOMMUNICATION PANEL
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR

CABLE CONNECTOR FOR NON-CLASSIFIED AREA

C0XXXX-XX-XX/C0HTCPXX-TBXX-XX
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- CONTROL PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-EJ-0000-P0156
UEL# 2012016-1EF-CAB-000-0256-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-02-03-031	CO-EES-22 ELECTRICAL EQUIPMENT LAYOUT

REV No	DATE	DESCRIPTION
00	2014-04-04	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	JAP	TAE	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER JAMES PAUL DAILY 2014-APR-04

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

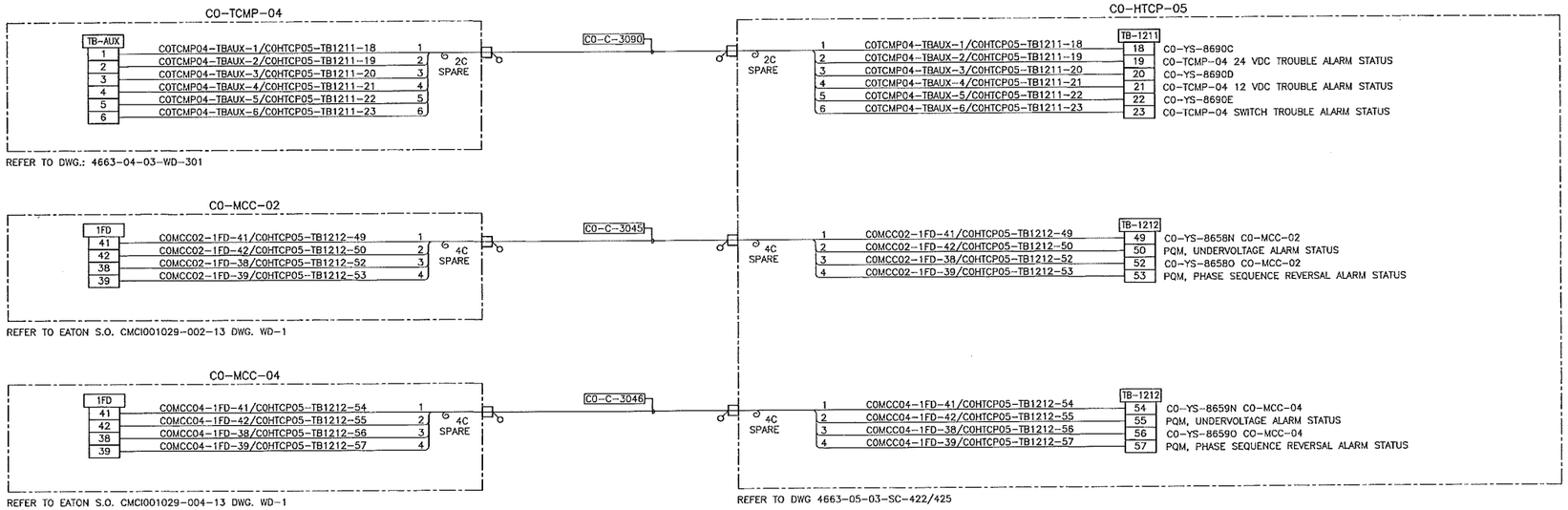
CO-EES-22
CO-SWBD-04 TO CO-HTCP-05
INTERCONNECTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-06-02-07-156 | REV 00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS



NOTES:

1. ALL TAGS ON THIS DRAWING TO BE PREFIXED WITH "130 KSHIT-" UNLESS SPECIFIED OTHERWISE.

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
TCMP	TELECOMMUNICATION PANEL
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
□o	CABLE CONNECTOR FOR NON-CLASSIFIED AREA

COXXXX-XX-XX/COHTCPXX-TBXX-XX
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- CONTROL PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-EJ-0000-P0157
UEL# 2012016-1EF-CAB-000-0257-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-02-03-031	CO-EES-22 ELECTRICAL EQUIPMENT LAYOUT

REVISION

REV No.	DATE	DESCRIPTION
00	2014-04-04	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	JAP	TAE	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 2014-APR-04

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TransCanada — In business to deliver

upside Engineering Ltd.

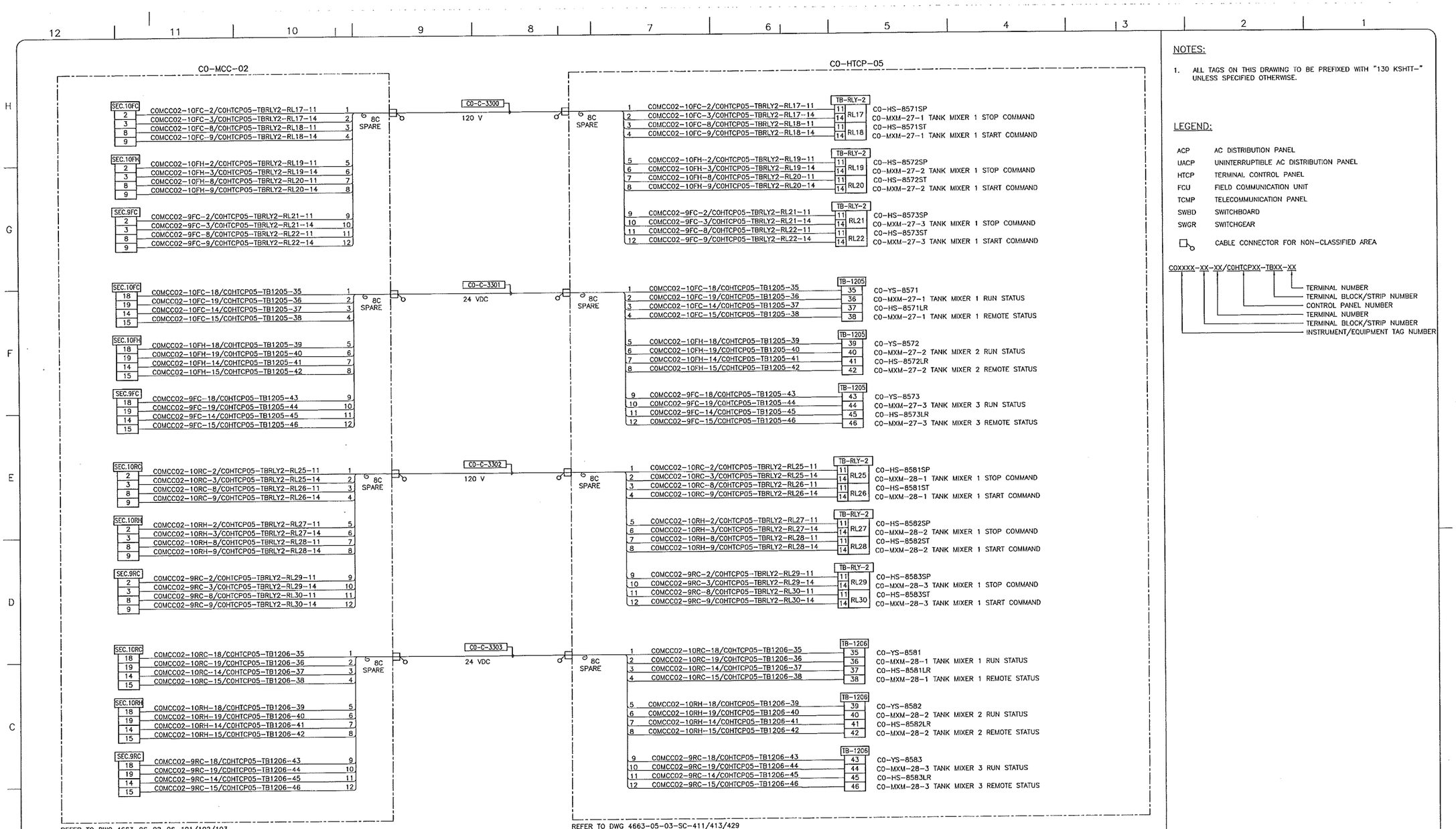
KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22
CO-TCMP-04/04 & CO-MCC-02/04 TO CO-HTCP-05 INTERCONNECTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-06-02-07-157 | REV 00

TIME — DESIGNFILE



NOTES:

1. ALL TAGS ON THIS DRAWING TO BE PREFIXED WITH "130 KSHTT-" UNLESS SPECIFIED OTHERWISE.

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
TCMP	TELECOMMUNICATION PANEL
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR

CABLE CONNECTOR FOR NON-CLASSIFIED AREA

COXXXX-XX-XX/COHTCPXX-TBXX-XX

- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- CONTROL PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-EJ-0000-P0158
UEL# 2012016-1EF-CAB-000-0258-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	-

REV No	DATE	DESCRIPTION
00	2014-03-19	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	2197104	JIM	TAE	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOORN 2014-MAR-21

PERMIT/ ENG. APPROVAL — DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

CO-EES-22
CO-MCC-02 TO CO-HTCP-05
INTERCONNECTION WIRING DIAGRAM 1 OF 3

SCALE N.T.S. | DRAWING No 4663-06-02-07-158 | REV 00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

CO-MCC-02

RESERVED FOR FUTURE

REFER TO DWG 4663-06-02-06-XXX/XXX/XXX
REFER TO DWG 4663-06-02-06-XXX/XXX/XXX

CO-HTCP-05

RESERVED FOR FUTURE

REFER TO DWG 4663-05-03-SC-XXX/XXX/XXX

NOTES:

1. ALL TAGS ON THIS DRAWING TO BE PREFIXED WITH "130 KSHTT-" UNLESS SPECIFIED OTHERWISE.

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
TCMP	TELECOMMUNICATION PANEL
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
	CABLE CONNECTOR FOR NON-CLASSIFIED AREA

COXXXX-XX-XX/COHTCPXX-TBXX-XX

- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- CONTROL PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-EJ-0000-P0159
UEL# 2012016-1EF-CAB-000-0259-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	-

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-14	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	JIM	TAE	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-MAR-21

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

TransCanada
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KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		06

CO-EES-22
CO-MCC-02 TO CO-HTCP-05
INTERCONNECTION WIRING DIAGRAM 2 OF 3

SCALE	DRAWING No	REV
N.T.S.	4663-06-02-07-159	00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

-TIME- -DESIGNFILE-

C0-MCC-02

RESERVED FOR FUTURE

REFER TO DWG 4663-06-02-06-XXX/XXX/XXX

C0-HTCP-05

RESERVED FOR FUTURE

REFER TO DWG 4663-05-03-SC-XXX/XXX/XXX

NOTES:

1. ALL TAGS ON THIS DRAWING TO BE PREFIXED WITH "130 KSHTT-" UNLESS SPECIFIED OTHERWISE.

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT
TCMP	TELECOMMUNICATION PANEL
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
	CABLE CONNECTOR FOR NON-CLASSIFIED AREA

COXXXX-XX-XX/COHTCPXX-TBXX-XX

- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- CONTROL PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-EJ-0000-P0160
UEL# 2012016-1EF-CAB-000-0260-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	-

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-14	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	JIM	TAE	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DCOSTA
2014-MAR-21

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

C0-EES-22
C0-MCC-02 TO C0-HTCP-05
INTERCONNECTION WIRING DIAGRAM 3 OF 3

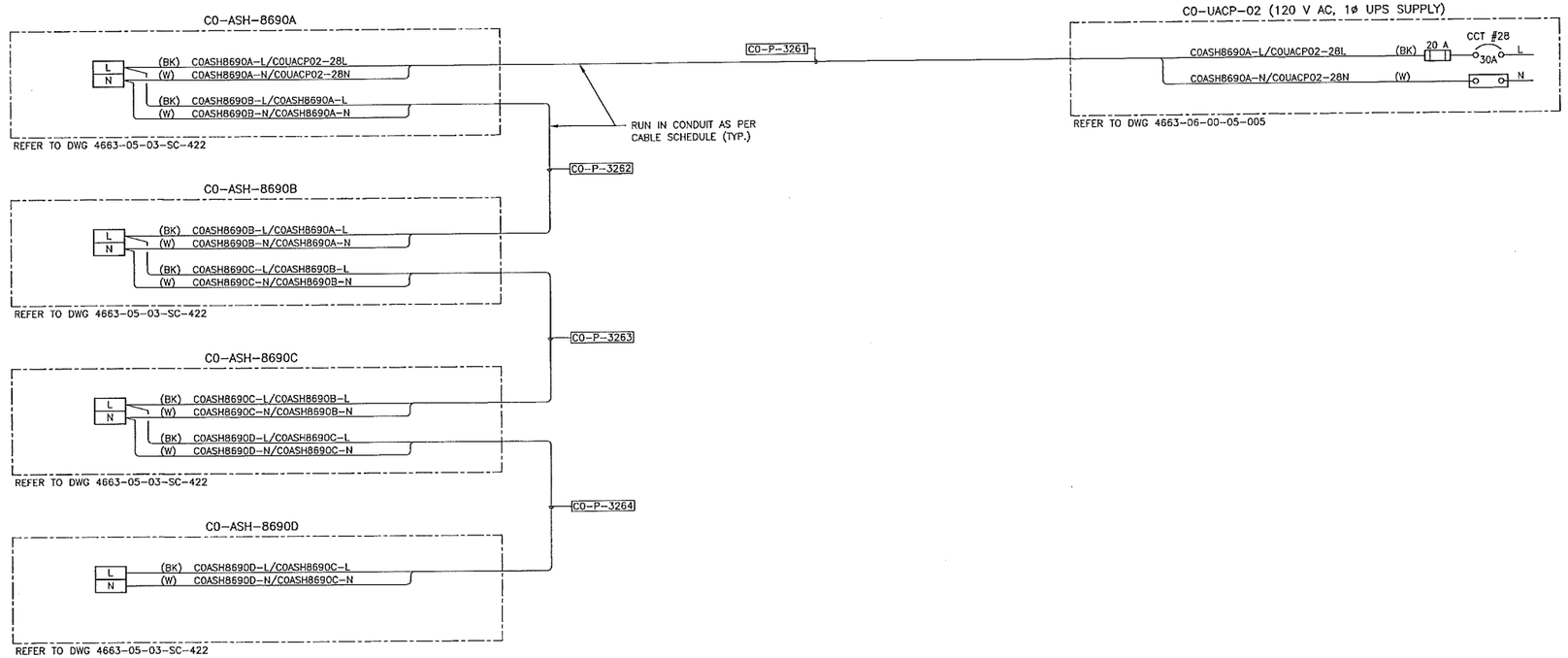
SCALE N.T.S. | DRAWING No 4663-06-02-07-160 | REV 00

TIME
DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

CO-EES-22



NOTES:

1. ALL TAGS SHALL BE PREFIXED WITH "130-KSHTT".

LEGEND:

ACP	AC DISTRIBUTION PANEL
UACP	UNINTERRUPTIBLE AC DISTRIBUTION PANEL
HTCP	TERMINAL CONTROL PANEL
FCU	FIELD COMMUNICATION UNIT

COXXX-XX-XX/COUACP02-XXL

- CIRCUIT NUMBER (L)LINE/(N)NEUTRAL
- DISTRIBUTION PANEL NUMBER
- TERMINAL NUMBER
- TERMINAL BLOCK/STRIP NUMBER
- INSTRUMENT/EQUIPMENT TAG NUMBER

SDN# 25472-130-E7-0000-P0613
UEL# 2012016-1EF-EWD-000-0613-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-09-00-01-004	KHTT SAFETY PLAN BUILDINGS CO-EES-21, CO-EES-22, CO-VES-21 LAYOUT
4663-06-00-05-005	CO-EES-22 CO-ACP-12, CO-UACP-02 DISTRIBUTION PANEL SCHEDULES
4663-06-02-03-031	CO-EES-22 ELECTRICAL EQUIPMENT LAYOUT
4663-06-02-03-035	CO-EES-22 INSTRUMENTATION DEVICES LAYOUT

REVISION

REV No	DATE	DESCRIPTION
00	2014-04-04	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	TAE	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY

2014-APR-04

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

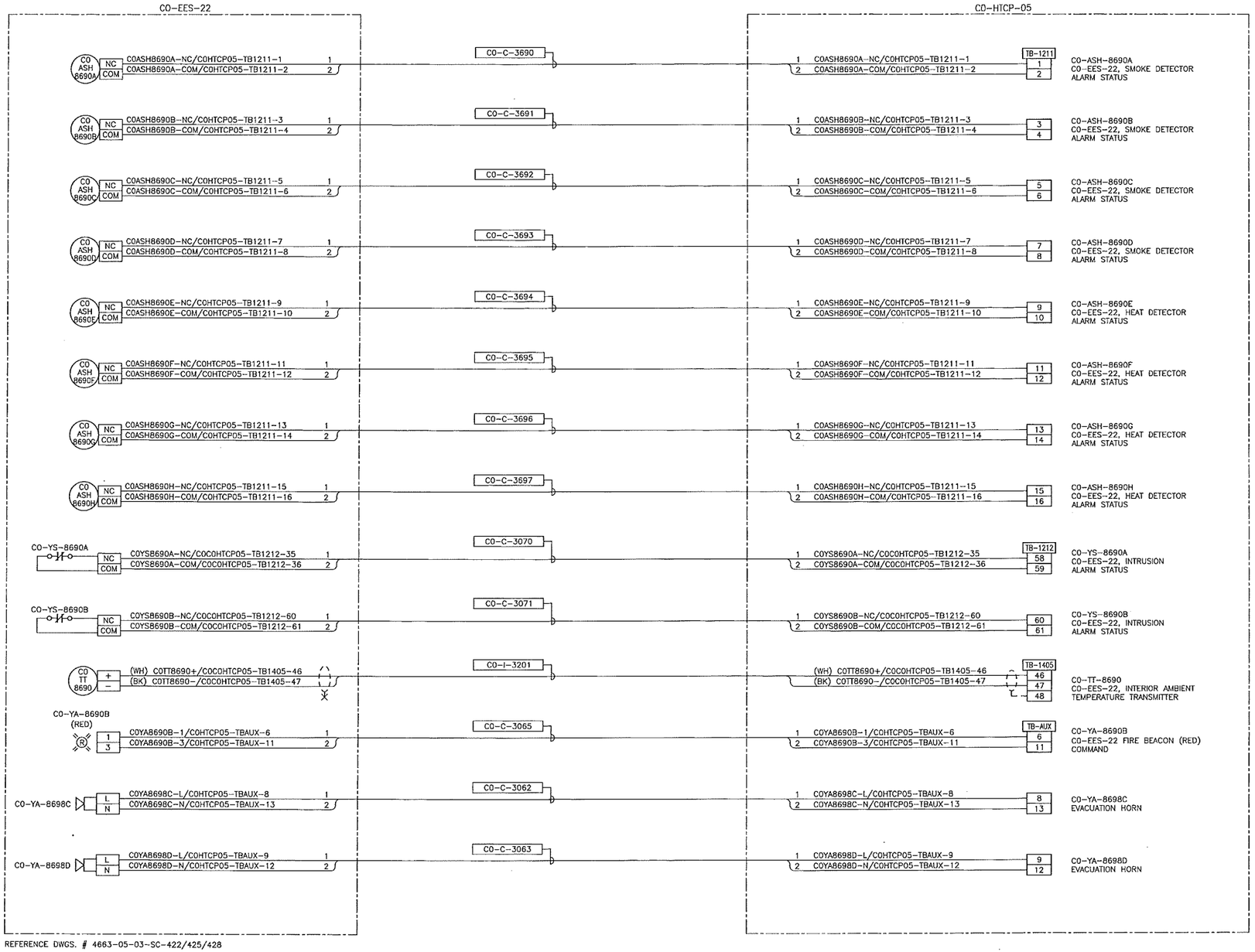
CO-EES-22
UPS SUPPLIES TO SMOKE DETECTORS
INTERCONNECTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-06-02-07-003 | REV 00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS



REFERENCE DWGS. # 4663-05-03-SC-422/425/428

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT REQUIRES EXTERNAL 120VAC POWER. SEE DRAWING 4663-06-02-07-003.
6. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND YES 21

SDN# 25472-130-E7-0000-P0375
UEL# 2012016-1EF-EWD-000-0375-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-14	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	JIM	TAE	HNM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY
2014-MAR-21

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHANAGE:	DISCIPLINE #
4663		06

CO-EES-22
BUILDING INSTRUMENTS & CONTROL PANEL CO-HTCP-05 INTERCONNECTION WIRING DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663-06-07-06-025	00

TC_A1_BR.DWG 594X841

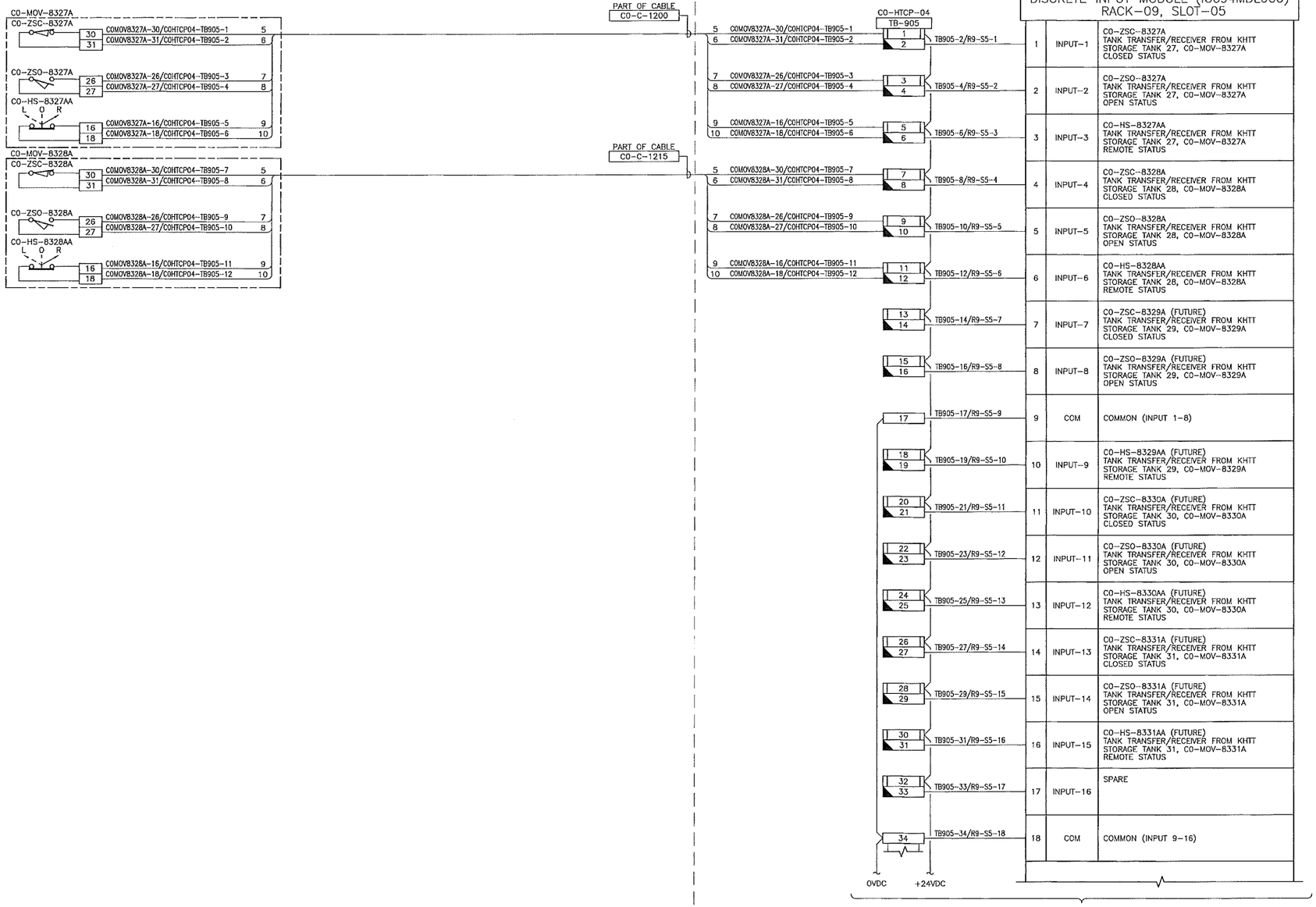
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

DESIGNFILE - TIME

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)



DISCRETE INPUT MODULE (IC694MDL660)
RACK-09, SLOT-05

1	INPUT-1	CO-ZSC-8327A TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 27, CO-MOV-8327A CLOSED STATUS
2	INPUT-2	CO-ZSO-8327A TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 27, CO-MOV-8327A OPEN STATUS
3	INPUT-3	CO-HS-8327AA TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 27, CO-MOV-8327A REMOTE STATUS
4	INPUT-4	CO-ZSC-8328A TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 28, CO-MOV-8328A CLOSED STATUS
5	INPUT-5	CO-ZSO-8328A TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 28, CO-MOV-8328A OPEN STATUS
6	INPUT-6	CO-HS-8328AA TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 28, CO-MOV-8328A REMOTE STATUS
7	INPUT-7	CO-ZSC-8329A (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 29, CO-MOV-8329A CLOSED STATUS
8	INPUT-8	CO-ZSO-8329A (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 29, CO-MOV-8329A OPEN STATUS
9	COM	COMMON (INPUT 1-8)
10	INPUT-9	CO-HS-8329AA (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 29, CO-MOV-8329A REMOTE STATUS
11	INPUT-10	CO-ZSC-8330A (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 30, CO-MOV-8330A CLOSED STATUS
12	INPUT-11	CO-ZSO-8330A (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 30, CO-MOV-8330A OPEN STATUS
13	INPUT-12	CO-HS-8330AA (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 30, CO-MOV-8330A REMOTE STATUS
14	INPUT-13	CO-ZSC-8331A (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 31, CO-MOV-8331A CLOSED STATUS
15	INPUT-14	CO-ZSO-8331A (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 31, CO-MOV-8331A OPEN STATUS
16	INPUT-15	CO-HS-8331AA (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 31, CO-MOV-8331A REMOTE STATUS
17	INPUT-16	SPARE
18	COM	COMMON (INPUT 9-16)

CONTINUES ON DWG. 4663-05-03-SC-313

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0082
UEL# 2012016-1EF-CLD-000-0082-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/09 SLOT 05 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-312 | REV 00

TIME----DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CONTINUES ON DWG. 4663-05-03-SC-312

CO-MOV-8327B
CO-ZSC-8327B
CO-ZSO-8327B
CO-HS-8327BA (L O R)

PART OF CABLE CO-C-1201

30	CO_MOV_8327B-30/CO_HTCP04-TB905-41	5	
31	CO_MOV_8327B-31/CO_HTCP04-TB905-42	6	
26	CO_MOV_8327B-26/CO_HTCP04-TB905-43	7	
27	CO_MOV_8327B-27/CO_HTCP04-TB905-44	8	
16	CO_MOV_8327B-16/CO_HTCP04-TB905-45	9	
18	CO_MOV_8327B-18/CO_HTCP04-TB905-46	10	

CO-MOV-8328B
CO-ZSC-8328B
CO-ZSO-8328B
CO-HS-8328BA (L O R)

PART OF CABLE CO-C-1216

30	CO_MOV_8328B-30/CO_HTCP04-TB905-47	5	
31	CO_MOV_8328B-31/CO_HTCP04-TB905-48	6	
26	CO_MOV_8328B-26/CO_HTCP04-TB905-49	7	
27	CO_MOV_8328B-27/CO_HTCP04-TB905-50	8	
16	CO_MOV_8328B-16/CO_HTCP04-TB905-52	9	
18	CO_MOV_8328B-18/CO_HTCP04-TB905-53	10	

0VDC +24VDC

CO-HTCP-04 TB-905

5	CO_MOV_8327B-30/CO_HTCP04-TB905-41	35	TB905-36/R9-S5-19
6	CO_MOV_8327B-31/CO_HTCP04-TB905-42	36	
		37	TB905-38/R9-S5-20
7	CO_MOV_8327B-26/CO_HTCP04-TB905-43	38	
8	CO_MOV_8327B-27/CO_HTCP04-TB905-44	39	TB905-40/R9-S5-21
9	CO_MOV_8327B-16/CO_HTCP04-TB905-45	40	
10	CO_MOV_8327B-18/CO_HTCP04-TB905-46	41	TB905-42/R9-S5-22
5	CO_MOV_8328B-30/CO_HTCP04-TB905-47	42	
6	CO_MOV_8328B-31/CO_HTCP04-TB905-48	43	TB905-44/R9-S5-23
7	CO_MOV_8328B-26/CO_HTCP04-TB905-49	44	
8	CO_MOV_8328B-27/CO_HTCP04-TB905-50	45	TB905-46/R9-S5-24
9	CO_MOV_8328B-16/CO_HTCP04-TB905-52	46	
10	CO_MOV_8328B-18/CO_HTCP04-TB905-53	47	TB905-48/R9-S5-25
		48	
		49	TB905-50/R9-S5-26
		50	
		51	TB905-51/R9-S5-27
		52	TB905-53/R9-S5-28
		53	
		54	TB905-55/R9-S5-29
		55	
		56	TB905-57/R9-S5-30
		57	
		58	TB905-59/R9-S5-31
		59	
		60	TB905-61/R9-S5-32
		61	
		62	TB905-63/R9-S5-33
		63	
		64	TB905-65/R9-S5-34
		65	
		66	TB905-67/R9-S5-35
		67	
		68	TB905-68/R9-S5-36

DISCRETE INPUT MODULE (IC694MDL660)
RACK-09, SLOT-05

19	INPUT-17	CO-ZSC-8332A (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 32, CO-MOV-8332A CLOSED STATUS
20	INPUT-18	CO-ZSO-8332A (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 32, CO-MOV-8332A OPEN STATUS
21	INPUT-19	CO-HS-8332AA (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 32, CO-MOV-8332A REMOTE STATUS
22	INPUT-20	CO-ZSC-8327B HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 27, CO-MOV-8327B CLOSED STATUS
23	INPUT-21	CO-ZSO-8327B HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 27, CO-MOV-8327B OPEN STATUS
24	INPUT-22	CO-HS-8327BA HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 27, CO-MOV-8327B REMOTE STATUS
25	INPUT-23	CO-ZSC-8328B HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 28, CO-MOV-8328B CLOSED STATUS
26	INPUT-24	CO-ZSO-8328B HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 28, CO-MOV-8328B OPEN STATUS
27	COM	COMMON (INPUT 17-24)
28	INPUT-25	CO-HS-8328BA HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 28, CO-MOV-8328B REMOTE STATUS
29	INPUT-26	CO-ZSC-8329B (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 29, CO-MOV-8329B CLOSED STATUS
30	INPUT-27	CO-ZSO-8329B (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 29, CO-MOV-8329B OPEN STATUS
31	INPUT-28	CO-HS-8329BA (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 29, CO-MOV-8329B REMOTE STATUS
32	INPUT-29	CO-ZSC-8330B (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 30, CO-MOV-8330B CLOSED STATUS
33	INPUT-30	CO-ZSO-8330B (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 30, CO-MOV-8330B OPEN STATUS
34	INPUT-31	CO-HS-8330BA (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 30, CO-MOV-8330B REMOTE STATUS
35	INPUT-32	SPARE
36	COM	COMMON (INPUT 25-32)

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

0VDC TBDC(-)-5/TB905-68
+24VDC TBDC(+)-5/TB905-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-708 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0083
UEL# 2012016-1EF-CLD-000-0083-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOOBAY

2014-MAR-7

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/09 SLOT 05
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-313 | REV 00

TIME-DESIGNFILE

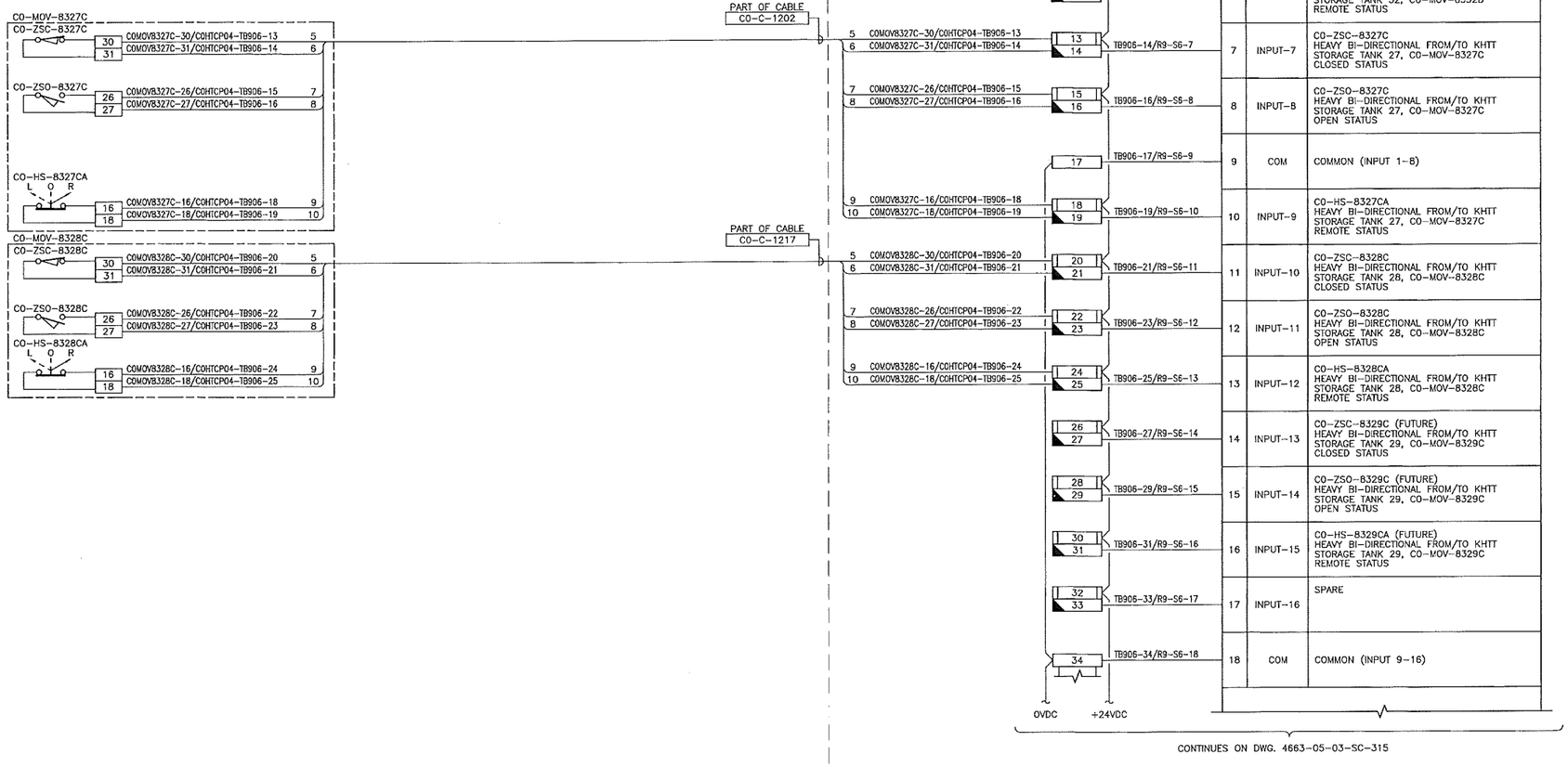
ID

TC_A1_BR.DWG 594X841

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)



DISCRETE INPUT MODULE (IC694MDL660)
RACK-09, SLOT-06

1	INPUT-1	CO-ZSC-8331B (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 31, CO-MOV-8331B CLOSED STATUS
2	INPUT-2	CO-ZSO-8331B (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 31, CO-MOV-8331B OPEN STATUS
3	INPUT-3	CO-HS-8331BA (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 31, CO-MOV-8331B REMOTE STATUS
4	INPUT-4	CO-ZSC-8332B (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 32, CO-MOV-8332B CLOSED STATUS
5	INPUT-5	CO-ZSO-8332B (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 32, CO-MOV-8332B OPEN STATUS
6	INPUT-6	CO-HS-8332BA (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 32, CO-MOV-8332B REMOTE STATUS
7	INPUT-7	CO-ZSC-8327C HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 27, CO-MOV-8327C CLOSED STATUS
8	INPUT-8	CO-ZSO-8327C HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 27, CO-MOV-8327C OPEN STATUS
9	COM	COMMON (INPUT 1-8)
10	INPUT-9	CO-HS-8327CA HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 27, CO-MOV-8327C REMOTE STATUS
11	INPUT-10	CO-ZSC-8328C HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 28, CO-MOV-8328C CLOSED STATUS
12	INPUT-11	CO-ZSO-8328C HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 28, CO-MOV-8328C OPEN STATUS
13	INPUT-12	CO-HS-8328CA HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 28, CO-MOV-8328C REMOTE STATUS
14	INPUT-13	CO-ZSC-8329C (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 29, CO-MOV-8329C CLOSED STATUS
15	INPUT-14	CO-ZSO-8329C (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 29, CO-MOV-8329C OPEN STATUS
16	INPUT-15	CO-HS-8329CA (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 29, CO-MOV-8329C REMOTE STATUS
17	INPUT-16	SPARE
18	COM	COMMON (INPUT 9-16)

CONTINUES ON DWG. 4663-05-03-SC-315

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
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   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
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   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0084
UEL# 2012016-1EF-CLD-000-0084-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-MAR-7

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/09 SLOT 06
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-314 | REV 00

TIME ---- DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CONTINUES ON DWG. 4663-05-03-SC-314

0VDC +24VDC

CO-HTCP-04 TB-906

DISCRETE INPUT MODULE (IC694MDL660) RACK-09, SLOT-06

35	TB905-36/R9-S6-19	19	INPUT-17	CO-ZSC-8330C (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHIT STORAGE TANK 30, CO-MOV-8330C CLOSED STATUS
36				
37	TB905-38/R9-S6-20	20	INPUT-18	CO-ZSO-8330C (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHIT STORAGE TANK 30, CO-MOV-8330C OPEN STATUS
38				
39	TB906-40/R9-S6-21	21	INPUT-19	CO-HS-8330CA (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHIT STORAGE TANK 30, CO-MOV-8330C REMOTE STATUS
40				
41	TB905-42/R9-S6-22	22	INPUT-20	CO-ZSC-8331C (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHIT STORAGE TANK 31, CO-MOV-8331C CLOSED STATUS
42				
43	TB906-44/R9-S6-23	23	INPUT-21	CO-ZSO-8331C (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHIT STORAGE TANK 31, CO-MOV-8331C OPEN STATUS
44				
45	TB906-46/R9-S6-24	24	INPUT-22	CO-HS-8331CA (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHIT STORAGE TANK 31, CO-MOV-8331C REMOTE STATUS
46				
47	TB906-48/R9-S6-25	25	INPUT-23	CO-ZSC-8332C (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHIT STORAGE TANK 32, CO-MOV-8332C CLOSED STATUS
48				
49	TB906-50/R9-S6-26	26	INPUT-24	CO-ZSO-8332C (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHIT STORAGE TANK 32, CO-MOV-8332C OPEN STATUS
50				
51	TB906-51/R9-S6-27	27	COM	COMMON (INPUT 17-24)
52	TB906-53/R9-S6-28	28	INPUT-25	CO-HS-8332CA (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHIT STORAGE TANK 32, CO-MOV-8332C REMOTE STATUS
53				
54	TB906-55/R9-S6-29	29	INPUT-26	SPARE
55				
56	TB906-57/R9-S6-30	30	INPUT-27	SPARE
57				
58	TB906-59/R9-S6-31	31	INPUT-28	SPARE
59				
60	TB905-61/R9-S6-32	32	INPUT-29	CO-ZSC-8827 HAND VALVE, CO-HV-8827, CO-TK-27 INLET FROM SUMP CO-OST-21 CLOSED STATUS
61				
62	TB906-63/R9-S6-33	33	INPUT-30	CO-ZSO-8827 HAND VALVE, CO-HV-8827, CO-TK-27 INLET FROM SUMP CO-OST-21 OPEN STATUS
63				
64	TB906-65/R9-S6-34	34	INPUT-31	CO-ZSC-8828 HAND VALVE, CO-HV-8828, CO-TK-28 INLET FROM SUMP CO-OST-21 CLOSED STATUS
65				
66	TB906-67/R9-S6-35	35	INPUT-32	CO-ZSO-8828 HAND VALVE, CO-HV-8828, CO-TK-28 INLET FROM SUMP CO-OST-21 OPEN STATUS
67				
68	TB906-68/R9-S6-36	36	COM	COMMON (INPUT 25-32)

CO-HV-8827
CO-ZSC-8827
NC C
CO-ZSO-8827
NO C

CO-C-1286

1 CO-HV8827-NC/CO-HTCP04-TB906-60
2 CO-HV8827-C/CO-HTCP04-TB906-61
3 CO-HV8827-NO/CO-HTCP04-TB906-62
4 CO-HV8827-C/CO-HTCP04-TB906-63

CO-HV-8828
CO-ZSC-8828
NC C
CO-ZSO-8828
NO C

CO-C-1287

1 CO-HV8828-NC/CO-HTCP04-TB906-64
2 CO-HV8828-C/CO-HTCP04-TB906-65
3 CO-HV8828-NO/CO-HTCP04-TB906-66
4 CO-HV8828-C/CO-HTCP04-TB906-67

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

0VDC TBDC(-)-6/TB906-68
+24VDC TBDC(+)-6/TB906-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0085
UEL# 2012016-1EF-CLD-000-0085-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER JAMES DOOLEY ALBERTA

2014-MAR-7

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

Upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/09 SLOT 06 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-315 | REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TIME-DESIGNFILE

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CO-MOV-8327D
CO-ZSC-8327D
30 COMOVB327D-30/COHTCP04-TB907-1 5
31 COMOVB327D-31/COHTCP04-TB907-2 6
CO-ZSO-8327D
26 COMOVB327D-26/COHTCP04-TB907-3 7
27 COMOVB327D-27/COHTCP04-TB907-4 8
CO-HS-8327DA
L O R
16 COMOVB327D-16/COHTCP04-TB907-5 9
18 COMOVB327D-18/COHTCP04-TB907-6 10

CO-MOV-8328D
CO-ZSC-8328D
30 COMOVB328D-30/COHTCP04-TB907-7 5
31 COMOVB328D-31/COHTCP04-TB907-8 6
CO-ZSO-8328D
26 COMOVB328D-26/COHTCP04-TB907-9 7
27 COMOVB328D-27/COHTCP04-TB907-10 8
CO-HS-8328DA
L O R
16 COMOVB328D-16/COHTCP04-TB907-11 9
18 COMOVB328D-18/COHTCP04-TB907-12 10

PART OF CABLE CO-C-1203
PART OF CABLE CO-C-1218

CO-HTCP-04 TB-907

5 COMOVB327D-30/COHTCP04-TB907-1	1	TB907-2/R9-S7-1	
6 COMOVB327D-31/COHTCP04-TB907-2	2		
7 COMOVB327D-26/COHTCP04-TB907-3	3	TB907-4/R9-S7-2	
8 COMOVB327D-27/COHTCP04-TB907-4	4		
9 COMOVB327D-16/COHTCP04-TB907-5	5	TB907-6/R9-S7-3	
10 COMOVB327D-18/COHTCP04-TB907-6	6		
5 COMOVB328D-30/COHTCP04-TB907-7	7	TB907-8/R9-S7-4	
6 COMOVB328D-31/COHTCP04-TB907-8	8		
7 COMOVB328D-26/COHTCP04-TB907-9	9	TB907-10/R9-S7-5	
8 COMOVB328D-27/COHTCP04-TB907-10	10		
9 COMOVB328D-16/COHTCP04-TB907-11	11	TB907-12/R9-S7-6	
10 COMOVB328D-18/COHTCP04-TB907-12	12		
	13	TB907-14/R9-S7-7	
	14		
	15	TB907-16/R9-S7-8	
	16		
	17	TB907-17/R9-S7-9	
	18	TB907-19/R9-S7-10	
	19		
	20	TB907-21/R9-S7-11	
	21		
	22	TB907-23/R9-S7-12	
	23		
	24	TB907-25/R9-S7-13	
	25		
	26	TB907-27/R9-S7-14	
	27		
	28	TB907-29/R9-S7-15	
	29		
	30	TB907-31/R9-S7-16	
	31		
	32	TB907-33/R9-S7-17	
	33		
	34	TB907-34/R9-S7-18	

0VDC +24VDC

DISCRETE INPUT MODULE (IC694MDL660)
RACK-09, SLOT-07

1	INPUT-1	CO-ZSC-8327D HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 27, CO-MOV-8327D CLOSED STATUS
2	INPUT-2	CO-ZSO-8327D HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 27, CO-MOV-8327D OPEN STATUS
3	INPUT-3	CO-HS-8327DA HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 27, CO-MOV-8327D REMOTE STATUS
4	INPUT-4	CO-ZSC-8328D HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 28, CO-MOV-8328D CLOSED STATUS
5	INPUT-5	CO-ZSO-8328D HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 28, CO-MOV-8328D OPEN STATUS
6	INPUT-6	CO-HS-8328DA HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 28, CO-MOV-8328D REMOTE STATUS
7	INPUT-7	CO-ZSC-8329D (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 29, CO-MOV-8329D CLOSED STATUS
8	INPUT-8	CO-ZSO-8329D (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 29, CO-MOV-8329D OPEN STATUS
9	COM	COMMON (INPUT 1-8)
10	INPUT-9	CO-HS-8329DA (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 29, CO-MOV-8329D REMOTE STATUS
11	INPUT-10	CO-ZSC-8330D (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 30, CO-MOV-8330D CLOSED STATUS
12	INPUT-11	CO-ZSO-8330D (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 30, CO-MOV-8330D OPEN STATUS
13	INPUT-12	CO-HS-8330DA (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 30, CO-MOV-8330D REMOTE STATUS
14	INPUT-13	CO-ZSC-8331D (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 31, CO-MOV-8331D CLOSED STATUS
15	INPUT-14	CO-ZSO-8331D (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 31, CO-MOV-8331D OPEN STATUS
16	INPUT-15	CO-HS-8331DA (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 31, CO-MOV-8331D REMOTE STATUS
17	INPUT-16	SPARE
18	COM	COMMON (INPUT 9-16)

CONTINUES ON DWG. 4663-05-03-SC-317

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
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   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0086
UEL# 2012016-1EF-CLD-000-0086-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOOD ALBERTA
2014-MAR-7
REV. NO. DATE

PERMIT/ ENG. APPROVAL
DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-04, PLC-11/09 SLOT 07 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-316	00

TC_A1_BR.DWG 594XB41

TIME ---- DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CO-MCC-06

RS27	TB-27	13	COMCC06-TB27-13/COHTCP04-TB907-52 1
		14	COMCC06-TB27-14/COHTCP04-TB907-53 2
RS28	TB-28	13	COMCC06-TB28-13/COHTCP04-TB907-54 3
		14	COMCC06-TB28-14/COHTCP04-TB907-55 4
RS29	TB-29	13	COMCC06-TB29-13/COHTCP04-TB907-56 5
		14	COMCC06-TB29-14/COHTCP04-TB907-57 6
RS30	TB-30	13	COMCC06-TB30-13/COHTCP04-TB907-58 7
		14	COMCC06-TB30-14/COHTCP04-TB907-59 8
RS31	TB-31	13	COMCC06-TB31-13/COHTCP04-TB907-60 9
		14	COMCC06-TB31-14/COHTCP04-TB907-61 10
RS32	TB-32	13	COMCC06-TB32-13/COHTCP04-TB907-62 11
		14	COMCC06-TB32-14/COHTCP04-TB907-63 12

REFER TO DWG #4663-06-02-06-411/412/413/414/415/416

CO-C-3556

1 COMCC06-TB27-13/COHTCP04-TB907-52
2 COMCC06-TB27-14/COHTCP04-TB907-53
3 COMCC06-TB28-13/COHTCP04-TB907-54
4 COMCC06-TB28-14/COHTCP04-TB907-55
5 COMCC06-TB29-13/COHTCP04-TB907-56
6 COMCC06-TB29-14/COHTCP04-TB907-57
7 COMCC06-TB30-13/COHTCP04-TB907-58
8 COMCC06-TB30-14/COHTCP04-TB907-59
9 COMCC06-TB31-13/COHTCP04-TB907-60
10 COMCC06-TB31-14/COHTCP04-TB907-61
11 COMCC06-TB32-13/COHTCP04-TB907-62
12 COMCC06-TB32-14/COHTCP04-TB907-63

6 SPARE

TO TBDC 4663-05-03-SC-303 POWER SUPPLY

0VDC TBDC(-)-7/TB907-68

+24VDC TBDC(+)-7/TB907-66

CONTINUES ON DWG. 4663-05-03-SC-316

0VDC +24VDC

CO-HTCP-04 TB-907

DISCRETE INPUT MODULE (IC694MDL660) RACK-09, SLOT-07

35/36	TB906-36/R9-S6-19	19	INPUT-17	CO-ZSC-8332D (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 32, CO-MOV-8332D CLOSED STATUS
37/38	TB907-38/R9-S7-20	20	INPUT-18	CO-ZSO-8332D (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 32, CO-MOV-8332D OPEN STATUS
39/40	TB907-40/R9-S7-21	21	INPUT-19	CO-HS-8332DA (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 32, CO-MOV-8332D REMOTE STATUS
41/42	TB907-42/R9-S7-22	22	INPUT-20	SPARE
43/44	TB907-44/R9-S7-23	23	INPUT-21	SPARE
45/46	TB907-46/R9-S7-24	24	INPUT-22	SPARE
47/48	TB907-48/R9-S7-25	25	INPUT-23	SPARE
49/50	TB907-50/R9-S7-26	26	INPUT-24	SPARE
51	TB907-51/R9-S7-27	27	COM	COMMON (INPUT 17-24)
52/53	TB907-53/R9-S7-28	28	INPUT-25	CO-HS-27-LR TANK TK-27 FIRE FOAM HAND SWITCH REMOTE STATUS
54/55	TB907-55/R9-S7-29	29	INPUT-26	CO-HS-28-LR TANK TK-28 FIRE FOAM HAND SWITCH REMOTE STATUS
56/57	TB907-57/R9-S7-30	30	INPUT-27	CO-HS-29-LR (FUTURE) TANK TK-29 FIRE FOAM HAND SWITCH REMOTE STATUS
58/59	TB907-59/R9-S7-31	31	INPUT-28	CO-HS-30-LR (FUTURE) TANK TK-30 FIRE FOAM HAND SWITCH REMOTE STATUS
60/61	TB907-61/R9-S7-32	32	INPUT-29	CO-HS-31-LR (FUTURE) TANK TK-31 FIRE FOAM HAND SWITCH
62/63	TB907-63/R9-S7-33	33	INPUT-30	CO-HS-32-LR (FUTURE) TANK TK-32 FIRE FOAM HAND SWITCH REMOTE STATUS
64/65	TB907-65/R9-S7-34	34	INPUT-31	SPARE
66/67	TB907-67/R9-S7-35	35	INPUT-32	SPARE
68	TB907-68/R9-S7-36	36	COM	COMMON (INPUT 25-32)

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0087
UEL# 2012016-1EF-CLD-000-0087-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BFM	DMC	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOUGLAS CAMPBELL 28525 2014-MAR-7

REV. NO. DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.

PERMIT NUMBER: P 5508

The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TransCanada In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/09 SLOT 07
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-317 | REV 00

TIME DESIGNFILE

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-09, SLOT-10

CO-HS-8327ACL TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 27, CO-MOV-8327A CLOSE COMMAND	OUT 1 NO	1	R9-S10-2/TB910-1
	OUT 1	2	
CO-HS-8327AOP TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 27, CO-MOV-8327A OPEN COMMAND	OUT 2 NO	3	R9-S10-4/TB910-3
	OUT 2	4	
CO-HS-8328ACL TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 28, CO-MOV-8328A CLOSE COMMAND	OUT 3 NO	5	R9-S10-6/TB910-5
	OUT 3	6	
CO-HS-832BAOP TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 28, CO-MOV-8328A OPEN COMMAND	OUT 4 NO	7	R9-S10-8/TB910-7
	OUT 4	8	
CO-HS-8329ACL (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 29, CO-MOV-8329A CLOSE COMMAND	OUT 5 NO	9	R9-S10-10/TB910-9
	OUT 5	10	
CO-HS-8329AOP (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 29, CO-MOV-8329A OPEN COMMAND	OUT 6 NO	11	R9-S10-12/TB910-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8330ACL (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 30, CO-MOV-8330A CLOSE COMMAND	OUT 7 NO	14	R9-S10-15/TB910-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8330AOP (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 30, CO-MOV-8330A OPEN COMMAND	OUT 8 NO	17	R9-S10-18/TB910-15
	OUT 8	18	
CO-HS-8331ACL (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 31, CO-MOV-8331A CLOSE COMMAND	OUT 9 NO	19	R9-S10-20/TB910-17
	OUT 9	20	
CO-HS-8331AOP (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 31, CO-MOV-8331A OPEN COMMAND	OUT 10 NO	21	R9-S10-22/TB910-19
	OUT 10	22	
CO-HS-8332ACL (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 32, CO-MCV-8332A CLOSE COMMAND	OUT 11 NO	23	R9-S10-24/TB910-21
	OUT 11	24	
CO-HS-8332AOP (FUTURE) TANK TRANSFER/RECEIVER FROM KHTT STORAGE TANK 32, CO-MOV-8332A OPEN COMMAND	OUT 12 NO	25	R9-S10-26/TB910-23
	OUT 12	26	
SPARE	OUT 13 NO	27	R9-S10-28/TB910-25
	OUT 13	28	
SPARE	OUT 14 NO	29	R9-S10-30/TB910-27
	OUT 14	30	
NO CONNECTION	NC	31	
SPARE	OUT 15 NO	32	R9-S10-33/TB910-29
	OUT 15	33	
NO CONNECTION	NC	34	
SPARE	OUT 16 NO	35	R9-S10-36/TB910-31
	OUT 16	36	

CO-HTCP-04 TB-910

1	2	COMOV8327A-51/COHTCP04-TB910-1	1
		COMOV8327A-32/COHTCP04-TB910-2	2
3	4	COMOV8327A-52/COHTCP04-TB910-3	3
		COMOV8327A-53/COHTCP04-TB910-4	4
5	6	COMOV8328A-51/COHTCP04-TB910-5	1
		COMOV8328A-32/COHTCP04-TB910-6	2
7	8	COMOV8328A-52/COHTCP04-TB910-7	3
		COMOV8328A-53/COHTCP04-TB910-8	4
9	10		
11	12		
13	14		
15	16		
17	18		
19	20		
21	22		
23	24		
25	26		
27	28		
29	30		
31	32		

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

+24VDC ← TBDC(+)8/R9-S10-35
0VDC ← TBDC(-)8/TB910-20

PART OF CABLE CO-C-1200

PART OF CABLE CO-C-1215

CO-MOV-8327A

1	COMOV8327A-51/COHTCP04-TB910-1	51	CO-HS-8327ACL
2	COMOV8327A-32/COHTCP04-TB910-2	32	
3	COMOV8327A-52/COHTCP04-TB910-3	52	CO-HS-8327AOP
4	COMOV8327A-53/COHTCP04-TB910-4	53	

CO-MOV-8328A

1	COMOV8328A-51/COHTCP04-TB910-5	51	CO-HS-8328ACL
2	COMOV8328A-32/COHTCP04-TB910-6	32	
3	COMOV8328A-52/COHTCP04-TB910-7	52	CO-HS-8328AOP
4	COMOV8328A-53/COHTCP04-TB910-8	53	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
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   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0088
UEL# 2012016-1EF-CLD-000-0088-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 2014-MAR-7

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/09 SLOT 10 DISCRETE OUTPUT - RELAY I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-322 | REV 00

TMC DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-09, SLOT-11

CO-HS-8327BCL HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 27, CO-MOV-8327B CLOSE COMMAND	OUT 1 NO	1	R9-S11-2/TB911-1	1
	OUT 1	2		2
CO-HS-8327BOP HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 27, CO-MOV-8327B OPEN COMMAND	OUT 2 NO	3	R9-S11-4/TB911-3	3
	OUT 2	4		4
CO-HS-8328BCL HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 28, CO-MOV-8328B CLOSE COMMAND	OUT 3 NO	5	R9-S11-6/TB911-5	5
	OUT 3	6		6
CO-HS-8328BOP HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 28, CO-MOV-8328B OPEN COMMAND	OUT 4 NO	7	R9-S11-8/TB911-7	7
	OUT 4	8		8
CO-HS-8329BCL (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 29, CO-MOV-8329B CLOSE COMMAND	OUT 5 NO	9	R9-S11-10/TB911-9	9
	OUT 5	10		10
CO-HS-8329BOP (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 29, CO-MOV-8329B OPEN COMMAND	OUT 6 NO	11	R9-S11-12/TB911-11	11
	OUT 6	12		12
NO CONNECTION	NC	13		
CO-HS-8330BCL (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 30, CO-MOV-8330B CLOSE COMMAND	OUT 7 NO	14	R9-S11-15/TB911-13	13
	OUT 7	15		14
NO CONNECTION	NC	16		
CO-HS-8330BOP (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 30, CO-MOV-8330B OPEN COMMAND	OUT 8 NO	17	R9-S11-18/TB911-15	15
	OUT 8	18		16
CO-HS-8331BCL (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 31, CO-MOV-8331B CLOSE COMMAND	OUT 9 NO	19	R9-S11-20/TB911-17	17
	OUT 9	20		18
CO-HS-8331BOP (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 31, CO-MOV-8331B OPEN COMMAND	OUT 10 NO	21	R9-S11-22/TB911-19	19
	OUT 10	22		20
CO-HS-8332BCL (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 32, CO-MOV-8332B CLOSE COMMAND	OUT 11 NO	23	R9-S11-24/TB911-21	21
	OUT 11	24		22
CO-HS-8332BOP (FUTURE) HEAVY/LIGHT OIL FROM KHTT TO STORAGE TANK 32, CO-MOV-8332B OPEN COMMAND	OUT 12 NO	25	R9-S11-26/TB911-23	23
	OUT 12	26		24
SPARE	OUT 13 NO	27	R9-S11-28/TB911-25	25
	OUT 13	28		26
SPARE	OUT 14 NO	29	R9-S11-30/TB911-27	27
	OUT 14	30		28
NO CONNECTION	NC	31		
SPARE	OUT 15 NO	32	R9-S11-33/TB911-29	29
	OUT 15	33		30
NO CONNECTION	NC	34		
SPARE	OUT 16 NO	35	R9-S11-36/TB911-31	31
	OUT 16	36		32

CO-HTCP-04 TB-911

1	COMOV8327B-51/COHTCP04-TB911-1	1	
2	COMOV8327B-32/COHTCP04-TB911-2	2	
3	COMOV8327B-52/COHTCP04-TB911-3	3	
4	COMOV8327B-53/COHTCP04-TB911-4	4	
5	COMOV8328B-51/COHTCP04-TB911-5	1	
6	COMOV8328B-32/COHTCP04-TB911-6	2	
7	COMOV8328B-52/COHTCP04-TB911-7	3	
8	COMOV8328B-53/COHTCP04-TB911-8	4	

PART OF CABLE CO-C-1201

PART OF CABLE CO-C-1216

CO-MOV-8327B

1	COMOV8327B-51/COHTCP04-TB911-1	51	CO-HS-8327BCL
2	COMOV8327B-32/COHTCP04-TB911-2	32	
3	COMOV8327B-52/COHTCP04-TB911-3	52	CO-HS-8327BOP
4	COMOV8327B-53/COHTCP04-TB911-4	53	

CO-MOV-8328B

1	COMOV8328B-51/COHTCP04-TB911-5	51	CO-HS-8328BCL
2	COMOV8328B-32/COHTCP04-TB911-6	32	
3	COMOV8328B-52/COHTCP04-TB911-7	52	CO-HS-8328BOP
4	COMOV8328B-53/COHTCP04-TB911-8	53	

TO TBDC 4663-05-03-SC-303 POWER SUPPLY

+24VDC → TBDC(+)9/R9-S11-35

0VDC → TBDC(-)9/TB911-20

NOTES:

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   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0089
UEL# 2012016-1EF-CLD-000-0089-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BDM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER JAMES DODDS ALBERTA PERMIT TO PRACTICE UPSIDE ENGINEERING LTD. PERMIT NUMBER: P 5508 The Association of Professional Engineers, Geologists and Geophysicists of Alberta

2014-MAR-7

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/09 SLOT 11 DISCRETE OUTPUT - RELAY I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-323 | REV 00

TC_A1_BR.DWG 594X841

TIME DESIGNFILE

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-09, SLOT-12

CO-HS-8327CCL HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 27, CO-MOV-8327C CLOSE COMMAND	OUT 1 NO	1	R9-S12-2/TB912-1
	OUT 1	2	
CO-HS-8327COP HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 27, CO-MOV-8327C OPEN COMMAND	OUT 2 NO	3	R9-S12-4/TB912-3
	OUT 2	4	
CO-HS-8328CCL HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 28, CO-MOV-8328C CLOSE COMMAND	OUT 3 NO	5	R9-S12-6/TB912-5
	OUT 3	6	
CO-HS-8328COP HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 28, CO-MOV-8328C OPEN COMMAND	OUT 4 NO	7	R9-S12-8/TB912-7
	OUT 4	8	
CO-HS-8329CCL (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 29, CO-MOV-8329C CLOSE COMMAND	OUT 5 NO	9	R9-S12-10/TB912-9
	OUT 5	10	
CO-HS-8329COP (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 29, CO-MOV-8329C OPEN COMMAND	OUT 6 NO	11	R9-S12-12/TB912-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8330CCL (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 30, CO-MOV-8330C CLOSE COMMAND	OUT 7 NO	14	R9-S12-15/TB912-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8330COP (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 30, CO-MOV-8330C OPEN COMMAND	OUT 8 NO	17	R9-S12-18/TB912-15
	OUT 8	18	
CO-HS-8331CCL (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 31, CO-MOV-8331C CLOSE COMMAND	OUT 9 NO	19	R9-S12-20/TB912-17
	OUT 9	20	
CO-HS-8331COP (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 31, CO-MOV-8331C OPEN COMMAND	OUT 10 NO	21	R9-S12-22/TB912-19
	OUT 10	22	
CO-HS-8332CCL (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 32, CO-MOV-8332C CLOSE COMMAND	OUT 11 NO	23	R9-S12-24/TB912-21
	OUT 11	24	
CO-HS-8332COP (FUTURE) HEAVY BI-DIRECTIONAL FROM/TO KHTT STORAGE TANK 32, CO-MOV-8332C OPEN COMMAND	OUT 12 NO	25	R9-S12-26/TB912-23
	OUT 12	26	
SPARE	OUT 13 NO	27	R9-S12-28/TB912-25
	OUT 13	28	
SPARE	OUT 14 NO	29	R9-S12-30/TB912-27
	OUT 14	30	
NO CONNECTION	NC	31	
SPARE	OUT 15 NO	32	R9-S12-33/TB912-29
	OUT 15	33	
NO CONNECTION	NC	34	
SPARE	OUT 16 NO	35	R9-S12-36/TB912-31
	OUT 16	36	

CO-HTCP-04 TB-912

1	COMOVB327C-51/COHTCP04-TB912-1	1
2	COMOVB327C-32/COHTCP04-TB912-2	2
3	COMOVB327C-52/COHTCP04-TB912-3	3
4	COMOVB327C-53/COHTCP04-TB912-4	4
5	COMOVB328C-51/COHTCP04-TB912-5	1
6	COMOVB328C-32/COHTCP04-TB912-6	2
7	COMOVB328C-52/COHTCP04-TB912-7	3
8	COMOVB328C-53/COHTCP04-TB912-8	4
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TO TBDC
4663-05-03-SC-303
POWER SUPPLY

+24VDC — TBDC(+)10/R9-S12-35

0VDC — TBDC(-)10/TB912-32

PART OF CABLE CO-C-1202

PART OF CABLE CO-C-1217

CO-MOV-8327C

1	COMOVB327C-51/COHTCP04-TB912-1	51	CO-HS-8327CCL
2	COMOVB327C-32/COHTCP04-TB912-2	32	
3	COMOVB327C-52/COHTCP04-TB912-3	52	CO-HS-8327COP
4	COMOVB327C-53/COHTCP04-TB912-4	53	

CO-MOV-8328C

1	COMOVB328C-51/COHTCP04-TB912-5	51	CO-HS-8328CCL
2	COMOVB328C-32/COHTCP04-TB912-6	32	
3	COMOVB328C-52/COHTCP04-TB912-7	52	CO-HS-8328COP
4	COMOVB328C-53/COHTCP04-TB912-8	53	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
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5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0090
UEL# 2012016-1EF-CLD-000-0090-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DODD ALBERTA PERMIT TO PRACTICE

2014-MAR-7

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/09 SLOT 12 DISCRETE OUTPUT - RELAY I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-324 | REV 00

TIME DESIGNFILE

ID A1

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-09, SLOT-13

CO-HS-8327DCL HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 27, CO-MOV-8327D CLOSE COMMAND	OUT 1 NO	1	R9-S13-2/TB913-1
	OUT 1	2	
CO-HS-8327DOP HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 27, CO-MOV-8327D OPEN COMMAND	OUT 2 NO	3	R9-S13-4/TB913-3
	OUT 2	4	
CO-HS-8328DCL HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 28, CO-MOV-8328D CLOSE COMMAND	OUT 3 NO	5	R9-S13-6/TB913-5
	OUT 3	6	
CO-HS-8328DOP HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 28, CO-MOV-8328D OPEN COMMAND	OUT 4 NO	7	R9-S13-8/TB913-7
	OUT 4	8	
CO-HS-8329DCL (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 29, CO-MOV-8329D CLOSE COMMAND	OUT 5 NO	9	R9-S13-10/TB913-9
	OUT 5	10	
CO-HS-8329DOP (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 29, CO-MOV-8329D OPEN COMMAND	OUT 6 NO	11	R9-S13-12/TB913-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8330DCL (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 30, CO-MOV-8330D CLOSE COMMAND	OUT 7 NO	14	R9-S13-15/TB913-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8330DOP (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 30, CO-MOV-8330D OPEN COMMAND	OUT 8 NO	17	R9-S13-18/TB913-15
	OUT 8	18	
CO-HS-8331DCL (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 31, CO-MOV-8331D CLOSE COMMAND	OUT 9 NO	19	R9-S13-20/TB913-17
	OUT 9	20	
CO-HS-8331DOP (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 31, CO-MOV-8331D OPEN COMMAND	OUT 10 NO	21	R9-S13-22/TB913-19
	OUT 10	22	
CO-HS-8332DCL (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 32, CO-MOV-8332D CLOSE COMMAND	OUT 11 NO	23	R9-S13-24/TB913-21
	OUT 11	24	
CO-HS-8332DOP (FUTURE) HEAVY-1 FROM HARDISTY B TO KHTT STORAGE TANK 32, CO-MOV-8332D OPEN COMMAND	OUT 12 NO	25	R9-S13-26/TB913-23
	OUT 12	26	
SPARE	OUT 13 NO	27	R9-S13-28/TB913-25
	OUT 13	28	
SPARE	OUT 14 NO	29	R9-S13-30/TB913-27
	OUT 14	30	
NO CONNECTION	NC	31	
SPARE	OUT 15 NO	32	R9-S13-33/TB913-29
	OUT 15	33	
NO CONNECTION	NC	34	
SPARE	OUT 16 NO	35	R9-S13-36/TB913-31
	OUT 16	36	

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

+24VDC ← TBDC(+)11/R9-S13-35
0VDC ← TBDC(-)11/TB913-32

CO-HTCP-04
TB-913

1	COMOVB327D-51/COHTCP04-TB912-1	1
2	COMOVB327D-32/COHTCP04-TB912-2	2
3	COMOVB327D-52/COHTCP04-TB912-3	3
4	COMOVB327D-53/COHTCP04-TB912-4	4
5	COMOVB328D-51/COHTCP04-TB912-5	1
6	COMOVB328D-32/COHTCP04-TB912-6	2
7	COMOVB328D-52/COHTCP04-TB912-7	3
8	COMOVB328D-53/COHTCP04-TB912-8	4

PART OF CABLE CO-C-1203

PART OF CABLE CO-C-1218

CO-MOV-8327D

1	COMOVB327D-51/COHTCP04-TB912-1	51	CO-HS-8327DCL
2	COMOVB327D-32/COHTCP04-TB912-2	32	
3	COMOVB327D-52/COHTCP04-TB912-3	52	CO-HS-8327DOP
4	COMOVB327D-53/COHTCP04-TB912-4	53	

CO-MOV-8328D

1	COMOVB328D-51/COHTCP04-TB912-5	51	CO-HS-8328DCL
2	COMOVB328D-32/COHTCP04-TB912-6	32	
3	COMOVB328D-52/COHTCP04-TB912-7	52	CO-HS-8328DOP
4	COMOVB328D-53/COHTCP04-TB912-8	53	

NOTES:

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   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0091
UEL# 2012016-1EF-CLD-000-0091-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY

2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-04, PLC-11/09 SLOT 13
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-325	00

TIME DESIGNFILE

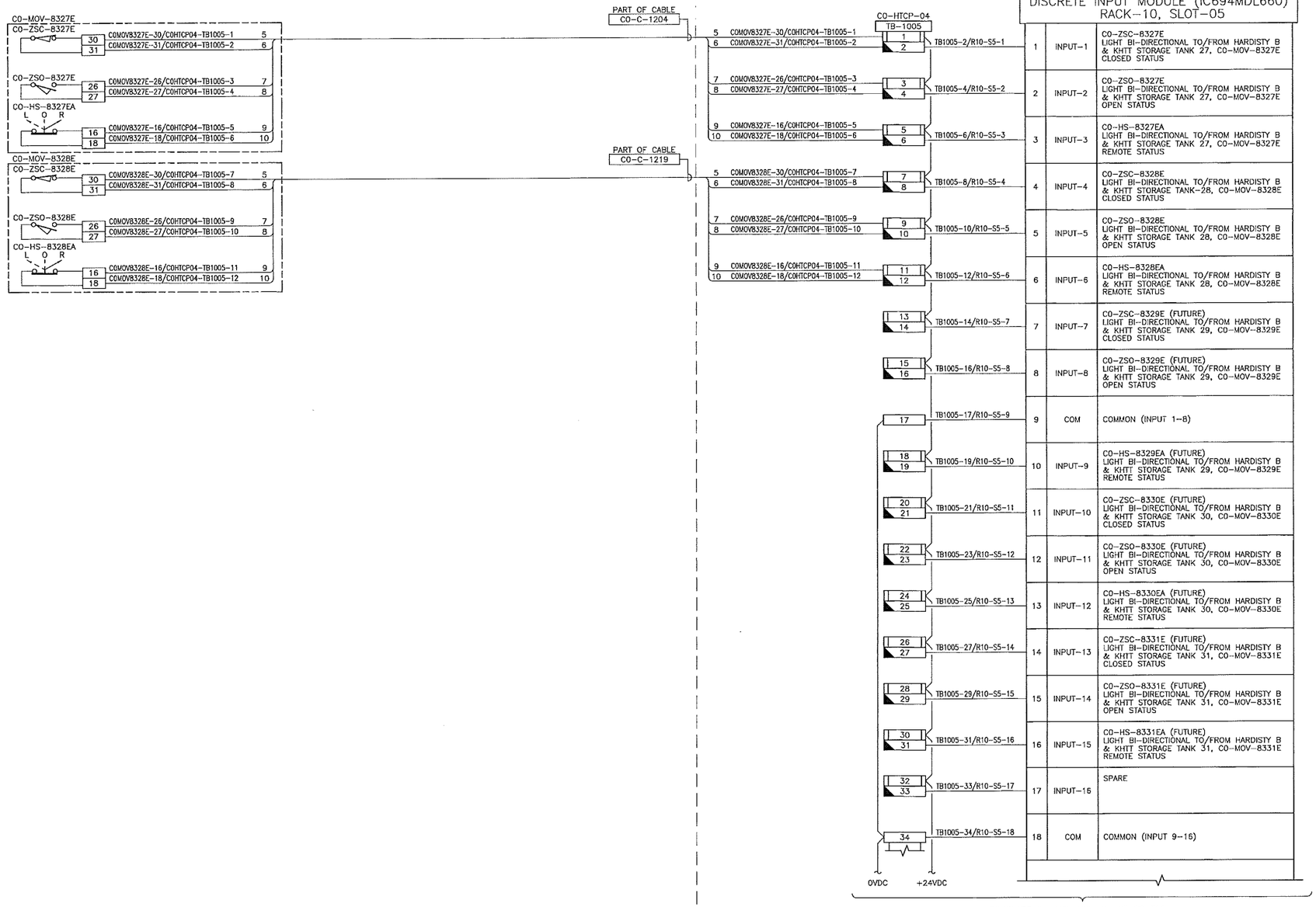
TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)



DISCRETE INPUT MODULE (IC694MDL660)
RACK-10, SLOT-05

1	INPUT-1	CO-ZSC-8327E LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 27, CO-MOV-8327E CLOSED STATUS
2	INPUT-2	CO-ZSO-8327E LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 27, CO-MOV-8327E OPEN STATUS
3	INPUT-3	CO-HS-8327EA LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 27, CO-MOV-8327E REMOTE STATUS
4	INPUT-4	CO-ZSC-8328E LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK-28, CO-MOV-8328E CLOSED STATUS
5	INPUT-5	CO-ZSO-8328E LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 28, CO-MOV-8328E OPEN STATUS
6	INPUT-6	CO-HS-8328EA LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 28, CO-MOV-8328E REMOTE STATUS
7	INPUT-7	CO-ZSC-8329E (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 29, CO-MOV-8329E CLOSED STATUS
8	INPUT-8	CO-ZSO-8329E (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 29, CO-MOV-8329E OPEN STATUS
9	COM	COMMON (INPUT 1-8)
10	INPUT-9	CO-HS-8329EA (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 29, CO-MOV-8329E REMOTE STATUS
11	INPUT-10	CO-ZSC-8330E (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 30, CO-MOV-8330E CLOSED STATUS
12	INPUT-11	CO-ZSO-8330E (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 30, CO-MOV-8330E OPEN STATUS
13	INPUT-12	CO-HS-8330EA (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 30, CO-MOV-8330E REMOTE STATUS
14	INPUT-13	CO-ZSC-8331E (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 31, CO-MOV-8331E CLOSED STATUS
15	INPUT-14	CO-ZSO-8331E (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 31, CO-MOV-8331E OPEN STATUS
16	INPUT-15	CO-HS-8331EA (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 31, CO-MOV-8331E REMOTE STATUS
17	INPUT-16	SPARE
18	COM	COMMON (INPUT 9-16)

CONTINUES ON DWG. 4663-05-03-SC-329

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
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   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0092
UEL# 2012016-1EF-CLD-000-0092-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DVC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DODD ALBERTA
2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/10 SLOT 05 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-328 | REV 00

TIME ---- DESIGNFILE

TC_A1_BR.DWG 594X841

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CONTINUES ON DWG. 4663-05-03-SC-328

CO-MOV-8327F
CO-ZSC-8327F
30 COMOV8327F-30/COHTCP04-TB1005-41 5
31 COMOV8327F-31/COHTCP04-TB1005-42 6
CO-ZSO-8327F
26 COMOV8327F-26/COHTCP04-TB1005-43 7
27 COMOV8327F-27/COHTCP04-TB1005-44 8
CO-HS-8327FA
L O R
16 COMOV8327F-16/COHTCP04-TB1005-45 9
18 COMOV8327F-18/COHTCP04-TB1005-46 10

PART OF CABLE CO-C-1205

5 COMOV8327F-30/COHTCP04-TB1005-41
6 COMOV8327F-31/COHTCP04-TB1005-42
7 COMOV8327F-26/COHTCP04-TB1005-43
8 COMOV8327F-27/COHTCP04-TB1005-44
9 COMOV8327F-16/COHTCP04-TB1005-45
10 COMOV8327F-18/COHTCP04-TB1005-46

CO-MOV-8328F
CO-ZSC-8328F
30 COMOV8328F-30/COHTCP04-TB1005-47 5
31 COMOV8328F-31/COHTCP04-TB1005-48 6
CO-ZSO-8328F
26 COMOV8328F-26/COHTCP04-TB1005-49 7
27 COMOV8328F-27/COHTCP04-TB1005-50 8
CO-HS-8328FA
L O R
16 COMOV8328F-16/COHTCP03-TB1005-52 9
18 COMOV8328F-18/COHTCP03-TB1005-53 10

PART OF CABLE CO-C-1220

5 COMOV8328F-30/COHTCP04-TB1005-47
6 COMOV8328F-31/COHTCP04-TB1005-48
7 COMOV8328F-26/COHTCP04-TB1005-49
8 COMOV8328F-27/COHTCP04-TB1005-50
9 COMOV8328F-16/COHTCP04-TB1005-52
10 COMOV8328F-18/COHTCP04-TB1005-53

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

0VDC TBDC(-)-16/TB1005-68
+24VDC TBDC(+)-16/TB1005-66

0VDC +24VDC
CO-HTCP-04
TB-1005

DISCRETE INPUT MODULE (IC694MDL660)
RACK-10, SLOT-05

35	TB1005-36/R10-S5-19	19	INPUT-17	CO-ZSC-8332E LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 32, CO-MOV-8332E CLOSED STATUS
37	TB1005-38/R10-S5-20	20	INPUT-18	CO-ZSO-8332E LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 32, CO-MOV-8332E OPEN STATUS
39	TB1005-40/R10-S5-21	21	INPUT-19	CO-HS-8332EA LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 32, CO-MOV-8332E REMOTE STATUS
41	TB1005-42/R10-S5-22	22	INPUT-20	CO-ZSC-8327F 36" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327F
43	TB1005-44/R10-S5-23	23	INPUT-21	CO-ZSO-8327F 36" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327F
45	TB1005-46/R10-S5-24	24	INPUT-22	CO-HS-8327FA 36" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327F
47	TB1005-48/R10-S5-25	25	INPUT-23	CO-ZSC-8328F 36" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328F
49	TB1005-50/R10-S5-26	26	INPUT-24	CO-ZSO-8328F 36" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328F
51	TB1005-51/R10-S5-27	27	COM	COMMON (INPUT 17-24)
52	TB1005-53/R10-S5-28	28	INPUT-25	CO-HS-8328FA 36" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328F
54	TB1005-55/R10-S5-29	29	INPUT-26	CO-ZSC-8329F (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329F
56	TB1005-57/R10-S5-30	30	INPUT-27	CO-ZSO-8329F (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329F
58	TB1005-59/R10-S5-31	31	INPUT-28	CO-HS-8329FA (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329F
60	TB1005-61/R10-S5-32	32	INPUT-29	CO-ZSC-8330F (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330F
62	TB1005-63/R10-S5-33	33	INPUT-30	CO-ZSO-8330F (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330F
64	TB1005-65/R10-S5-34	34	INPUT-31	CO-HS-8330FA (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330F
66	TB1005-67/R10-S5-35	35	INPUT-32	SPARE
68	TB1005-68/R10-S5-36	36	COM	COMMON (INPUT 25-32)

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0093
UEL# 2012016-1EF-CLD-000-0093-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER JAMES DOORN ALBERTA
2014-MAR-7

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/10 SLOT 05
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-329 | REV. 00

TIME-DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CO-MOV-8327G
CO-ZSC-8327G
30 COMOV8327G-30/COHTCP04-TB1006-13 5
31 COMOV8327G-31/COHTCP04-TB1006-14 6
CO-ZSO-8327G
26 COMOV8327G-26/COHTCP04-TB1006-15 7
27 COMOV8327G-27/COHTCP04-TB1006-16 8
CO-HS-8327GA
L O R
16 COMOV8327G-16/COHTCP04-TB1006-18 9
18 COMOV8327G-18/COHTCP04-TB1006-19 10

CO-MOV-8328G
CO-ZSC-8328G
30 COMOV8328G-30/COHTCP04-TB1006-20 5
31 COMOV8328G-31/COHTCP04-TB1006-21 6
CO-ZSO-8328G
26 COMOV8328G-26/COHTCP04-TB1006-22 7
27 COMOV8328G-27/COHTCP04-TB1006-23 8
CO-HS-8328GA
L O R
16 COMOV8328G-16/COHTCP04-TB1006-24 9
18 COMOV8328G-18/COHTCP04-TB1006-25 10

PART OF CABLE CO-C-1206

5 COMOV8327G-30/COHTCP04-TB1006-13
6 COMOV8327G-31/COHTCP04-TB1006-14
7 COMOV8327G-26/COHTCP04-TB1006-15
8 COMOV8327G-27/COHTCP04-TB1006-16
9 COMOV8327G-16/COHTCP04-TB1006-18
10 COMOV8327G-18/COHTCP04-TB1006-19

PART OF CABLE CO-C-1221

5 COMOV8328G-30/COHTCP04-TB1006-20
6 COMOV8328G-31/COHTCP04-TB1006-21
7 COMOV8328G-26/COHTCP04-TB1006-22
8 COMOV8328G-27/COHTCP04-TB1006-23
9 COMOV8328G-16/COHTCP04-TB1006-24
10 COMOV8328G-18/COHTCP04-TB1006-25

CO-HTCP-04
TB-1006

1	TB1006-2/R10-S6-1	1	INPUT-1
2	TB1006-4/R10-S6-2	2	INPUT-2
3	TB1006-6/R10-S6-3	3	INPUT-3
4	TB1006-8/R10-S6-4	4	INPUT-4
5	TB1006-10/R10-S6-5	5	INPUT-5
6	TB1006-12/R10-S6-6	6	INPUT-6
13	TB1006-14/R10-S6-7	7	INPUT-7
15	TB1006-16/R10-S6-8	8	INPUT-8
17	TB1006-17/R10-S6-9	9	COM
18	TB1006-19/R10-S6-10	10	INPUT-9
20	TB1006-21/R10-S6-11	11	INPUT-10
22	TB1006-23/R10-S6-12	12	INPUT-11
24	TB1006-25/R10-S6-13	13	INPUT-12
26	TB1006-27/R10-S6-14	14	INPUT-13
28	TB1006-29/R10-S6-15	15	INPUT-14
30	TB1006-31/R10-S6-16	16	INPUT-15
32	TB1006-33/R10-S6-17	17	INPUT-16
34	TB1006-34/R10-S6-18	18	COM

DISCRETE INPUT MODULE (IC694MDL660)
RACK-10, SLOT-06

1	CO-ZSC-8331F (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331F CLOSED STATUS
2	CO-ZSO-8331F (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331F OPEN STATUS
3	CO-HS-8331FA (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331F REMOTE STATUS
4	CO-ZSC-8332F (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332F CLOSED STATUS
5	CO-ZSO-8332F (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332F OPEN STATUS
6	CO-HS-8332FA (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332F REMOTE STATUS
7	CO-ZSC-8327G 30" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327G CLOSED STATUS
8	CO-ZSO-8327G 30" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327G OPEN STATUS
9	COMMON (INPUT 1-8)
10	CO-HS-8327GA 30" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327G REMOTE STATUS
11	CO-ZSC-8328G 30" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328G CLOSED STATUS
12	CO-ZSO-8328G 30" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328G OPEN STATUS
13	CO-HS-8328GA 30" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328G REMOTE STATUS
14	CO-ZSC-8329G (FUTURE) 30" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329G CLOSED STATUS
15	CO-ZSO-8329G (FUTURE) 30" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329G OPEN STATUS
16	CO-HS-8329GA (FUTURE) 30" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329G REMOTE STATUS
17	SPARE
18	COMMON (INPUT 9-16)

0VDC +24VDC

CONTINUES ON DWG. 4663-05-03-SC-331

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
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5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0094
UEL# 2012016-1EF-CLD-000-0094-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DODDY 2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-04, PLC-11/10 SLOT 06 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-330	00

TC_A1_BR.DWG 594X841

TIME ---- DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CONTINUES ON DWG. 4663-05-03-SC-330

0VDC +24VDC

CO-HTCP-04
TB-1006

DISCRETE INPUT MODULE (IC694MDL660)
RACK-10, SLOT-06

35, 36	TB1006-35/R10-S6-19	19	INPUT-17	CO-ZSC-8330G (FUTURE) 30" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330G CLOSED STATUS
37, 38	TB1006-38/R10-S6-20	20	INPUT-18	CO-ZSO-8330G (FUTURE) 30" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330G OPEN STATUS
39, 40	TB1006-40/R10-S6-21	21	INPUT-19	CO-HS-8330GA (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330G REMOTE STATUS
41, 42	TB1006-42/R10-S6-22	22	INPUT-20	CO-ZSC-8331G (FUTURE) 30" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331G CLOSED STATUS
43, 44	TB1006-44/R10-S6-23	23	INPUT-21	CO-ZSO-8331G (FUTURE) 30" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331G OPEN STATUS
45, 46	TB1006-46/R10-S6-24	24	INPUT-22	CO-HS-8331GA (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331G REMOTE STATUS
47, 48	TB1006-48/R10-S6-25	25	INPUT-23	CO-ZSC-8332G (FUTURE) 30" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332G CLOSED STATUS
49, 50	TB1006-50/R10-S6-26	26	INPUT-24	CO-ZSO-8332G (FUTURE) 30" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332G OPEN STATUS
51	TB1006-51/R10-S6-27	27	COM	COMMON (INPUT 17-24)
52, 53	TB1006-53/R10-S6-28	28	INPUT-25	CO-HS-8332GA (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332G REMOTE STATUS
54, 55	TB1006-55/R10-S6-29	29	INPUT-26	SPARE
56, 57	TB1006-57/R10-S6-30	30	INPUT-27	SPARE
58, 59	TB1006-59/R10-S6-31	31	INPUT-28	SPARE
60, 61	TB1006-61/R10-S6-32	32	INPUT-29	SPARE
62, 63	TB1006-63/R10-S6-33	33	INPUT-30	SPARE
64, 65	TB1006-65/R10-S6-34	34	INPUT-31	SPARE
66, 67	TB1006-67/R10-S6-35	35	INPUT-32	SPARE
68	TB1006-68/R10-S6-36	36	COM	COMMON (INPUT 25-32)

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

0VDC — TBDC(-)-17/TB1006-68
+24VDC — TBDC(+)-17/TB1006-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0095
UEL# 2012016-1EF-CLD-000-0095-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOOLEY ALBERTA

2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

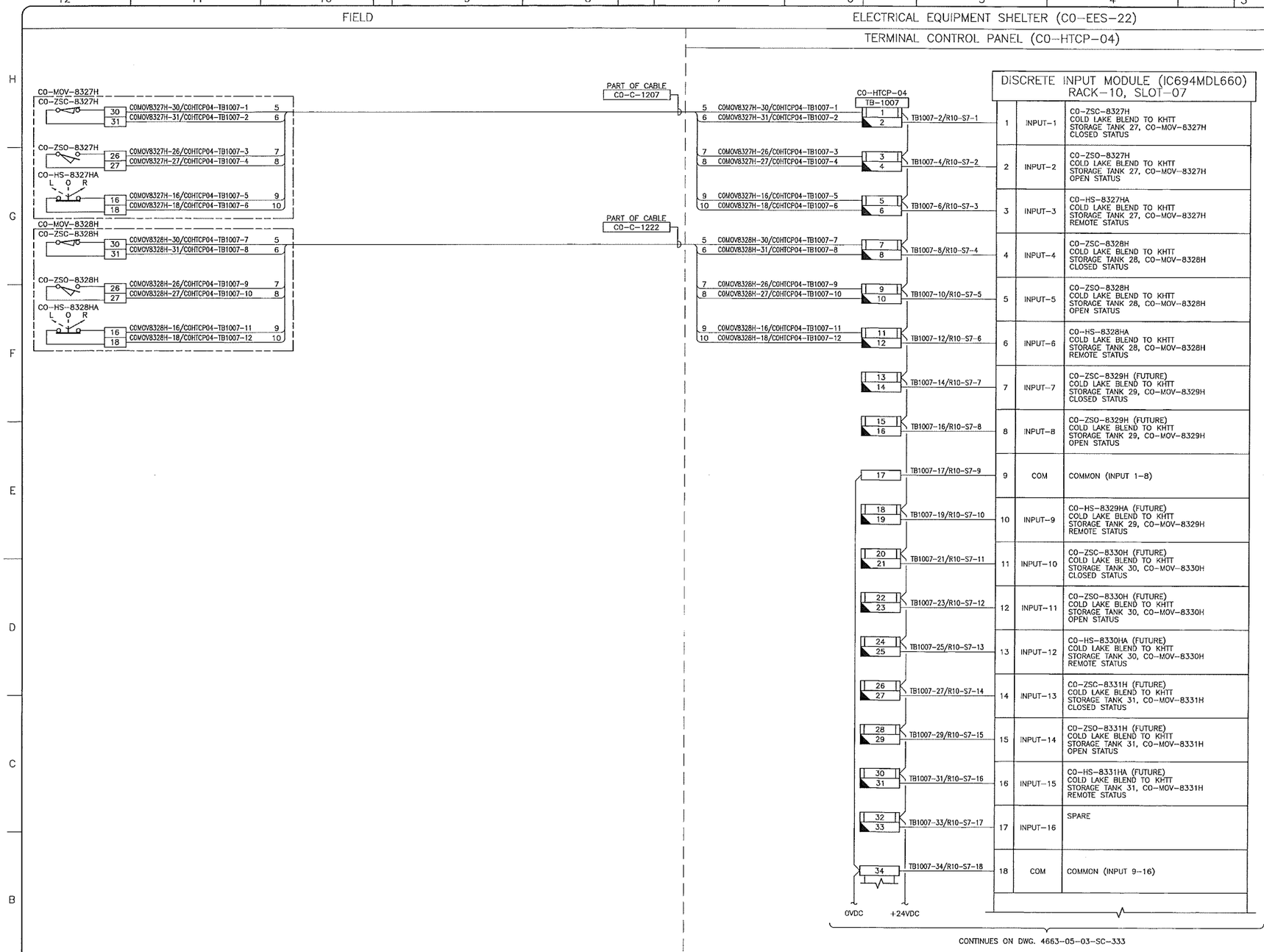
FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-04, PLC-11/10 SLOT 06
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-331	00

TIME-DESIGNFILE

TC_A1_BR.DWG 594X841



CONTINUES ON DWG. 4663-05-03-SC-333

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 C0-TANK-21 AREA
   4663-06-00-03-706 C0-TANK-22 AREA
   4663-06-00-03-709 C0-TANK-23 AREA
   4663-06-00-03-712 C0-TANK-24 AREA
   4663-06-00-03-715 C0-TANK-25 AREA
   4663-06-00-03-718 C0-TANK-26 AREA
   4663-06-00-03-721 C0-TANK-27 AREA
   4663-06-00-03-724 C0-TANK-28 AREA
   4663-06-00-03-745 C0-VALVE MANIFOLD AREA
   4663-06-00-03-748 C0-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS C0-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0096
UEL# 2012016-1EF-CLD-000-0096-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY

2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

C0-HTCP-04, PLC-11/10 SLOT 07 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-332	00

TIME-DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CONTINUES ON DWG. 4663-05-03-SC-332

0VDC +24VDC

CO-HTCP-04 TB-1007

DISCRETE INPUT MODULE (IC694MDL660) RACK-10, SLOT-07

35	TB1007-36/R10-S7-19	19	INPUT-17	CO-ZSC-8332H (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332H CLOSED STATUS
36				
37	TB1007-38/R10-S7-20	20	INPUT-18	CO-ZSO-8332H (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332H OPEN STATUS
38				
39	TB1007-40/R10-S7-21	21	INPUT-19	CO-HS-8332HA (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332H REMOTE STATUS
40				
41	TB1007-42/R10-S7-22	22	INPUT-20	SPARE
42				
43	TB1007-44/R10-S7-23	23	INPUT-21	SPARE
44				
45	TB1007-46/R10-S7-24	24	INPUT-22	SPARE
46				
47	TB1007-48/R10-S7-25	25	INPUT-23	SPARE
48				
49	TB1007-50/R10-S7-26	26	INPUT-24	SPARE
50				
51	TB1007-51/R10-S7-27	27	COM	COMMON (INPUT 17-24)
52	TB1007-53/R10-S7-28	28	INPUT-25	SPARE
53				
54	TB1007-55/R10-S7-29	29	INPUT-26	SPARE
55				
56	TB1007-57/R10-S7-30	30	INPUT-27	SPARE
57				
58	TB1007-59/R10-S7-31	31	INPUT-28	SPARE
59				
60	TB1007-61/R10-S7-32	32	INPUT-29	SPARE
61				
62	TB1007-63/R10-S7-33	33	INPUT-30	SPARE
63				
64	TB1007-65/R10-S7-34	34	INPUT-31	SPARE
65				
66	TB1007-67/R10-S7-35	35	INPUT-32	SPARE
67				
68	TB1007-68/R10-S7-36	36	COM	COMMON (INPUT 25-32)

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

0VDC TBDC(-)-18/TB1007-68

+24VDC TBDC(+)-18/TB1007-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
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   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0097
UEL# 2012016-1EF-CLD-000-0097-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOUGLAS 2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/10 SLOT 07 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-333 | REV 00

TIME DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916) RACK-10, SLOT-10

CO-HS-8327ECL LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 27, CO-MOV-8327E CLOSE COMMAND	OUT 1 NO	1	R10-S10-2/TB1010-1
	OUT 1	2	
CO-HS-8327EOP LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 27, CO-MOV-8327E OPEN COMMAND	OUT 2 NO	3	R10-S10-4/TB1010-3
	OUT 2	4	
CO-HS-8328ECL LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 28, CO-MOV-8328E CLOSE COMMAND	OUT 3 NO	5	R10-S10-6/TB1010-5
	OUT 3	6	
CO-HS-8328EOP LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 28, CO-MOV-8328E OPEN COMMAND	OUT 4 NO	7	R10-S10-8/TB1010-7
	OUT 4	8	
CO-HS-8329ECL (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 29, CO-MOV-8329E CLOSE COMMAND	OUT 5 NO	9	R10-S10-10/TB1010-9
	OUT 5	10	
CO-HS-8329EOP (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 29, CO-MOV-8329E OPEN COMMAND	OUT 6 NO	11	R10-S10-12/TB1010-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8330ECL (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 30, CO-MOV-8330E CLOSE COMMAND	OUT 7 NO	14	R10-S10-15/TB1010-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8330EOP (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 30, CO-MOV-8330E OPEN COMMAND	OUT 8 NO	17	R10-S10-18/TB1010-15
	OUT 8	18	
CO-HS-8331ECL (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 31, CO-MOV-8331E CLOSE COMMAND	OUT 9 NO	19	R10-S10-20/TB1010-17
	OUT 9	20	
CO-HS-8331EOP (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 31, CO-MOV-8331E OPEN COMMAND	OUT 10 NO	21	R10-S10-22/TB1010-19
	OUT 10	22	
CO-HS-8332ECL (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 32, CO-MOV-8332E CLOSE COMMAND	OUT 11 NO	23	R10-S10-24/TB1010-21
	OUT 11	24	
CO-HS-8332EOP (FUTURE) LIGHT BI-DIRECTIONAL TO/FROM HARDISTY B & KHTT STORAGE TANK 32, CO-MOV-8332E OPEN COMMAND	OUT 12 NO	25	R10-S10-26/TB1010-23
	OUT 12	26	
SPARE	OUT 13 NO	27	R10-S10-28/TB1010-25
	OUT 13	28	
SPARE	OUT 14 NO	29	R10-S10-30/TB1010-27
	OUT 14	30	
NO CONNECTION	NC	31	
SPARE	OUT 15 NO	32	R10-S10-33/TB1010-29
	OUT 15	33	
NO CONNECTION	NC	34	
SPARE	OUT 16 NO	35	R10-S10-36/TB1010-31
	OUT 16	36	

TO TBDC 4663-05-03-SC-303 POWER SUPPLY

+24VDC ← TBDC(+)19/R10-S10-35

0VDC ← TBDC(-)19/TB1010-20

CO-HTCP-04 TB-1010

1	COMOV8327E-51/COHTCP04-TB1010-1	1
2	COMOV8327E-32/COHTCP04-TB1010-2	2
3	COMOV8327E-52/COHTCP04-TB1010-3	3
4	COMOV8327E-53/COHTCP04-TB1010-4	4
5	COMOV8328E-51/COHTCP04-TB1010-5	1
6	COMOV8328E-32/COHTCP04-TB1010-6	2
7	COMOV8328E-52/COHTCP04-TB1010-7	3
8	COMOV8328E-53/COHTCP04-TB1010-8	4

PART OF CABLE CO-C-1204

PART OF CABLE CO-C-1219

CO-MOV-8327E

1	COMOV8327E-51/COHTCP04-TB1010-1	51	CO-HS-8327ECL
2	COMOV8327E-32/COHTCP04-TB1010-2	32	
3	COMOV8327E-52/COHTCP04-TB1010-3	52	CO-HS-8327EOP
4	COMOV8327E-53/COHTCP04-TB1010-4	53	

CO-MOV-8328E

1	COMOV8328E-51/COHTCP04-TB1010-5	51	CO-HS-8328ECL
2	COMOV8328E-32/COHTCP04-TB1010-6	32	
3	COMOV8328E-52/COHTCP04-TB1010-7	52	CO-HS-8328EOP
4	COMOV8328E-53/COHTCP04-TB1010-8	53	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-05-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0098
UEL# 2012016-1EF-CLD-000-0098-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER JAMES DOODY ALBERTA
2014-MAR-7

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — in business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/10 SLOT 10 DISCRETE OUTPUT - RELAY I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-338 | REV 00

TC_A1_BR.DWG 594X841

ID — TIME — DESIGNFILE

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-10, SLOT-11

CO-HS-8327FCL 36" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327F CLOSE COMMAND	OUT 1 NO	1	R10-S11-2/TB1011-1
	OUT 1	2	
CO-HS-8327FOP 36" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327F OPEN COMMAND	OUT 2 NO	3	R10-S11-4/TB1011-3
	OUT 2	4	
CO-HS-8328FCL 36" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328F CLOSE COMMAND	OUT 3 NO	5	R10-S11-6/TB1011-5
	OUT 3	6	
CO-HS-8328FOP 36" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328F OPEN COMMAND	OUT 4 NO	7	R10-S11-8/TB1011-7
	OUT 4	8	
CO-HS-8329FCL (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329F CLOSE COMMAND	OUT 5 NO	9	R10-S11-10/TB1011-9
	OUT 5	10	
CO-HS-8329FOP (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329F OPEN COMMAND	OUT 6 NO	11	R10-S11-12/TB1011-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8330FCL (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330F CLOSE COMMAND	OUT 7 NO	14	R10-S11-15/TB1011-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8330FOP (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330F OPEN COMMAND	OUT 8 NO	17	R10-S11-18/TB1011-15
	OUT 8	18	
CO-HS-8331FCL (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331F CLOSE COMMAND	OUT 9 NO	19	R10-S11-20/TB1011-17
	OUT 9	20	
CO-HS-8331FOP (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331F OPEN COMMAND	OUT 10 NO	21	R10-S11-22/TB1011-19
	OUT 10	22	
CO-HS-8332FCL (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332F CLOSE COMMAND	OUT 11 NO	23	R10-S11-24/TB1011-21
	OUT 11	24	
CO-HS-8332FOP (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332F OPEN COMMAND	OUT 12 NO	25	R10-S11-26/TB1011-23
	OUT 12	26	
SPARE	OUT 13 NO	27	R10-S11-28/TB1011-25
	OUT 13	28	
SPARE	OUT 14 NO	29	R10-S11-30/TB1011-27
	OUT 14	30	
NO CONNECTION	NC	31	
SPARE	OUT 15 NO	32	R10-S11-33/TB1011-29
	OUT 15	33	
NO CONNECTION	NC	34	
SPARE	OUT 16 NO	35	R10-S11-36/TB1011-31
	OUT 16	36	

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

+24VDC ← TBDX(+)20/R10-S11-35
0VDC ← TBDX(-)20/TB1011-20

CO-HTCP-04
TB-1011

1	COMOV8327F-51/COHTCP04-TB1011-1	1
2	COMOV8327F-32/COHTCP04-TB1011-2	2
3	COMOV8327F-52/COHTCP04-TB1011-3	3
4	COMOV8327F-53/COHTCP04-TB1011-4	4
5	COMOV8328F-51/COHTCP04-TB1011-5	1
6	COMOV8328F-32/COHTCP04-TB1011-6	2
7	COMOV8328F-52/COHTCP04-TB1011-7	3
8	COMOV8328F-53/COHTCP04-TB1011-8	4

PART OF CABLE CO-C-1205

PART OF CABLE CO-C-1220

CO-MOV-8327F

1	COMOV8327F-51/COHTCP04-TB1011-1	51	CO-HS-8327FCL
2	COMOV8327F-32/COHTCP04-TB1011-2	32	
3	COMOV8327F-52/COHTCP04-TB1011-3	52	CO-HS-8327FOP
4	COMOV8327F-53/COHTCP04-TB1011-4	53	

CO-MOV-8328F

1	COMOV8328F-51/COHTCP04-TB1011-5	51	CO-HS-8328FCL
2	COMOV8328F-32/COHTCP04-TB1011-6	32	
3	COMOV8328F-52/COHTCP04-TB1011-7	52	CO-HS-8328FOP
4	COMOV8328F-53/COHTCP04-TB1011-8	53	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0099
UEL# 2012016-1EF-CLD-000-0099-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DODDY ALBERTA
2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/10 SLOT 11
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-339 | REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ID — TIME — DESIGNFILE

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-10, SLOT-12

CO-HS-8327GCL 36" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327G CLOSE COMMAND	OUT 1 NO	1	R10-S12-2/TB1012-1
	OUT 1	2	
CO-HS-8327GOP 36" SPARE LINE TO/FROM KHTT STORAGE TANK 27, CO-MOV-8327G OPEN COMMAND	OUT 2 NO	3	R10-S12-4/TB1012-3
	OUT 2	4	
CO-HS-8328GCL 36" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328G CLOSE COMMAND	OUT 3 NO	5	R10-S12-6/TB1012-5
	OUT 3	6	
CO-HS-8328GOP 36" SPARE LINE TO/FROM KHTT STORAGE TANK 28, CO-MOV-8328G OPEN COMMAND	OUT 4 NO	7	R10-S12-8/TB1012-7
	OUT 4	8	
CO-HS-8329GCL (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329G CLOSE COMMAND	OUT 5 NO	9	R10-S12-10/TB1012-9
	OUT 5	10	
CO-HS-8329GOP (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 29, CO-MOV-8329G OPEN COMMAND	OUT 6 NO	11	R10-S12-12/TB1012-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8330GCL (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330G CLOSE COMMAND	OUT 7 NO	14	R10-S12-15/TB1012-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8330GOP (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 30, CO-MOV-8330G OPEN COMMAND	OUT 8 NO	17	R10-S12-18/TB1012-15
	OUT 8	18	
CO-HS-8331GCL (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331G CLOSE COMMAND	OUT 9 NO	19	R10-S12-20/TB1012-17
	OUT 9	20	
CO-HS-8331GOP (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 31, CO-MOV-8331G OPEN COMMAND	OUT 10 NO	21	R10-S12-22/TB1012-19
	OUT 10	22	
CO-HS-8332GCL (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332G CLOSE COMMAND	OUT 11 NO	23	R10-S12-24/TB1012-21
	OUT 11	24	
CO-HS-8332GOP (FUTURE) 36" SPARE LINE TO/FROM KHTT STORAGE TANK 32, CO-MOV-8332G OPEN COMMAND	OUT 12 NO	25	R10-S12-26/TB1012-23
	OUT 12	26	
SPARE	OUT 13 NO	27	R10-S12-28/TB1012-25
	OUT 13	28	
SPARE	OUT 14 NO	29	R10-S12-30/TB1012-27
	OUT 14	30	
NO CONNECTION	NC	31	
SPARE	OUT 15 NO	32	R10-S12-33/TB1012-29
	OUT 15	33	
NO CONNECTION	NC	34	
SPARE	OUT 16 NO	35	R10-S12-36/TB1012-31
	OUT 16	36	

CO-HTCP-04 TB-1012

1	COMOVB327G-51/COHTCP04-TB1012-1	1
2	COMOVB327G-32/COHTCP04-TB1012-2	2
3	COMOVB327G-52/COHTCP04-TB1012-3	3
4	COMOVB327G-53/COHTCP04-TB1012-4	4
5	COMOVB328G-51/COHTCP04-TB1012-5	1
6	COMOVB328G-32/COHTCP04-TB1012-6	2
7	COMOVB328G-52/COHTCP04-TB1012-7	3
8	COMOVB328G-53/COHTCP04-TB1012-8	4
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32		

TO TBDC 4663-05-03-SC-303 POWER SUPPLY

+24VDC — TBDC(+)21/R10-S12-35

0VDC — TBDC(-)21/TB1012-20

PART OF CABLE CO-C-1206

PART OF CABLE CO-C-1221

CO-MOV-8327G

1	COMOVB327G-51/COHTCP04-TB1012-1	51	CO-HS-8327GCL
2	COMOVB327G-32/COHTCP04-TB1012-2	32	
3	COMOVB327G-52/COHTCP04-TB1012-3	52	CO-HS-8327GOP
4	COMOVB327G-53/COHTCP04-TB1012-4	53	

CO-MOV-8328G

1	COMOVB328G-51/COHTCP04-TB1012-5	51	CO-HS-8328GCL
2	COMOVB328G-32/COHTCP04-TB1012-6	32	
3	COMOVB328G-52/COHTCP04-TB1012-7	52	CO-HS-8328GOP
4	COMOVB328G-53/COHTCP04-TB1012-8	53	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0100
UEL# 2012016-1EF-CLD-000-0100-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER JAMES DOODY ALBERTA

2014-MAR-7

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/10 SLOT 12
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-340 | REV 00

TIME DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-10, SLOT-13

CO-HS-8327HCL COLD LAKE BLEND TO KHTT STORAGE TANK 27, CO-MOV-8327H CLOSE COMMAND	OUT 1 NO	1	R10-S13-2/TB1013-1
	OUT 1	2	
CO-HS-8327HOP COLD LAKE BLEND TO KHTT STORAGE TANK 27, CO-MOV-8327H OPEN COMMAND	OUT 2 NO	3	R10-S13-4/TB1013-3
	OUT 2	4	
CO-HS-8328HCL COLD LAKE BLEND TO KHTT STORAGE TANK 28, CO-MOV-8328H CLOSE COMMAND	OUT 3 NO	5	R10-S13-6/TB1013-5
	OUT 3	6	
CO-HS-8328HOP COLD LAKE BLEND TO KHTT STORAGE TANK 28, CO-MOV-8328H OPEN COMMAND	OUT 4 NO	7	R10-S13-8/TB1013-7
	OUT 4	8	
CO-HS-8329HCL (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 29, CO-MOV-8329H CLOSE COMMAND	OUT 5 NO	9	R10-S13-10/TB1013-9
	OUT 5	10	
CO-HS-8329HOP (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 29, CO-MOV-8329H OPEN COMMAND	OUT 6 NO	11	R10-S13-12/TB1013-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8330HCL (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 30, CO-MOV-8330H CLOSE COMMAND	OUT 7 NO	14	R10-S13-15/TB1013-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8330HOP (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 30, CO-MOV-8330H OPEN COMMAND	OUT 8 NO	17	R10-S13-18/TB1013-15
	OUT 8	18	
CO-HS-8331HCL (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 31, CO-MOV-8331H CLOSE COMMAND	OUT 9 NO	19	R10-S13-20/TB1013-17
	OUT 9	20	
CO-HS-8331HOP (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 31, CO-MOV-8331H OPEN COMMAND	OUT 10 NO	21	R10-S13-22/TB1013-19
	OUT 10	22	
CO-HS-8332HCL (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332H CLOSE COMMAND	OUT 11 NO	23	R10-S13-24/TB1013-21
	OUT 11	24	
CO-HS-8332HOP (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332H OPEN COMMAND	OUT 12 NO	25	R10-S13-26/TB1013-23
	OUT 12	26	
SPARE	OUT 13 NO	27	R10-S13-28/TB1013-25
	OUT 13	28	
SPARE	OUT 14 NO	29	R10-S13-30/TB1013-27
	OUT 14	30	
NO CONNECTION	NC	31	
SPARE	OUT 15 NO	32	R10-S13-33/TB1013-29
	OUT 15	33	
NO CONNECTION	NC	34	
SPARE	OUT 16 NO	35	R10-S13-35/TB1013-31
	OUT 16	36	

CO-HTCP-04 TB-1013

1	COMOV8327H-51/COHTCP04-TB1013-1	1
2	COMOV8327H-32/COHTCP04-TB1013-2	2
3	COMOV8327H-52/COHTCP04-TB1013-3	3
4	COMOV8327H-53/COHTCP04-TB1013-4	4
5	COMOV8328H-51/COHTCP04-TB1013-5	1
6	COMOV8328H-32/COHTCP04-TB1013-6	2
7	COMOV8328H-52/COHTCP04-TB1013-7	3
8	COMOV8328H-53/COHTCP04-TB1013-8	4
9		
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TO TBDC 4663-05-03-SC-303 POWER SUPPLY

+24VDC ← TBDC(+)22/R10-S13-35

0VDC ← TBDC(-)22/TB1013-20

PART OF CABLE CO-C-1207

PART OF CABLE CO-C-1222

CO-MOV-8327H

1	COMOV8327H-51/COHTCP04-TB1013-1	51	CO-HS-8327HCL
2	COMOV8327H-32/COHTCP04-TB1013-2	32	
3	COMOV8327H-52/COHTCP04-TB1013-3	52	CO-HS-8327HOP
4	COMOV8327H-53/COHTCP04-TB1013-4	53	

CO-MOV-8328H

1	COMOV8328H-51/COHTCP04-TB1013-5	51	CO-HS-8328HCL
2	COMOV8328H-32/COHTCP04-TB1013-6	32	
3	COMOV8328H-52/COHTCP04-TB1013-7	52	CO-HS-8328HOP
4	COMOV8328H-53/COHTCP04-TB1013-8	53	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0101
UEL# 2012016-1EF-CLD-000-0101-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 29749 2014-MAR-7

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

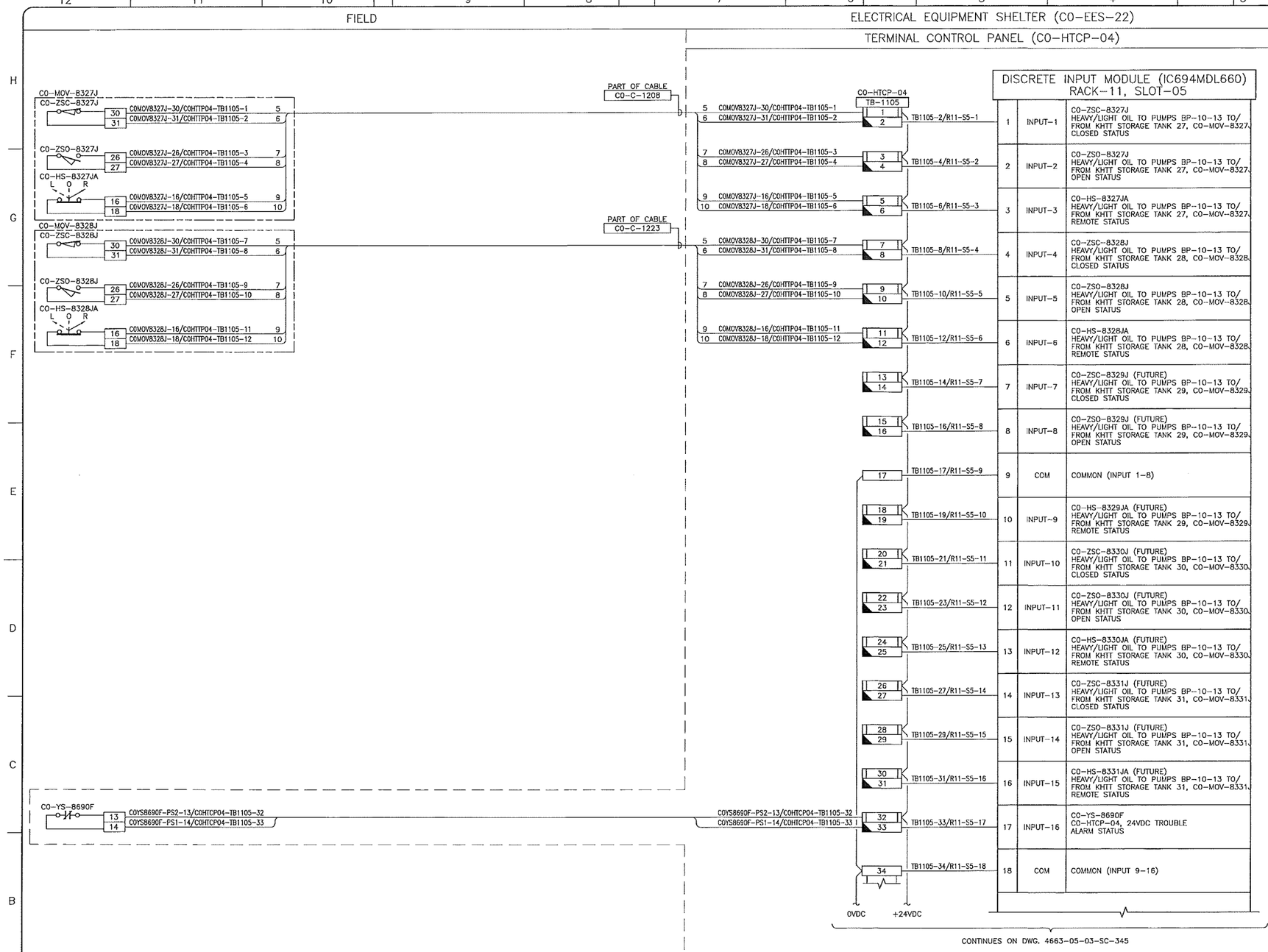
CO-HTCP-04, PLC-11/10 SLOT 13 DISCRETE OUTPUT - RELAY I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-341 | REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TIME---DESIGNFILE



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
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   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0102
UEL# 2012016-1EF-CLD-000-0102-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER JAMES DOUGLAS BARRETT 06220 2014-MAR-7

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-04, PLC-11/11 SLOT 05 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-344	00

TC_A1_BR.DWG 594X841

TIME - DESIGN FILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CONTINUES ON DWG. 4663-05-03-SC-344

CO-MOV-8327K
CO-ZSC-8327K
30 COMOVB327K-30/COHTCP04-TB1105-41 5
31 COMOVB327K-31/COHTCP04-TB1105-42 6
CO-ZSO-8327K
26 COMOVB327K-26/COHTCP04-TB1105-43 7
27 COMOVB327K-27/COHTCP04-TB1105-44 8
CO-HS-8327KA
L O R
16 COMOVB327K-16/COHTCP04-TB1105-45 9
18 COMOVB327K-18/COHTCP04-TB1105-46 10

PART OF CABLE CO-C-1209

5 COMOVB327K-30/COHTCP04-TB1105-41
6 COMOVB327K-31/COHTCP04-TB1105-42
7 COMOVB327K-26/COHTCP04-TB1105-43
8 COMOVB327K-27/COHTCP04-TB1105-44
9 COMOVB327K-16/COHTCP04-TB1105-45
10 COMOVB327K-18/COHTCP04-TB1105-46

CO-MOV-8328K
CO-ZSC-8328K
30 COMOVB328K-30/COHTCP04-TB1105-47 5
31 COMOVB328K-31/COHTCP04-TB1105-48 6
CO-ZSO-8328K
26 COMOVB328K-26/COHTCP04-TB1105-49 7
27 COMOVB328K-27/COHTCP04-TB1105-50 8
CO-HS-8328KA
L O R
16 COMOVB328K-16/COHTCP04-TB1105-52 9
18 COMOVB328K-18/COHTCP04-TB1105-53 10

PART OF CABLE CO-C-1224

5 COMOVB328K-30/COHTCP04-TB1105-47
6 COMOVB328K-31/COHTCP04-TB1105-48
7 COMOVB328K-26/COHTCP04-TB1105-49
8 COMOVB328K-27/COHTCP04-TB1105-50
9 COMOVB328K-16/COHTCP04-TB1105-52
10 COMOVB328K-18/COHTCP04-TB1105-53

0VDC +24VDC

CO-HTCP-04 TB-1105

DISCRETE INPUT MODULE (IC694MDL660) RACK-11, SLOT-05

35/36	TB1105-36/R11-S5-19	19	INPUT-17	CO-ZSC-8332J (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 32, CO-MOV-8332J CLOSED STATUS
37/38	TB1105-38/R11-S5-20	20	INPUT-18	CO-ZSO-8332J (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 32, CO-MOV-8332J OPEN STATUS
39/40	TB1105-40/R11-S5-21	21	INPUT-19	CO-HS-8332JA (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 32, CO-MOV-8332J REMOTE STATUS
41/42	TB1105-42/R11-S5-22	22	INPUT-20	CO-ZSC-8327K COLD LAKE BLEND TO KHTT STORAGE TANK 27, CO-MOV-8327K CLOSED STATUS
43/44	TB1105-44/R11-S5-23	23	INPUT-21	CO-ZSO-8327K COLD LAKE BLEND TO KHTT STORAGE TANK 27, CO-MOV-8327K OPEN STATUS
45/46	TB1105-46/R11-S5-24	24	INPUT-22	CO-HS-8327KA COLD LAKE BLEND TO KHTT STORAGE TANK 27, CO-MOV-8327K REMOTE STATUS
47/48	TB1105-48/R11-S5-25	25	INPUT-23	CO-ZSC-8328K COLD LAKE BLEND TO KHTT STORAGE TANK 28, CO-MOV-8328K CLOSED STATUS
49/50	TB1105-50/R11-S5-26	26	INPUT-24	CO-ZSO-8328K COLD LAKE BLEND TO KHTT STORAGE TANK 28, CO-MOV-8328K OPEN STATUS
51	TB1105-51/R11-S5-27	27	COM	COMMON (INPUT 17-24)
52/53	TB1105-53/R11-S5-28	28	INPUT-25	CO-HS-8328KA COLD LAKE BLEND TO KHTT STORAGE TANK 28, CO-MOV-8328K REMOTE STATUS
54/55	TB1105-55/R11-S5-29	29	INPUT-26	CO-ZSC-8329K (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 29, CO-MOV-8329K CLOSED STATUS
56/57	TB1105-57/R11-S5-30	30	INPUT-27	CO-ZSO-8329K (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 29, CO-MOV-8329K OPEN STATUS
58/59	TB1105-59/R11-S5-31	31	INPUT-28	CO-HS-8329KA (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 29, CO-MOV-8329K REMOTE STATUS
60/61	TB1105-61/R11-S5-32	32	INPUT-29	CO-ZSC-8330K (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 30, CO-MOV-8330K CLOSED STATUS
62/63	TB1105-63/R11-S5-33	33	INPUT-30	CO-ZSO-8330K (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 30, CO-MOV-8330K OPEN STATUS
64/65	TB1105-65/R11-S5-34	34	INPUT-31	CO-HS-8330KA (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 30, CO-MOV-8330K REMOTE STATUS
66/67	TB1105-67/R11-S5-35	35	INPUT-32	SPARE
68	TB1105-68/R11-S5-36	36	COM	COMMON (INPUT 25-32)

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

0VDC TBDC(-)-27/TB1105-68
+24VDC TBDC(+)-27/TB1105-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0103
UEL# 2012016-1EF-CLD-000-0103-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No.	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DVC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 29828 2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/11 SLOT 05
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-345 | REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ID-TIME-DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CO-MOV-8327L
CO-ZSC-8327L
30 COMOV8327L-30/COHTCP04-TB1106-13 5
31 COMOV8327L-31/COHTCP04-TB1106-14 6
CO-ZSO-8327L
26 COMOV8327L-26/COHTCP04-TB1106-15 7
27 COMOV8327L-27/COHTCP04-TB1106-16 8
CO-HS-8327LA
L O R
16 COMOV8327L-16/COHTCP04-TB1106-18 9
18 COMOV8327L-18/COHTCP04-TB1106-19 10

PART OF CABLE CO-C-1210

5 COMOV8327L-30/COHTCP04-TB1106-13
6 COMOV8327L-31/COHTCP04-TB1106-14
7 COMOV8327L-26/COHTCP04-TB1106-15
8 COMOV8327L-27/COHTCP04-TB1106-16
9 COMOV8327L-16/COHTCP04-TB1106-18
10 COMOV8327L-18/COHTCP04-TB1106-19

CO-MOV-8328L
CO-ZSC-8328L
30 COMOV8328L-30/COHTCP04-TB1106-20 5
31 COMOV8328L-31/COHTCP04-TB1106-21 6
CO-ZSO-8328L
26 COMOV8328L-26/COHTCP04-TB1106-22 7
27 COMOV8328L-27/COHTCP04-TB1106-23 8
CO-HS-8328LA
L O R
16 COMOV8328L-16/COHTCP04-TB1106-24 9
18 COMOV8328L-18/COHTCP04-TB1106-25 10

PART OF CABLE CO-C-1225

5 COMOV8328L-30/COHTCP04-TB1106-20
6 COMOV8328L-31/COHTCP04-TB1106-21
7 COMOV8328L-26/COHTCP04-TB1106-22
8 COMOV8328L-27/COHTCP04-TB1106-23
9 COMOV8328L-16/COHTCP04-TB1106-24
10 COMOV8328L-18/COHTCP04-TB1106-25

CO-HTCP-04
TB-1106

1	TB1106-2/R11-S6-1	
2		
3	TB1106-4/R11-S6-2	
4		
5	TB1106-6/R11-S6-3	
6		
7	TB1106-8/R11-S6-4	
8		
9	TB1106-10/R11-S6-5	
10		
11	TB1106-12/R11-S6-6	
12		
13	TB1106-14/R11-S6-7	
14		
15	TB1106-16/R11-S6-8	
16		
17	TB1106-17/R11-S6-9	
18	TB1106-19/R11-S6-10	
19		
20	TB1106-21/R11-S6-11	
21		
22	TB1106-23/R11-S6-12	
23		
24	TB1106-25/R11-S6-13	
25		
26	TB1106-27/R11-S6-14	
27		
28	TB1106-29/R11-S6-15	
29		
30	TB1106-31/R11-S6-16	
31		
32	TB1106-33/R11-S6-17	
33		
34	TB1106-34/R11-S6-18	

0VDC +24VDC

DISCRETE INPUT MODULE (IC694MDL660)
RACK-11, SLOT-06

1	INPUT-1	CO-ZSC-8331K (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 31, CO-MOV-8331K CLOSED STATUS
2	INPUT-2	CO-ZSO-8331K (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 31, CO-MOV-8331K OPEN STATUS
3	INPUT-3	CO-HS-8331KA (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 31, CO-MOV-8331K REMOTE STATUS
4	INPUT-4	CO-ZSC-8332K (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332K CLOSED STATUS
5	INPUT-5	CO-ZSO-8332K (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332K OPEN STATUS
6	INPUT-6	CO-HS-8332KA (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332K REMOTE STATUS
7	INPUT-7	CO-ZSC-8327L 36" SPARE LINE TO KHTT STORAGE TANK 27, CO-MOV-8327L CLOSED STATUS
8	INPUT-8	CO-ZSO-8327L 36" SPARE LINE TO KHTT STORAGE TANK 27, CO-MOV-8327L OPEN STATUS
9	COM	COMMON (INPUT 1-8)
10	INPUT-9	CO-HS-8327LA 36" SPARE LINE TO KHTT STORAGE TANK 27, CO-MOV-8327L REMOTE STATUS
11	INPUT-10	CO-ZSC-8328L 36" SPARE LINE TO KHTT STORAGE TANK 28, CO-MOV-8328L CLOSED STATUS
12	INPUT-11	CO-ZSO-8328L 36" SPARE LINE TO KHTT STORAGE TANK 28, CO-MOV-8328L OPEN STATUS
13	INPUT-12	CO-HS-8328LA 36" SPARE LINE TO KHTT STORAGE TANK 28, CO-MOV-8328L REMOTE STATUS
14	INPUT-13	CO-ZSC-8329L (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 29, CO-MOV-8329L CLOSED STATUS
15	INPUT-14	CO-ZSO-8329L (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 29, CO-MOV-8329L OPEN STATUS
16	INPUT-15	CO-HS-8329LA (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 29, CO-MOV-8329L REMOTE STATUS
17	INPUT-16	SPARE
18	COM	COMMON (INPUT 9-16)

CONTINUES ON DWG. 4663-05-03-SC-347

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
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   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0104
UEL# 2012016-1EF-CLD-000-0104-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DODD 2014-MAR-7

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/11 SLOT 06
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-346 | REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TIME — DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CONTINUES ON DWG. 4663-05-03-SC-346

0VDC +24VDC

CO-HTCP-04 TB-1106

DISCRETE INPUT MODULE (IC694MDL660) RACK-11, SLOT-06

35/36	TB1106-36/R11-S6-19	19	INPUT-17	CO-ZSC-8330L (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 30, CO-MOV-8330L CLOSED STATUS
37/38	TB1106-38/R11-S6-20	20	INPUT-18	CO-ZSO-8330L (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 30, CO-MOV-8330L OPEN STATUS
39/40	TB1106-40/R11-S6-21	21	INPUT-19	CO-HS-8330LA (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 30, CO-MOV-8330L REMOTE STATUS
41/42	TB1106-42/R11-S6-22	22	INPUT-20	CO-ZSC-8331L (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 31, CO-MOV-8331L CLOSED STATUS
43/44	TB1106-44/R11-S6-23	23	INPUT-21	CO-ZSO-8331L (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 31, CO-MOV-8331L OPEN STATUS
45/46	TB1106-46/R11-S6-24	24	INPUT-22	CO-HS-8331LA (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 31, CO-MOV-8331L REMOTE STATUS
47/48	TB1106-48/R11-S6-25	25	INPUT-23	CO-ZSC-8332L (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 32, CO-MOV-8332L CLOSED STATUS
49/50	TB1106-50/R11-S6-26	26	INPUT-24	CO-ZSO-8332L (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 32, CO-MOV-8332L OPEN STATUS
51	TB1106-51/R11-S6-27	27	COM	COMMON (INPUT 17-24)
52/53	TB1106-53/R11-S6-28	28	INPUT-25	CO-HS-8332LA (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 32, CO-MOV-8332L REMOTE STATUS
54/55	TB1106-55/R11-S6-29	29	INPUT-26	SPARE
56/57	TB1106-57/R11-S6-30	30	INPUT-27	SPARE
58/59	TB1106-59/R11-S6-31	31	INPUT-28	SPARE
60/61	TB1106-61/R11-S6-32	32	INPUT-29	SPARE
62/63	TB1106-63/R11-S6-33	33	INPUT-30	SPARE
64/65	TB1106-65/R11-S6-34	34	INPUT-31	SPARE
66/67	TB1106-67/R11-S6-35	35	INPUT-32	SPARE
68	TB1105-68/R11-S6-36	36	COM	COMMON (INPUT 25-32)

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

0VDC → TBDC(-)-28/TB1106-68
+24VDC → TBDC(+)-28/TB1106-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0105
UEL# 2012016-1EF-CLD-000-0105-01

REFERENCE DRAWINGS

DRAWING No	TITLE
--	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOODY ALBERTA
2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5598
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/11 SLOT 06 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-347 | REV 00

TIME ---- DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CO-HTCP-04
TB-1107

DISCRETE INPUT MODULE (IC694MDL660)
RACK-11, SLOT-07

1, 2	TB1107-2/R11-S7-1	1	INPUT-1	SPARE
3, 4	TB1107-4/R11-S7-2	2	INPUT-2	SPARE
5, 6	TB1107-6/R11-S7-3	3	INPUT-3	SPARE
7, 8	TB1107-8/R11-S7-4	4	INPUT-4	SPARE
9, 10	TB1107-10/R11-S7-5	5	INPUT-5	SPARE
11, 12	TB1107-12/R11-S7-6	6	INPUT-6	SPARE
13, 14	TB1107-14/R11-S7-7	7	INPUT-7	SPARE
15, 16	TB1107-16/R11-S7-8	8	INPUT-8	SPARE
17	TB1107-17/R11-S7-9	9	COM	COMMON (INPUT 1-8)
18, 19	TB1107-19/R11-S7-10	10	INPUT-9	SPARE
20, 21	TB1107-21/R11-S7-11	11	INPUT-10	SPARE
22, 23	TB1107-23/R11-S7-12	12	INPUT-11	SPARE
24, 25	TB1107-25/R11-S7-13	13	INPUT-12	SPARE
26, 27	TB1107-27/R11-S7-14	14	INPUT-13	SPARE
28, 29	TB1107-29/R11-S7-15	15	INPUT-14	SPARE
30, 31	TB1107-31/R11-S7-16	16	INPUT-15	SPARE
32, 33	TB1107-33/R11-S7-17	17	INPUT-16	SPARE
34	TB1107-34/R11-S7-18	18	COM	COMMON (INPUT 9-16)

0VDC +24VDC

CONTINUES ON DWG. 4663-05-03-SC-349

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0106
UEL# 2012016-1EF-CLD-000-0106-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BDM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOCKRILL ALBERTA
2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-04, PLC-11/11 SLOT 07 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-348	00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TIME ---- DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-04)

CONTINUES ON DWG. 4663-05-03-SC-348

0VDC +24VDC

CO-HTCP-04
TB-1107

DISCRETE INPUT MODULE (IC694MDL660)
RACK-11, SLOT-07

35 / 36	TB1107-36/R11-S7-19	19	INPUT-17	SPARE
37 / 38	TB1107-38/R11-S7-20	20	INPUT-18	SPARE
39 / 40	TB1107-40/R11-S7-21	21	INPUT-19	SPARE
41 / 42	TB1107-42/R11-S7-22	22	INPUT-20	SPARE
43 / 44	TB1107-44/R11-S7-23	23	INPUT-21	SPARE
45 / 46	TB1107-46/R11-S7-24	24	INPUT-22	SPARE
47 / 48	TB1107-48/R11-S7-25	25	INPUT-23	SPARE
49 / 50	TB1107-50/R11-S7-26	26	INPUT-24	SPARE
51	TB1107-51/R11-S7-27	27	COM	COMMON (INPUT 17-24)
52 / 53	TB1107-53/R11-S7-28	28	INPUT-25	SPARE
54 / 55	TB1107-55/R11-S7-29	29	INPUT-26	SPARE
56 / 57	TB1107-57/R11-S7-30	30	INPUT-27	SPARE
58 / 59	TB1107-59/R11-S7-31	31	INPUT-28	SPARE
60 / 61	TB1107-61/R11-S7-32	32	INPUT-29	SPARE
62 / 63	TB1107-63/R11-S7-33	33	INPUT-30	SPARE
64 / 65	TB1107-65/R11-S7-34	34	INPUT-31	SPARE
66 / 67	TB1107-67/R11-S7-35	35	INPUT-32	SPARE
68	TB1107-68/R11-S7-36	36	COM	COMMON (INPUT 25-32)

TO TBDC
4663-05-03-SC-303
POWER SUPPLY

0VDC TBDC(-)-29/TB1107-68
+24VDC TBDC(+)-29/TB1107-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0107
UEL# 2012016-1EF-CLD-000-0107-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER JAMES DOOLEY ALBERTA
2014-MAR-7

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-04, PLC-11/11 SLOT 07 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-349	00

TIME DESIGNFILE

ID

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-11, SLOT-10

CO-HS-8327JCL HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 27, CO-MOV-8327J CLOSE COMMAND	OUT 1 NO	1
	OUT 1	2
CO-HS-8327JOP HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 27, CO-MOV-8327J OPEN COMMAND	OUT 2 NO	3
	OUT 2	4
CO-HS-8328JCL HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 28, CO-MOV-8328J CLOSE COMMAND	OUT 3 NO	5
	OUT 3	6
CO-HS-8328JOP HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 28, CO-MOV-8328J OPEN COMMAND	OUT 4 NO	7
	OUT 4	8
CO-HS-8329JCL (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 29, CO-MOV-8329J CLOSE COMMAND	OUT 5 NO	9
	OUT 5	10
CO-HS-8329JOP (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 29, CO-MOV-8329J OPEN COMMAND	OUT 6 NO	11
	OUT 6	12
NO CONNECTION	NC	13
CO-HS-8330JCL (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 30, CO-MOV-8330J CLOSE COMMAND	OUT 7 NO	14
	OUT 7	15
NO CONNECTION	NC	16
CO-HS-8330JOP (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 30, CO-MOV-8330J OPEN COMMAND	OUT 8 NO	17
	OUT 8	18
CO-HS-8331JCL (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 31, CO-MOV-8331J CLOSE COMMAND	OUT 9 NO	19
	OUT 9	20
CO-HS-8331JOP (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 31, CO-MOV-8331J OPEN COMMAND	OUT 10 NO	21
	OUT 10	22
CO-HS-8332JCL (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 32, CO-MOV-8332J CLOSE COMMAND	OUT 11 NO	23
	OUT 11	24
CO-HS-8332JOP (FUTURE) HEAVY/LIGHT OIL TO PUMPS BP-10-13 TO/ FROM KHTT STORAGE TANK 32, CO-MOV-8332J OPEN COMMAND	OUT 12 NO	25
	OUT 12	26
SPARE	OUT 13 NO	27
	OUT 13	28
SPARE	OUT 14 NO	29
	OUT 14	30
NO CONNECTION	NC	31
SPARE	OUT 15 NO	32
	OUT 15	33
NO CONNECTION	NC	34
SPARE	OUT 16 NO	35
	OUT 16	36

TO TBDC 4663-05-03-SC-303 POWER SUPPLY

+24VDC — TBDC(+)30/R11-S10-35

0VDC — TBDC(-)30/TB1110-20

CO-HTCP-04 TB-1110

R11-S10-2/TB1110-1	1	COMOVB327J-51/COHTCP04-TB1110-1 1
	2	COMOVB327J-32/COHTCP04-TB1110-2 2
R11-S10-4/TB1110-3	3	COMOVB327J-52/COHTCP04-TB1110-3 3
	4	COMOVB327J-53/COHTCP04-TB1110-4 4
R11-S10-6/TB1110-5	5	COMOVB328J-51/COHTCP04-TB1110-5 1
	6	COMOVB328J-32/COHTCP04-TB1110-6 2
R11-S10-8/TB1110-7	7	COMOVB328J-52/COHTCP04-TB1110-7 3
	8	COMOVB328J-53/COHTCP04-TB1110-8 4
R11-S10-10/TB1110-9	9	
	10	
R11-S10-12/TB1110-11	11	
	12	
R11-S10-15/TB1110-13	13	
	14	
R11-S10-18/TB1110-15	15	
	16	
R11-S10-20/TB1110-17	17	
	18	
R11-S10-22/TB1110-19	19	
	20	
R11-S10-24/TB1110-21	21	
	22	
R11-S10-26/TB1110-23	23	
	24	
R11-S10-28/TB1110-25	25	
	26	
R11-S10-30/TB1110-27	27	
	28	
R11-S10-33/TB110-29	29	
	30	
R11-S10-36/TB1110-31	31	
	32	

PART OF CABLE CO-C-1208

PART OF CABLE CO-C-1223

CO-MOV-8327J

1 COMOVB327J-51/COHTCP04-TB1110-1	51	CO-HS-8327JCL
2 COMOVB327J-32/COHTCP04-TB1110-2	32	
3 COMOVB327J-52/COHTCP04-TB1110-3	52	CO-HS-8327JOP
4 COMOVB327J-53/COHTCP04-TB1110-4	53	

CO-MOV-8328J

1 COMOVB328J-51/COHTCP04-TB1110-5	51	CO-HS-8328JCL
2 COMOVB328J-32/COHTCP04-TB1110-6	32	
3 COMOVB328J-52/COHTCP04-TB1110-7	52	CO-HS-8328JOP
4 COMOVB328J-53/COHTCP04-TB1110-8	53	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
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   4663-08-00-03-703 CO-TANK-21 AREA
   4663-08-00-03-706 CO-TANK-22 AREA
   4663-08-00-03-709 CO-TANK-23 AREA
   4663-08-00-03-712 CO-TANK-24 AREA
   4663-08-00-03-715 CO-TANK-25 AREA
   4663-08-00-03-718 CO-TANK-26 AREA
   4663-08-00-03-721 CO-TANK-27 AREA
   4663-08-00-03-724 CO-TANK-28 AREA
   4663-08-00-03-745 CO-VALVE MANIFOLD AREA
   4663-08-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0108
UEL# 2012016-1EF-CLD-000-0108-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

PROFESSIONAL ENGINEER JAMES DOOD ALBERTA
2014-MAR-7

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DATE

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/11 SLOT 10
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-354 | REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-11, SLOT-11

CO-HS-8327KCL COLD LAKE BLEND TO KHTT STORAGE TANK 27, CO-MOV-8327K CLOSE COMMAND	OUT 1 NO	1	R11-S11-2/TB1111-1
	OUT 1	2	
CO-HS-8327KOP COLD LAKE BLEND TO KHTT STORAGE TANK 27, CO-MOV-8327K OPEN COMMAND	OUT 2 NO	3	R11-S11-4/TB1111-3
	OUT 2	4	
CO-HS-8328KCL COLD LAKE BLEND TO KHTT STORAGE TANK 28, CO-MOV-8328K CLOSE COMMAND	OUT 3 NO	5	R11-S11-6/TB1111-5
	OUT 3	6	
CO-HS-8328KOP COLD LAKE BLEND TO KHTT STORAGE TANK 28, CO-MOV-8328K OPEN COMMAND	OUT 4 NO	7	R11-S11-8/TB1111-7
	OUT 4	8	
CO-HS-8329KCL (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 29, CO-MOV-8329K CLOSE COMMAND	OUT 5 NO	9	R11-S11-10/TB1111-9
	OUT 5	10	
CO-HS-8329KOP (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 29, CO-MOV-8329K OPEN COMMAND	OUT 6 NO	11	R11-S11-12/TB1111-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8330KCL (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 30, CO-MOV-8330K CLOSE COMMAND	OUT 7 NO	14	R11-S11-15/TB1111-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8330KOP (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 30, CO-MOV-8330K OPEN COMMAND	OUT 8 NO	17	R11-S11-18/TB1111-15
	OUT 8	18	
CO-HS-8331KCL (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 31, CO-MOV-8331K CLOSE COMMAND	OUT 9 NO	19	R11-S11-20/TB1111-17
	OUT 9	20	
CO-HS-8331KOP (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 31, CO-MOV-8331K OPEN COMMAND	OUT 10 NO	21	R11-S11-22/TB1111-19
	OUT 10	22	
CO-HS-8332KCL (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332K CLOSE COMMAND	OUT 11 NO	23	R11-S11-24/TB1111-21
	OUT 11	24	
CO-HS-8332KOP (FUTURE) COLD LAKE BLEND TO KHTT STORAGE TANK 32, CO-MOV-8332K OPEN COMMAND	OUT 12 NO	25	R11-S11-26/TB1111-23
	OUT 12	26	
SPARE	OUT 13 NO	27	R11-S11-28/TB1111-25
	OUT 13	28	
SPARE	OUT 14 NO	29	R11-S11-30/TB1111-27
	OUT 14	30	
NO CONNECTION	NC	31	
SPARE	OUT 15 NO	32	R11-S11-33/TB111-29
	OUT 15	33	
NO CONNECTION	NC	34	
SPARE	OUT 16 NO	35	R11-S11-36/TB1111-31
	OUT 16	36	

TO TBDC 4663-05-03-SC-303 POWER SUPPLY

+24VDC ← TBDC(+)31/R11-S11-35

0VDC ← TBDC(-)31/TB1111-20

CO-HTCP-04 TB-1111

1	2	COMOV8327K-51/COHTCP04-TB1111-1	1
		COMOV8327K-32/COHTCP04-TB1111-2	2
3	4	COMOV8327K-52/COHTCP04-TB1111-3	3
		COMOV8327K-53/COHTCP04-TB1111-4	4
5	6	COMOV8328K-51/COHTCP04-TB1111-5	1
		COMOV8328K-32/COHTCP04-TB1111-6	2
7	8	COMOV8328K-52/COHTCP04-TB1111-7	3
		COMOV8328K-53/COHTCP04-TB1111-8	4
9	10		
11	12		
13	14		
15	16		
17	18		
19	20		
21	22		
23	24		
25	26		
27	28		
29	30		
31	32		

PART OF CABLE CO-C-1209

PART OF CABLE CO-C-1224

CO-MOV-8327K

1	COMOV8327K-51/COHTCP04-TB1111-1	51	CO-HS-8327KCL
2	COMOV8327K-32/COHTCP04-TB1111-2	32	
3	COMOV8327K-52/COHTCP04-TB1111-3	52	CO-HS-8327KOP
4	COMOV8327K-53/COHTCP04-TB1111-4	53	

CO-MOV-8328K

1	COMOV8328K-51/COHTCP04-TB1111-5	51	CO-HS-8328KCL
2	COMOV8328K-32/COHTCP04-TB1111-6	32	
3	COMOV8328K-52/COHTCP04-TB1111-7	52	CO-HS-8328KOP
4	COMOV8328K-53/COHTCP04-TB1111-8	53	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0109
UEL# 2012016-1EF-CLD-000-0109-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOODY NUBERA
2014-MAR-7

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-04, PLC-11/11 SLOT 11
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-355 | REV 00

TIME DESIGNFILE

ID

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-04)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-11, SLOT-12

CO-HS-8327LCL 36" SPARE LINE TO KHTT STORAGE TANK 27, CO-MOV-8327L CLOSE COMMAND	OUT 1 NO	1	R11-S12-2/TB1112-1
	OUT 1	2	
CO-HS-8327LOP 36" SPARE LINE TO KHTT STORAGE TANK 27, CO-MOV-8327L OPEN COMMAND	OUT 2 NO	3	R11-S12-4/TB1112-3
	OUT 2	4	
CO-HS-8328LCL 36" SPARE LINE TO KHTT STORAGE TANK 28, CO-MOV-8328L CLOSE COMMAND	OUT 3 NO	5	R11-S12-6/TB1112-5
	OUT 3	6	
CO-HS-8328LOP 36" SPARE LINE TO KHTT STORAGE TANK 28, CO-MOV-8328L OPEN COMMAND	OUT 4 NO	7	R11-S12-8/TB1112-7
	OUT 4	8	
CO-HS-8329LCL (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 29, CO-MOV-8329L CLOSE COMMAND	OUT 5 NO	9	R11-S12-10/TB1112-9
	OUT 5	10	
CO-HS-8329LOP (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 29, CO-MOV-8329L OPEN COMMAND	OUT 6 NO	11	R11-S12-12/TB1112-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8330LCL (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 30, CO-MOV-8330L CLOSE COMMAND	OUT 7 NO	14	R11-S12-15/TB1112-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8330LOP (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 30, CO-MOV-8330L OPEN COMMAND	OUT 8 NO	17	R11-S12-18/TB1112-15
	OUT 8	18	
CO-HS-8331LCL (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 31, CO-MOV-8331L CLOSE COMMAND	OUT 9 NO	19	R11-S12-20/TB1112-17
	OUT 9	20	
CO-HS-8331LOP (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 31, CO-MOV-8331L OPEN COMMAND	OUT 10 NO	21	R11-S12-22/TB1112-19
	OUT 10	22	
CO-HS-8332LCL (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 32, CO-MOV-8332L CLOSE COMMAND	OUT 11 NO	23	R11-S12-24/TB1112-21
	OUT 11	24	
CO-HS-8332LOP (FUTURE) 36" SPARE LINE TO KHTT STORAGE TANK 32, CO-MOV-8332L OPEN COMMAND	OUT 12 NO	25	R11-S12-26/TB1112-23
	OUT 12	26	
SPARE	OUT 13 NO	27	R11-S12-28/TB1112-25
	OUT 13	28	
SPARE	OUT 14 NO	29	R11-S12-30/TB1112-27
	OUT 14	30	
NO CONNECTION	NC	31	
SPARE	OUT 15 NO	32	R11-S12-33/TB112-29
	OUT 15	33	
NO CONNECTION	NC	34	
SPARE	OUT 16 NO	35	R11-S12-36/TB1112-31
	OUT 16	36	

TO TBDC 4663-05-03-SC-303 POWER SUPPLY

+24VDC ← TBDC(+)32/R11-S12-35

0VDC ← TBDC(-)32/TB1112-20

CO-HTCP-04 TB-1112

1	COMOVB327L-51/COHTCP04-TB1112-1	1
2	COMOVB327L-32/COHTCP04-TB1112-2	2
3	COMOVB327L-52/COHTCP04-TB1112-3	3
4	COMOVB327L-53/COHTCP04-TB1112-4	4
5	COMOVB328L-51/COHTCP04-TB1112-5	1
6	COMOVB328L-32/COHTCP04-TB1112-6	2
7	COMOVB328L-52/COHTCP04-TB1112-7	3
8	COMOVB328L-53/COHTCP04-TB1112-8	4
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PART OF CABLE CO-C-1210

PART OF CABLE CO-C-1225

CO-MOV-8327L

1	COMOVB327L-51/COHTCP04-TB1112-1	51	CO-HS-8327LCL
2	COMOVB327L-32/COHTCP04-TB1112-2	32	
3	COMOVB327L-52/COHTCP04-TB1112-3	52	CO-HS-8327LOP
4	COMOVB327L-53/COHTCP04-TB1112-4	53	

CO-MOV-8328L

1	COMOVB328L-51/COHTCP04-TB1112-5	51	CO-HS-8328LCL
2	COMOVB328L-32/COHTCP04-TB1112-6	32	
3	COMOVB328L-52/COHTCP04-TB1112-7	52	CO-HS-8328LOP
4	COMOVB328L-53/COHTCP04-TB1112-8	53	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTI".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0110
UEL# 2012016-1EF-CLD-000-0110-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE
	[illegible]	[illegible]	SRL	JED	DCB	

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY

2014-MAR-7

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-04, PLC-11/11 SLOT 12
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-356	00

TIME DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CO-MOV-8427A
CO-ZSC-8427A
30 COMOV8427A-30/COHTCP05-TB1205-1 5
31 COMOV8427A-31/COHTCP05-TB1205-2 6
CO-ZSO-8427A
26 COMOV8427A-26/COHTCP05-TB1205-3 7
27 COMOV8427A-27/COHTCP05-TB1205-4 8
CO-HS-8427AA
L O R
16 COMOV8427A-16/COHTCP05-TB1205-5 9
18 COMOV8427A-18/COHTCP05-TB1205-6 10

CO-MOV-8427B
CO-ZSC-8427B
30 COMOV8427B-30/COHTCP05-TB1205-7 5
31 COMOV8427B-31/COHTCP05-TB1205-8 6
CO-ZSO-8427B
26 COMOV8427B-26/COHTCP05-TB1205-9 7
27 COMOV8427B-27/COHTCP05-TB1205-10 8
CO-HS-8427BA
L O R
16 COMOV8427B-16/COHTCP05-TB1205-11 9
18 COMOV8427B-18/COHTCP05-TB1205-12 10

CO-MOV-8427C
CO-ZSC-8427C
30 COMOV8427C-30/COHTCP05-TB1205-13 5
31 COMOV8427C-31/COHTCP05-TB1205-14 6
CO-ZSO-8427C
26 COMOV8427C-26/COHTCP05-TB1205-15 7
27 COMOV8427C-27/COHTCP05-TB1205-16 8
CO-HS-8427CA
L O R
16 COMOV8427C-16/COHTCP05-TB1205-18 9
18 COMOV8427C-18/COHTCP05-TB1205-19 10

CO-MOV-8427D
CO-ZSC-8427D
30 COMOV8427D-30/COHTCP05-TB1205-20 5
31 COMOV8427D-31/COHTCP05-TB1205-21 6
CO-ZSO-8427D
26 COMOV8427D-26/COHTCP05-TB1205-22 7
27 COMOV8427D-27/COHTCP05-TB1205-23 8
CO-HS-8427DA
L O R
16 COMOV8427D-16/COHTCP05-TB1205-24 9
18 COMOV8427D-18/COHTCP05-TB1205-25 10

CO-MOV-8427E
CO-ZSC-8427E
30 COMOV8427E-30/COHTCP05-TB1205-26 5
31 COMOV8427E-31/COHTCP05-TB1205-27 6
CO-ZSO-8427E
26 COMOV8427E-26/COHTCP05-TB1205-28 7
27 COMOV8427E-27/COHTCP05-TB1205-29 8
CO-HS-8427EA
L O R
16 COMOV8427E-16/COHTCP05-TB1205-30 9
18 COMOV8427E-18/COHTCP05-TB1205-31 10

CO LSH 8574
NC COLSH8574-NC/COUB272-TB1-7 1
COM COLSH8574-COM/COUB272-TB1-8 2
L1 COLSH8574-L1/COEJB272-TB1-2 1
L2 COLSH8574-L2/COEJB272-TB1-6 2

PART OF CABLE CO-C-1306
PART OF CABLE CO-C-1307
PART OF CABLE CO-C-1308
PART OF CABLE CO-C-1309
PART OF CABLE CO-C-1310
PART OF CABLE CO-C-1315

CO-I-1318
NOTE 5
CO-P-1318

CO-IJB-27-2
TB1-7 COUB272-TB1-7/COHTCP05-TB1205-32
TB1-8 COUB272-TB1-8/COHTCP05-TB1205-33

PR.3 COUB272-TB1-7/COHTCP05-TB1205-32
COUB272-TB1-8/COHTCP05-TB1205-33

CO-HTCP-05 TB-1205

5	COMOV8427A-30/COHTCP05-TB1205-1	1	TB1205-2/R12-S5-1
6	COMOV8427A-31/COHTCP05-TB1205-2	2	
7	COMOV8427A-26/COHTCP05-TB1205-3	3	TB1205-4/R12-S5-2
8	COMOV8427A-27/COHTCP05-TB1205-4	4	
9	COMOV8427A-16/COHTCP05-TB1205-5	5	TB1205-6/R12-S5-3
10	COMOV8427A-18/COHTCP05-TB1205-6	6	
5	COMOV8427B-30/COHTCP05-TB1205-7	7	TB1205-8/R12-S5-4
6	COMOV8427B-31/COHTCP05-TB1205-8	8	
7	COMOV8427B-26/COHTCP05-TB1205-9	9	TB1205-10/R12-S5-5
8	COMOV8427B-27/COHTCP05-TB1205-10	10	
9	COMOV8427B-16/COHTCP05-TB1205-11	11	TB1205-12/R12-S5-6
10	COMOV8427B-18/COHTCP05-TB1205-12	12	
5	COMOV8427C-30/COHTCP05-TB1205-13	13	TB1205-14/R12-S5-7
6	COMOV8427C-31/COHTCP05-TB1205-14	14	
7	COMOV8427C-26/COHTCP05-TB1205-15	15	TB1205-16/R12-S5-8
8	COMOV8427C-27/COHTCP05-TB1205-16	16	
		17	TB1205-17/R12-S5-9
9	COMOV8427C-16/COHTCP05-TB1205-18	18	TB1205-19/R12-S5-10
10	COMOV8427C-18/COHTCP05-TB1205-19	19	
5	COMOV8427D-30/COHTCP05-TB1205-20	20	TB1205-21/R12-S5-11
6	COMOV8427D-31/COHTCP05-TB1205-21	21	
7	COMOV8427D-26/COHTCP05-TB1205-22	22	TB1205-23/R12-S5-12
8	COMOV8427D-27/COHTCP05-TB1205-23	23	
9	COMOV8427D-16/COHTCP05-TB1205-24	24	TB1205-25/R12-S5-13
10	COMOV8427D-18/COHTCP05-TB1205-25	25	
5	COMOV8427E-30/COHTCP05-TB1205-26	26	TB1205-27/R12-S5-14
6	COMOV8427E-31/COHTCP05-TB1205-27	27	
7	COMOV8427E-26/COHTCP05-TB1205-28	28	TB1205-28/R12-S5-15
8	COMOV8427E-27/COHTCP05-TB1205-29	29	
9	COMOV8427E-16/COHTCP05-TB1205-30	30	TB1205-31/R12-S5-16
10	COMOV8427E-18/COHTCP05-TB1205-31	31	
	COUB272-TB1-7/COHTCP05-TB1205-32	32	TB1205-33/R12-S5-17
	COUB272-TB1-8/COHTCP05-TB1205-33	33	
		34	TB1205-34/R12-S5-18

0VDC +24VDC

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-05

1	INPUT-1	CO-ZSC-8427A CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427A
2	INPUT-2	CO-ZSO-8427A CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427A
3	INPUT-3	CO-HS-8427AA CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427A
4	INPUT-4	CO-ZSC-8427B CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427B
5	INPUT-5	CO-ZSO-8427B CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427B
6	INPUT-6	CO-HS-8427BA CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427B
7	INPUT-7	CO-ZSC-8427C CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427C
8	INPUT-8	CO-ZSO-8427C CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427C
9	COM	COMMON (INPUT 1-8)
10	INPUT-9	CO-HS-8427CA CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427C
11	INPUT-10	CO-ZSC-8427D CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427D
12	INPUT-11	CO-ZSO-8427D CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427D
13	INPUT-12	CO-HS-8427DA CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427D
14	INPUT-13	CO-ZSC-8427E CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427E
15	INPUT-14	CO-ZSO-8427E CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427E
16	INPUT-15	CO-HS-8427EA CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427E
17	INPUT-16	CO-LSH-8574 CO-TK-27, LEAK DETECTION LEVEL SWITCH HIGH ALARM
18	COM	COMMON (INPUT 9-16)

CONTINUES ON DWG. 4663-05-03-SC-411

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT REQUIRES EXTERNAL 120VAC POWER. SEE DRAWING 4663-06-02-07-174.
6. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0111
UEL# 2012016-1EF-CLD-000-0111-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER JAMES DOOLEY ALBERTA
2014-MAR-12

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 05 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-410 | REV 00

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TIME---DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CONTINUES ON DWG. 4663-05-03-SC-410

CO-MCC-02, SECTION 10F-C

CO-YS-8571
18 COMCC02-10FC-18/COHTCP05-TB1205-35 1
19 COMCC02-10FC-19/COHTCP05-TB1205-36 2

CO-HS-8571LR
14 COMCC02-10FC-14/COHTCP05-TB1205-37 3
15 COMCC02-10FC-15/COHTCP05-TB1205-38 4

CO-MCC-02, SECTION 10F-H

CO-YS-8572
18 COMCC02-10FH-18/COHTCP05-TB1205-39 5
19 COMCC02-10FH-19/COHTCP05-TB1205-40 6

CO-HS-8572LR
14 COMCC02-10FH-14/COHTCP05-TB1205-41 7
15 COMCC02-10FH-15/COHTCP05-TB1205-40 8

CO-MCC-02, SECTION 9F-C

CO-YS-8573
18 COMCC02-9FC-18/COHTCP05-TB1205-43 9
19 COMCC02-9FC-19/COHTCP05-TB1205-44 10

CO-HS-8573LR
14 COMCC02-9FC-14/COHTCP05-TB1205-45 11
15 COMCC02-9FC-15/COHTCP05-TB1205-46 12

CO-C-3301

CO-YS-8690G
13 COYS8690G-PS2-13/COHTCP05-TB1205-64
14 COYS8690G-PS1-14/COHTCP05-TB1205-65

CO ASH 8695A
NC COASH8695A-NC/COEJB2100-TB1-1 1
COM COASH8695A-COM/COEJB2100-TB1-2 2
L COASH8695A-L/XXXXXX-XX 1
N COASH8695A-N/XXXXXX-XX 2

CO-C-3710
1 COASH8695A-NC/COEJB2100-TB1-1
2 COASH8695A-COM/COEJB2100-TB1-2

NOTES 5 & 6

CO-P-3710

CO-EJB-2100
TB-1
1
2

PART OF CABLE CO-C-1685

COEJB2100-TB1-1/COHTCP05-TB1205-66 1
COEJB2100-TB1-2/COHTCP05-TB1205-67 2

1 COEJB2100-TB1-1/COHTCP05-TB1205-66
2 COEJB2100-TB1-2/COHTCP05-TB1205-67

TO TBDC
4663-05-03-SC-403
POWER SUPPLY

0VDC TBDC(-)-5/TB1205-68
+24VDC TBDC(+)-5/TB1205-66

0VDC +24VDC

CO-HTCP-05
TB-1205

1 COMCC02-10FC-18/COHTCP05-TB1205-35
2 COMCC02-10FC-19/COHTCP05-TB1205-36
3 COMCC02-10FC-14/COHTCP05-TB1205-37
4 COMCC02-10FC-15/COHTCP05-TB1205-38
5 COMCC02-10FH-18/COHTCP05-TB1205-39
6 COMCC02-10FH-19/COHTCP05-TB1205-40
7 COMCC02-10FH-14/COHTCP05-TB1205-41
8 COMCC02-10FH-15/COHTCP05-TB1205-40
9 COMCC02-9FC-18/COHTCP05-TB1205-43
10 COMCC02-9FC-19/COHTCP05-TB1205-44
11 COMCC02-9FC-14/COHTCP05-TB1205-45
12 COMCC02-9FC-15/COHTCP05-TB1205-46
COYS8690G-PS2-13/COHTCP05-TB1205-64
COYS8690G-PS1-14/COHTCP05-TB1205-65

35 36 TB1205-36/R12-S5-19
37 38 TB1205-38/R12-S5-20
39 40 TB1205-40/R12-S5-21
41 42 TB1205-42/R12-S5-22
43 44 TB1205-44/R12-S5-23
45 46 TB1205-46/R12-S5-24
47 48 TB1205-48/R12-S5-25
49 50 TB1205-50/R12-S5-26
51 TB1205-51/R12-S5-27
52 53 TB1205-53/R12-S5-28
54 55 TB1205-55/R12-S5-29
57 TB1205-57/R12-S5-30
58 59 TB1205-59/R12-S5-31
60 61 TB1205-61/R12-S5-32
62 63 TB1205-63/R12-S5-33
64 65 TB1205-65/R12-S5-34
66 67 TB1205-67/R12-S5-35
68 TB1205-68/R12-S5-36

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-05

19	INPUT-17	CO-YS-8571 CO-MXM-27-1, PRODUCT TANK MIXER 1 RUN STATUS
20	INPUT-18	CO-HS-8571LR CO-MXM-27-1, PRODUCT TANK MIXER 1 REMOTE STATUS
21	INPUT-19	CO-YS-8572 CO-MXM-27-2, PRODUCT TANK MIXER 2 RUN STATUS
22	INPUT-20	CO-HS-8572LR CO-MXM-27-2, PRODUCT TANK MIXER 2 REMOTE STATUS
23	INPUT-21	CO-YS-8573 CO-MXM-27-3, PRODUCT TANK MIXER 3 RUN STATUS
24	INPUT-22	CO-HS-8573LR CO-MXM-27-3, PRODUCT TANK MIXER 3 REMOTE STATUS
25	INPUT-23	SPARE
26	INPUT-24	SPARE
27	COM	COMMON (INPUT 17-24)
28	INPUT-25	SPARE
29	INPUT-26	SPARE
30	INPUT-27	SPARE
31	INPUT-28	SPARE
32	INPUT-29	SPARE
33	INPUT-30	SPARE
34	INPUT-31	CO-YS-8690G CO-HTCP-05, 24VDC TROUBLE ALARM STATUS
35	INPUT-32	CO-ASH-8695A CO-FSB-21, SMOKE DETECTOR ALARM STATUS
36	COM	COMMON (INPUT 25-32)

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT REQUIRES EXTERNAL 120VAC POWER.
6. OFFICE BUILDING CONTRACTOR TO SUPPLY, INSTALL, MARK AND TERMINATE ALL OFFICE BUILDING WIRING.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0112
UEL# 2012016-1EF-CLD-000-0112-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY

2014-MAR-12

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 05 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-411 | REV 00

TIME - DESIGNFILE

TC_A1_BR.DWG 594X841

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CO-MOV-8428A
CO-ZSC-8428A
30 COMOVB428A-30/COHTCP05-TB1206-1 5
31 COMOVB428A-31/COHTCP05-TB1206-2 6
CO-ZSO-8428A
26 COMOVB428A-26/COHTCP05-TB1206-3 7
27 COMOVB428A-27/COHTCP05-TB1206-4 8
CO-HS-8428AA
L O R
16 COMOVB428A-16/COHTCP05-TB1206-5 9
18 COMOVB428A-18/COHTCP05-TB1206-6 10

CO-MOV-8428B
CO-ZSC-8428B
30 COMOVB428B-30/COHTCP05-TB1206-7 5
31 COMOVB428B-31/COHTCP05-TB1206-8 6
CO-ZSO-8428B
26 COMOVB428B-26/COHTCP05-TB1206-9 7
27 COMOVB428B-27/COHTCP05-TB1206-10 8
CO-HS-8428BA
L O R
16 COMOVB428B-16/COHTCP05-TB1206-11 9
18 COMOVB428B-18/COHTCP05-TB1206-12 10

CO-MOV-8428C
CO-ZSC-8428C
30 COMOVB428C-30/COHTCP05-TB1206-13 5
31 COMOVB428C-31/COHTCP05-TB1206-14 6
CO-ZSO-8428C
26 COMOVB428C-26/COHTCP05-TB1206-15 7
27 COMOVB428C-27/COHTCP05-TB1206-16 8
CO-HS-8428CA
L O R
16 COMOVB428C-16/COHTCP05-TB1206-18 9
18 COMOVB428C-18/COHTCP05-TB1206-19 10

CO-MOV-8428D
CO-ZSC-8428D
30 COMOVB428D-30/COHTCP05-TB1206-20 5
31 COMOVB428D-31/COHTCP05-TB1206-21 6
CO-ZSO-8428D
26 COMOVB428D-26/COHTCP05-TB1206-22 7
27 COMOVB428D-27/COHTCP05-TB1206-23 8
CO-HS-8428DA
L O R
16 COMOVB428D-16/COHTCP05-TB1206-24 9
18 COMOVB428D-18/COHTCP05-TB1206-25 10

CO-MOV-8428E
CO-ZSC-8428E
30 COMOVB428E-30/COHTCP05-TB1206-26 5
31 COMOVB428E-31/COHTCP05-TB1206-27 6
CO-ZSO-8428E
26 COMOVB428E-26/COHTCP05-TB1206-28 7
27 COMOVB428E-27/COHTCP05-TB1206-29 8
CO-HS-8428EA
L O R
16 COMOVB428E-16/COHTCP05-TB1206-30 9
18 COMOVB428E-18/COHTCP05-TB1206-31 10

CO LSH 8584
NC COLSH8584-NC/COUB282-TB1-7 1
COM COLSH8584-COM/COUB282-TB1-8 2
L1 COLSH8584-L1/COEJB282-TB1-2 1
L2 COLSH8584-L2/COEJB282-TB1-6 2

PART OF CABLE CO-C-1356
PART OF CABLE CO-C-1357
PART OF CABLE CO-C-1358
PART OF CABLE CO-C-1359
PART OF CABLE CO-C-1360
PART OF CABLE CO-I-1365

CO-I-1368
1 COLSH8584-NC/COUB282-TB1-7
2 COLSH8584-COM/COUB282-TB1-8
NOTE 5
CO-P-1368

CO-IJB-28-2
TB1-7 COUB282-TB1-7/COHTCP05-TB1206-32
TB1-8 COUB282-TB1-8/COHTCP05-TB1206-33
PR.3 COUB282-TB1-7/COHTCP05-TB1206-32
COUB282-TB1-8/COHTCP05-TB1206-33

CO-HTCP-05 TB-1206

5 COMOVB428A-30/COHTCP05-TB1206-1	1	TB1206-2/R12-S6-1	
6 COMOVB428A-31/COHTCP05-TB1206-2	2		
7 COMOVB428A-26/COHTCP05-TB1206-3	3	TB1206-4/R12-S6-2	
8 COMOVB428A-27/COHTCP05-TB1206-4	4		
9 COMOVB428A-16/COHTCP05-TB1206-5	5	TB1206-6/R12-S6-3	
10 COMOVB428A-18/COHTCP05-TB1206-6	6		
5 COMOVB428B-30/COHTCP05-TB1206-7	7	TB1206-8/R12-S6-4	
6 COMOVB428B-31/COHTCP05-TB1206-8	8		
7 COMOVB428B-26/COHTCP05-TB1206-9	9	TB1206-10/R12-S6-5	
8 COMOVB428B-27/COHTCP05-TB1206-10	10		
9 COMOVB428B-16/COHTCP05-TB1206-11	11	TB1206-12/R12-S6-6	
10 COMOVB428B-18/COHTCP05-TB1206-12	12		
5 COMOVB428C-30/COHTCP05-TB1206-13	13	TB1206-14/R12-S6-7	
6 COMOVB428C-31/COHTCP05-TB1206-14	14		
7 COMOVB428C-26/COHTCP05-TB1206-15	15	TB1206-16/R12-S6-8	
8 COMOVB428C-27/COHTCP05-TB1206-16	16		
	17	TB1206-17/R12-S6-9	
9 COMOVB428C-16/COHTCP05-TB1206-18	18	TB1206-19/R12-S6-10	
10 COMOVB428C-18/COHTCP05-TB1206-19	19		
5 COMOVB428D-30/COHTCP05-TB1206-20	20	TB1206-21/R12-S6-11	
6 COMOVB428D-31/COHTCP05-TB1206-21	21		
7 COMOVB428D-26/COHTCP05-TB1206-22	22	TB1206-23/R12-S6-12	
8 COMOVB428D-27/COHTCP05-TB1206-23	23		
9 COMOVB428D-16/COHTCP05-TB1206-24	24	TB1206-25/R12-S6-13	
10 COMOVB428D-18/COHTCP05-TB1206-25	25		
5 COMOVB428E-30/COHTCP05-TB1206-26	26	TB1206-27/R12-S6-14	
6 COMOVB428E-31/COHTCP05-TB1206-27	27		
7 COMOVB428E-26/COHTCP05-TB1206-28	28	TB1206-29/R12-S6-15	
8 COMOVB428E-27/COHTCP05-TB1206-29	29		
9 COMOVB428E-16/COHTCP05-TB1206-30	30	TB1206-31/R12-S6-16	
10 COMOVB428E-18/COHTCP05-TB1206-31	31		
32	32	TB1206-33/R12-S6-17	
33	33		
34		TB1206-34/R12-S6-18	

0VDC +24VDC

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-06

1	INPUT-1	CO-ZSC-8428A CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428A
2	INPUT-2	CO-ZSO-8428A CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428A
3	INPUT-3	CO-HS-8428AA CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428A
4	INPUT-4	CO-ZSC-8428B CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428B
5	INPUT-5	CO-ZSO-8428B CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428B
6	INPUT-6	CO-HS-8428BA CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428B
7	INPUT-7	CO-ZSC-8428C CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428C
8	INPUT-8	CO-ZSO-8428C CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428C
9	COM	COMMON (INPUT 1-8)
10	INPUT-9	CO-HS-8428CA CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428C
11	INPUT-10	CO-ZSC-8428D CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428D
12	INPUT-11	CO-ZSO-8428D CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428D
13	INPUT-12	CO-HS-8428DA CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428D
14	INPUT-13	CO-ZSC-8428E CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428E
15	INPUT-14	CO-ZSO-8428E CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428E
16	INPUT-15	CO-HS-8428EA CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428E
17	INPUT-16	CO-LSH-8584 CO-TK-28, LEAK DETECTION LEVEL SWITCH HIGH ALARM
18	COM	COMMON (INPUT 9-16)

CONTINUES ON DWG. 4663-05-03-SC-413

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT REQUIRES EXTERNAL 120VAC POWER. SEE DRAWING 4663-06-02-07-184.
6. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0113
UEL# 2012016-1EF-CLD-000-0113-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-MAR-12

REV. NO. DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

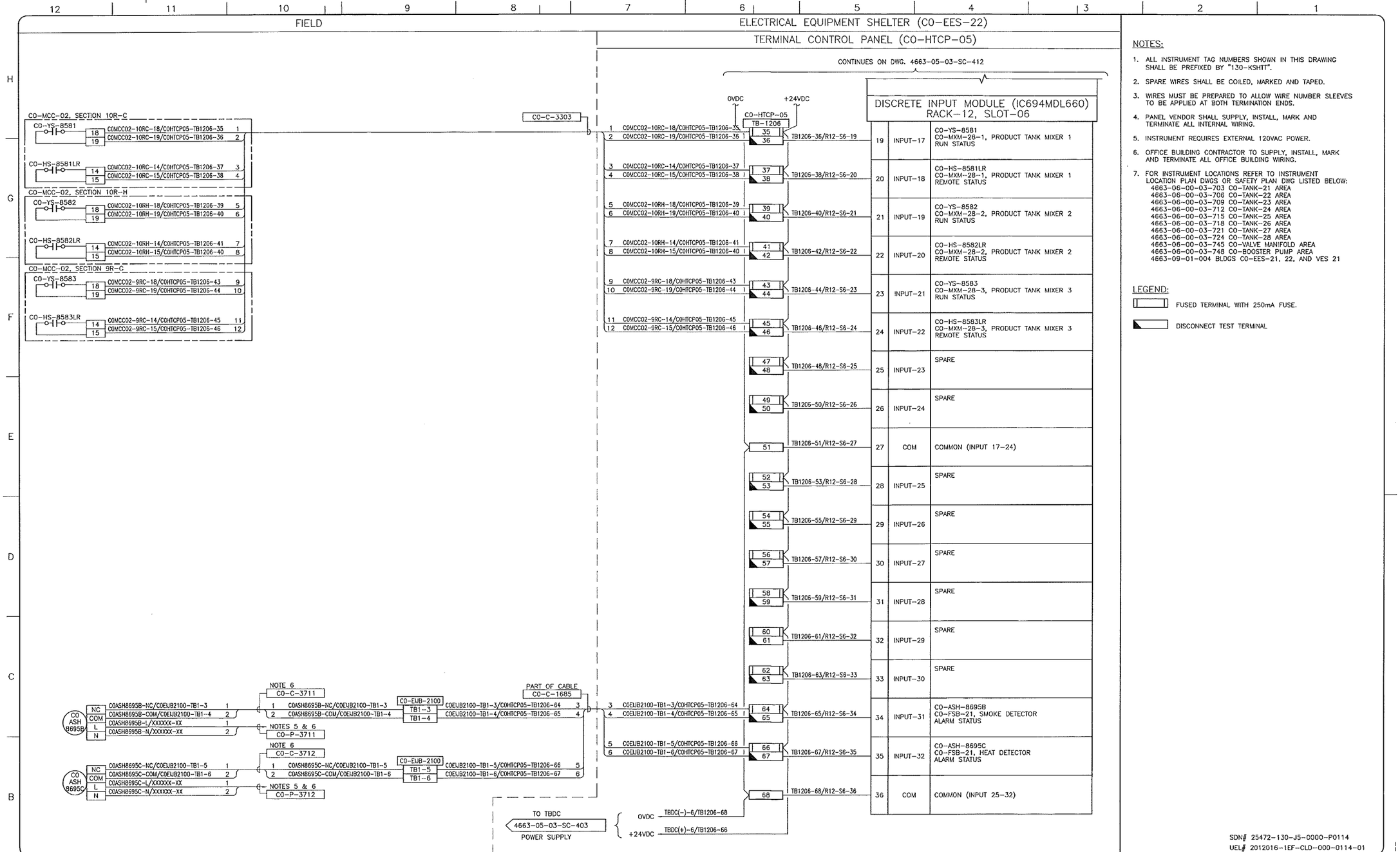
FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 06
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-412 | REV 00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT REQUIRES EXTERNAL 120VAC POWER.
6. OFFICE BUILDING CONTRACTOR TO SUPPLY, INSTALL, MARK AND TERMINATE ALL OFFICE BUILDING WIRING.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0114
UEL# 2012016-1EF-CLD-000-0114-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	HRM	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-MAR-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 06 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-413 | REV 00

TC_A1_BR.DWG 594X841

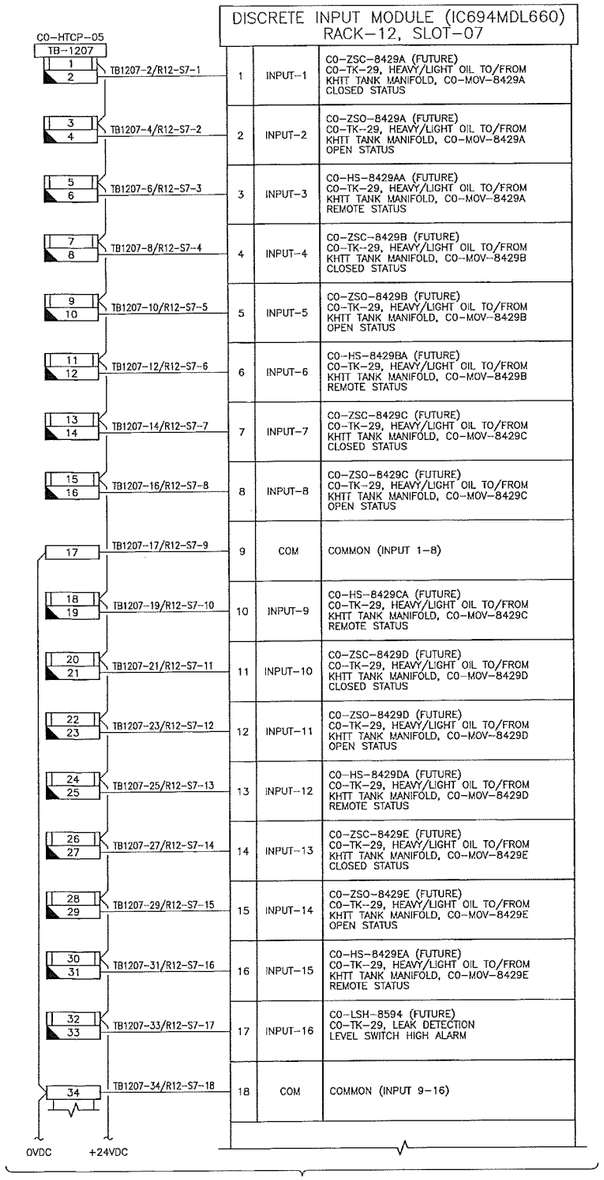
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TIME — DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)



CONTINUES ON DWG. 4663-05-03-SC-415

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND YES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0115
UEL# 2012016-1EF-CLD-000-0115-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA
CHARLES DOUGLAS BRADY
2014-MAR-12

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

PM # 4663	CHAINAGE:	DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 07
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S.	DRAWING No 4663-05-03-SC-414	REV 00

TIME-DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CONTINUES ON DWG. 4663-05-03-SC-414

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-07

19	INPUT-17	CO-YS-8591 (FUTURE) CO-MXM-29-1, PRODUCT TANK MIXER 1 RUN STATUS	TB1207-36/R12-S7-19
20	INPUT-18	CO-HS-8591LR (FUTURE) CO-MXM-29-1, PRODUCT TANK MIXER 1 REMOTE STATUS	TB1207-38/R12-S7-20
21	INPUT-19	CO-YS-8592 (FUTURE) CO-MXM-29-2, PRODUCT TANK MIXER 2 RUN STATUS	TB1207-40/R12-S7-21
22	INPUT-20	CO-HS-8592LR (FUTURE) CO-MXM-29-2, PRODUCT TANK MIXER 2 REMOTE STATUS	TB1207-42/R12-S7-22
23	INPUT-21	CO-YS-8593 (FUTURE) CO-MXM-29-3, PRODUCT TANK MIXER 3 RUN STATUS	TB1207-44/R12-S7-23
24	INPUT-22	CO-HS-8593LR (FUTURE) CO-MXM-29-3, PRODUCT TANK MIXER 3 REMOTE STATUS	TB1207-46/R12-S7-24
25	INPUT-23	SPARE	TB1207-48/R12-S7-25
26	INPUT-24	SPARE	TB1207-50/R12-S7-26
27	COM	COMMON (INPUT 17-24)	TB1207-51/R12-S7-27
28	INPUT-25	SPARE	TB1207-53/R12-S7-28
29	INPUT-26	SPARE	TB1207-55/R12-S7-29
30	INPUT-27	SPARE	TB1207-57/R12-S7-30
31	INPUT-28	SPARE	TB1207-59/R12-S7-31
32	INPUT-29	SPARE	TB1207-61/R12-S7-32
33	INPUT-30	SPARE	TB1207-63/R12-S7-33
34	INPUT-31	CO-ASH-8695D CO-FSB-21, HEAT DETECTOR ALARM STATUS	TB1207-65/R12-S7-34
35	INPUT-32	CO-YS-8695A CO-FSB-21, INTRUSION ALARM STATUS	TB1207-67/R12-S7-35
36	COM	COMMON (INPUT 25-32)	TB1207-68/R12-S7-36

OVDC +24VDC

CO-HTCP-05 TB-1207

35 36 TB1207-36/R12-S7-19
37 38 TB1207-38/R12-S7-20
39 40 TB1207-40/R12-S7-21
41 42 TB1207-42/R12-S7-22
43 44 TB1207-44/R12-S7-23
45 46 TB1207-46/R12-S7-24
47 48 TB1207-48/R12-S7-25
49 50 TB1207-50/R12-S7-26
51 TB1207-51/R12-S7-27
52 53 TB1207-53/R12-S7-28
54 55 TB1207-55/R12-S7-29
56 57 TB1207-57/R12-S7-30
58 59 TB1207-59/R12-S7-31
60 61 TB1207-61/R12-S7-32
62 63 TB1207-63/R12-S7-33
64 65 TB1207-65/R12-S7-34
66 67 TB1207-67/R12-S7-35
68 TB1207-68/R12-S7-36

CO ASH 8695D
NC COASH8695D-NC/COEJB2100-TB1-7 1
COM COASH8695D-COM/COEJB2100-TB1-8 2
L COASH8695D-L/XXXXXX-XX 1
N COASH8695D-N/XXXXXX-XX 2

NOTE 6 CO-C-3713
NOTES 5 & 6 CO-P-3713

COASH8695D-NC/COEJB2100-TB1-7 CO-EJB-2100 TB1-7
COASH8695D-COM/COEJB2100-TB1-8 CO-EJB-2100 TB1-8

PART OF CABLE CO-C-1685

COEJB2100-TB1-7/COHTCP05-TB1207-64 1
COEJB2100-TB1-8/COHTCP05-TB1207-65 2

1 COEJB2100-TB1-9/COHTCP05-TB1207-64
2 COEJB2100-TB1-10/COHTCP05-TB1207-65
3 COEJB2100-TB1-9/COHTCP05-TB1207-66
4 COEJB2100-TB1-10/COHTCP05-TB1207-67

CO-YS-8695A
NC COYS8695A-NC/COEJB2100-TB1-9 1
COM COYS8695A-COM/COEJB2100-TB1-10 2

NOTE 6 CO-C-3714

COYS8695A-NC/COEJB2100-TB1-9 CO-EJB-2100 TB1-9
COYS8695A-COM/COEJB2100-TB1-10 CO-EJB-2100 TB1-10

COEJB2100-TB1-9/COHTCP05-TB1207-66 3
COEJB2100-TB1-10/COHTCP05-TB1207-67 4

TO TBDC 4663-05-03-SC-403 POWER SUPPLY

OVDC TBDC(-)-7/TB1207-68
+24VDC TBDC(+)-7/TB1207-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT REQUIRES EXTERNAL 120VAC POWER.
6. OFFICE BUILDING CONTRACTOR TO SUPPLY, INSTALL, MARK AND TERMINATE ALL OFFICE BUILDING WIRING.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0116
UEL# 2012016-1EF-CLD-000-0116-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-MAR-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 07 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-415 | REV 00

TIME-DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CO-HTCP-05
TB-1208

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-08

1 / 2	TB1208-2/R12-S8-1	1	INPUT-1	CO-ZSC-8430A (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430A CLOSED STATUS
3 / 4	TB1208-4/R12-S8-2	2	INPUT-2	CO-ZSO-8430A (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430A OPEN STATUS
5 / 6	TB1208-6/R12-S8-3	3	INPUT-3	CO-HS-8430AA (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430A REMOTE STATUS
7 / 8	TB1208-8/R12-S8-4	4	INPUT-4	CO-ZSC-8430B (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430B CLOSED STATUS
9 / 10	TB1208-10/R12-S8-5	5	INPUT-5	CO-ZSO-8430B (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430B OPEN STATUS
11 / 12	TB1208-12/R12-S8-6	6	INPUT-6	CO-HS-8430BA (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430B REMOTE STATUS
13 / 14	TB1208-14/R12-S8-7	7	INPUT-7	CO-ZSC-8430C (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430C CLOSED STATUS
15 / 16	TB1208-16/R12-S8-8	8	INPUT-8	CO-ZSO-8430C (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430C OPEN STATUS
17	TB1208-17/R12-S8-9	9	COM	COMMON (INPUT 1-8)
18 / 19	TB1208-19/R12-S8-10	10	INPUT-9	CO-HS-8430CA (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430C REMOTE STATUS
20 / 21	TB1208-21/R12-S8-11	11	INPUT-10	CO-ZSC-8430D (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430D CLOSED STATUS
22 / 23	TB1208-23/R12-S8-12	12	INPUT-11	CO-ZSO-8430D (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430D OPEN STATUS
24 / 25	TB1208-25/R12-S8-13	13	INPUT-12	CO-HS-8430DA (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430D REMOTE STATUS
26 / 27	TB1208-27/R12-S8-14	14	INPUT-13	CO-ZSC-8430E (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430E CLOSED STATUS
28 / 29	TB1208-29/R12-S8-15	15	INPUT-14	CO-ZSO-8430E (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430E OPEN STATUS
30 / 31	TB1208-31/R12-S8-16	16	INPUT-15	CO-HS-8430EA (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430E REMOTE STATUS
32 / 33	TB1208-33/R12-S8-17	17	INPUT-16	CO-LSH-8504 (FUTURE) CO-TK-30, LEAK DETECTION LEVEL SWITCH HIGH ALARM
34	TB1208-34/R12-S8-18	18	COM	COMMON (INPUT 9-16)

0VDC +24VDC

CONTINUES ON DWG. 4663-05-03-SC-417

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
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   4663-06-00-03-706 CO-TANK-22 AREA
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   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0117
UEL# 2012016-1EF-CLD-000-0117-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DWC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY

2014-MAR-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
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The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/12 SLOT 08
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-416	00

TIME DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CONTINUES ON DWG. 4663-05-03-SC-416

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-08

0VDC +24VDC

CO-HTCP-05
TB-1208

35/36	TB1208-36/R12-S8-19	19	INPUT-17	CO-YS-8601 (FUTURE) CO-MXM-30-1, PRODUCT TANK MIXER 1 RUN STATUS
37/38	TB1208-38/R12-S8-20	20	INPUT-18	CO-HS-8601LR (FUTURE) CO-MXM-30-1, PRODUCT TANK MIXER 1 REMOTE STATUS
39/40	TB1208-40/R12-S8-21	21	INPUT-19	CO-YS-8602 (FUTURE) CO-MXM-30-2, PRODUCT TANK MIXER 2 RUN STATUS
41/42	TB1208-42/R12-S8-22	22	INPUT-20	CO-HS-8602LR (FUTURE) CO-MXM-30-2, PRODUCT TANK MIXER 2 REMOTE STATUS
43/44	TB1208-44/R12-S8-23	23	INPUT-21	CO-YS-8603 (FUTURE) CO-MXM-30-3, PRODUCT TANK MIXER 3 RUN STATUS
45/46	TB1208-46/R12-S8-24	24	INPUT-22	CO-HS-8603LR (FUTURE) CO-MXM-30-3, PRODUCT TANK MIXER 3 REMOTE STATUS
47/48	TB1208-48/R12-S8-25	25	INPUT-23	SPARE
49/50	TB1208-50/R12-S8-26	26	INPUT-24	SPARE
51	TB1208-51/R12-S8-27	27	COM	COMMON (INPUT 17-24)
52/53	TB1208-53/R12-S8-28	28	INPUT-25	SPARE
54/55	TB1208-55/R12-S8-29	29	INPUT-26	SPARE
56/57	TB1208-57/R12-S8-30	30	INPUT-27	SPARE
58/59	TB1208-59/R12-S8-31	31	INPUT-28	SPARE
60/61	TB1208-61/R12-S8-32	32	INPUT-29	SPARE
62/63	TB1208-63/R12-S8-33	33	INPUT-30	SPARE
64/65	TB1208-65/R12-S8-34	34	INPUT-31	CO-YS-8695B CO-FSB-21, INTRUSION ALARM STATUS
66/67	TB1208-67/R12-S8-35	35	INPUT-32	CO-LSHH-8695F CO-FSB-21, SEWAGE TANK LEVEL HIGH HIGH
68	TB1208-68/R12-S8-36	36	COM	COMMON (INPUT 25-32)

CO-YS-8695B
NC: CO0YS8695B-NC/C0EJB2100-TB1-11 1
COM: CO0YS8695B-COM/C0EJB2100-TB1-12 2
NOTE 5 CO-C-3715
1 C0YS8695B-NC/C0EJB2100-TB1-11 — CO-EJB-2100 TB1-11
2 C0YS8695B-COM/C0EJB2100-TB1-12 — CO-EJB-2100 TB1-12
PART OF CABLE CO-C-1685
C0EJB2100-TB1-11/C0HTCP05-TB1208-64 1
C0EJB2100-TB1-12/C0HTCP05-TB1208-65 2
1 C0EJB2100-TB1-11/C0HTCP05-TB1208-64
2 C0EJB2100-TB1-12/C0HTCP05-TB1208-65

CO-LSHH-8695F
NC: C0LSHH8695F-NC/C0EJB2100-TB1-21 1
COM: C0LSHH8695F-COM/C0EJB2100-TB1-22 2
NOTE 5 CO-C-3717
1 C0LSHH8695F-NC/C0EJB2100-TB1-21 — CO-EJB-2100 TB1-21
2 C0LSHH8695F-COM/C0EJB2100-TB1-22 — CO-EJB-2100 TB1-22
PART OF CABLE CO-C-1686
C0EJB2100-TB1-21/C0HTCP05-TB1208-66 1
C0EJB2100-TB1-22/C0HTCP05-TB1208-67 2
1 C0EJB2100-TB1-21/C0HTCP05-TB1208-66
2 C0EJB2100-TB1-22/C0HTCP05-TB1208-67

TO TBDC
4663-05-03-SC-403
POWER SUPPLY
0VDC TBDC(-)-8/TB1208-68
+24VDC TBDC(+)-8/TB1208-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. OFFICE BUILDING CONTRACTOR TO SUPPLY, INSTALL, MARK AND TERMINATE ALL OFFICE BUILDING WIRING.
6. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-05-00-03-703 CO-TANK-21 AREA
   4663-05-00-03-706 CO-TANK-22 AREA
   4663-05-00-03-709 CO-TANK-23 AREA
   4663-05-00-03-712 CO-TANK-24 AREA
   4663-05-00-03-715 CO-TANK-25 AREA
   4663-05-00-03-718 CO-TANK-26 AREA
   4663-05-00-03-721 CO-TANK-27 AREA
   4663-05-00-03-724 CO-TANK-28 AREA
   4663-05-00-03-745 CO-VALVE MANIFOLD AREA
   4663-05-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0118
UEL# 2012016-1EF-CLD-000-0118-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER JAMES DOOLEY ALBERTA
2014-MAR-12

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/12 SLOT 08 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-417	00

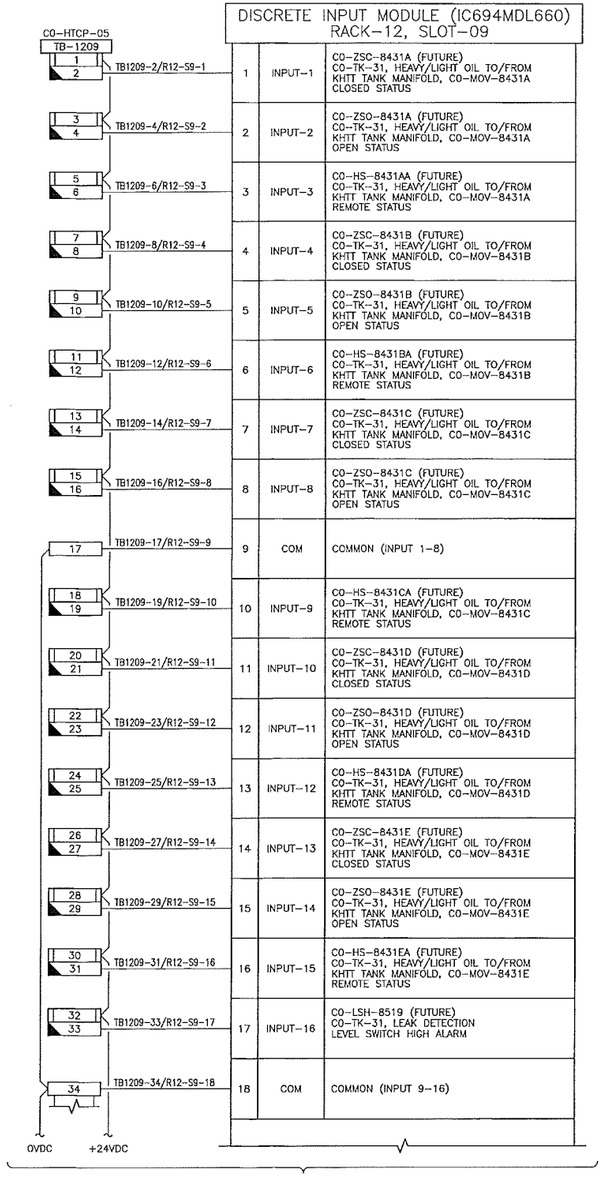
TIME-----DESIGNFILE

TC_A1_BR.DWG 594X841

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)



CONTINUES ON DWG. 4663-05-03-SC-419

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
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   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0119
UEL# 2012016-1EF-CLD-000-0119-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DVC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY

2014-MAR-12

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.

PERMIT NUMBER: P 5508

The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 09 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-418 | REV 00

TIME — DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CONTINUES ON DWG. 4663-05-03-SC-418

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-09

0VDC +24VDC

CO-HTCP-05
TB-1209

35/36	TB1209-36/R12-S9-19	19	INPUT-17	CO-YS-8611 (FUTURE) CO-MXM-31-1, PRODUCT TANK MIXER 1 RUN STATUS
37/38	TB1209-38/R12-S9-20	20	INPUT-18	CO-HS-8611LR (FUTURE) CO-MXM-31-1, PRODUCT TANK MIXER 1 REMOTE STATUS
39/40	TB1209-40/R12-S9-21	21	INPUT-19	CO-YS-8612 (FUTURE) CO-MXM-31-2, PRODUCT TANK MIXER 2 RUN STATUS
41/42	TB1209-42/R12-S9-22	22	INPUT-20	CO-HS-8612LR (FUTURE) CO-MXM-31-2, PRODUCT TANK MIXER 2 REMOTE STATUS
43/44	TB1209-44/R12-S9-23	23	INPUT-21	CO-YS-8613 (FUTURE) CO-MXM-31-3, PRODUCT TANK MIXER 3 RUN STATUS
45/46	TB1209-46/R12-S9-24	24	INPUT-22	CO-HS-8613LR (FUTURE) CO-MXM-31-3, PRODUCT TANK MIXER 3 REMOTE STATUS
47/48	TB1209-48/R12-S9-25	25	INPUT-23	SPARE
49/50	TB1209-50/R12-S9-26	26	INPUT-24	SPARE
51	TB1209-51/R12-S9-27	27	COM	COMMON (INPUT 17-24)
52/53	TB1209-53/R12-S9-28	28	INPUT-25	SPARE
54/55	TB1209-55/R12-S9-29	29	INPUT-26	SPARE
56/57	TB1209-57/R12-S9-30	30	INPUT-27	SPARE
58/59	TB1209-59/R12-S9-31	31	INPUT-28	SPARE
60/61	TB1209-61/R12-S9-32	32	INPUT-29	SPARE
62/63	TB1209-63/R12-S9-33	33	INPUT-30	SPARE
64/65	TB1209-65/R12-S9-34	34	INPUT-31	SPARE
66/67	TB1209-67/R12-S9-35	35	INPUT-32	SPARE
68	TB1209-68/R12-S9-36	36	COM	COMMON (INPUT 25-32)

TO TBDC
4663-05-03-SC-403
POWER SUPPLY

0VDC → TBDC(-)-9/TB1209-68
+24VDC → TBDC(+)-9/TB1209-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
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   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0120
UEL# 2012016-1EF-CLD-000-0120-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	2197104	BEM	HHM	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY
2014-MAR-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 09
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-419 | REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TIME---DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-10

CO-HTCP-05
TB-1210

1, 2	TB1210-2/R12-S10-1	1	INPUT-1	CO-ZSC-8432A (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432A CLOSED STATUS
3, 4	TB1210-4/R12-S10-2	2	INPUT-2	CO-ZSO-8432A (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432A OPEN STATUS
5, 6	TB1210-6/R12-S10-3	3	INPUT-3	CO-HS-8432AA (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432A REMOTE STATUS
7, 8	TB1210-8/R12-S10-4	4	INPUT-4	CO-ZSC-8432B (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432B CLOSED STATUS
9, 10	TB1210-10/R12-S10-5	5	INPUT-5	CO-ZSO-8432B (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432B OPEN STATUS
11, 12	TB1210-12/R12-S10-6	6	INPUT-6	CO-HS-8432BA (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432B REMOTE STATUS
13, 14	TB1210-14/R12-S10-7	7	INPUT-7	CO-ZSC-8432C (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432C CLOSED STATUS
15, 16	TB1210-16/R12-S10-8	8	INPUT-8	CO-ZSO-8432C (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432C OPEN STATUS
17	TB1210-17/R12-S10-9	9	COM	COMMON (INPUT 1-8)
18, 19	TB1210-19/R12-S10-10	10	INPUT-9	CO-HS-8432CA (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432C REMOTE STATUS
20, 21	TB1210-21/R12-S10-11	11	INPUT-10	CO-ZSC-8432D (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432D CLOSED STATUS
22, 23	TB1210-23/R12-S10-12	12	INPUT-11	CO-ZSO-8432D (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432D OPEN STATUS
24, 25	TB1210-25/R12-S10-13	13	INPUT-12	CO-HS-8432DA (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432D REMOTE STATUS
26, 27	TB1210-27/R12-S10-14	14	INPUT-13	CO-ZSC-8432E (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432E CLOSED STATUS
28, 29	TB1210-29/R12-S10-15	15	INPUT-14	CO-ZSO-8432E (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432E OPEN STATUS
30, 31	TB1210-31/R12-S10-16	16	INPUT-15	CO-HS-8432EA (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432E REMOTE STATUS
32, 33	TB1210-33/R12-S10-17	17	INPUT-16	CO-LSH-8529 (FUTURE) CO-TK-32, LEAK DETECTION LEVEL SWITCH HIGH ALARM
34	TB1210-34/R12-S10-18	18	COM	COMMON (INPUT 9-16)

0VDC +24VDC

CONTINUES ON DWG. 4663-05-03-SC-421

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0121
UEL# 2012016-1EF-CLD-000-0121-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No.	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-MAR-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

PA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/12 SLOT 10 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-420	00

TIME ---- DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CONTINUES ON DWG. 4663-05-03-SC-420

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-10

0VDC +24VDC

CO-HTCP-05
TB-1210

35/36	TB1210-36/R12-S10-19	19	INPUT-17	CO-YS-8621 (FUTURE) CO-MXM-32-1, PRODUCT TANK MIXER 1 RUN STATUS
37/38	TB1210-38/R12-S10-20	20	INPUT-18	CO-HS-8621LR (FUTURE) CO-MXM-32-1, PRODUCT TANK MIXER 1 REMOTE STATUS
39/40	TB1210-40/R12-S10-21	21	INPUT-19	CO-YS-8622 (FUTURE) CO-MXM-32-2, PRODUCT TANK MIXER 2 RUN STATUS
41/42	TB1210-42/R12-S10-22	22	INPUT-20	CO-HS-8622LR (FUTURE) CO-MXM-32-2, PRODUCT TANK MIXER 2 REMOTE STATUS
43/44	TB1210-44/R12-S10-23	23	INPUT-21	CO-YS-8623 (FUTURE) CO-MXM-32-3, PRODUCT TANK MIXER 3 RUN STATUS
45/46	TB1210-46/R12-S10-24	24	INPUT-22	CO-HS-8623LR (FUTURE) CO-MXM-32-3, PRODUCT TANK MIXER 3 REMOTE STATUS
47/48	TB1210-48/R12-S10-25	25	INPUT-23	SPARE
49/50	TB1210-50/R12-S10-26	26	INPUT-24	SPARE
51	TB1210-51/R12-S10-27	27	COM	COMMON (INPUT 17-24)
52/53	TB1210-53/R12-S10-28	28	INPUT-25	SPARE
54/55	TB1210-55/R12-S10-29	29	INPUT-26	SPARE
56/57	TB1210-57/R12-S10-30	30	INPUT-27	SPARE
58/59	TB1210-59/R12-S10-31	31	INPUT-28	SPARE
60/61	TB1210-61/R12-S10-32	32	INPUT-29	CO-ZSC-8927 CO-TK-27, FIRE FOAM SOLUTION VALVE CO-MOV-8927 CLOSED STATUS
62/63	TB1210-63/R12-S10-33	33	INPUT-30	CO-ZSO-8927 CO-TK-27, FIRE FOAM SOLUTION VALVE CO-MOV-8927 OPEN STATUS
64/65	TB1210-65/R12-S10-34	34	INPUT-31	CO-ZSO-8928 CO-TK-28, FIRE FOAM SOLUTION VALVE CO-MOV-8928 OPEN STATUS
66/67	TB1210-67/R12-S10-35	35	INPUT-32	CO-ZSC-8928 CO-TK-28, FIRE FOAM SOLUTION VALVE CO-MOV-8928 CLOSED STATUS
68	TB1210-68/R12-S10-36	36	COM	COMMON (INPUT 25-32)

CO-MOV-8927
- CO-ZSC-8927: 20/21 — COMOV8927-D-20/COMCC06-TB27-4 (4) / COMOV8927-D-21/COMCC06-TB27-5 (5)
- CO-ZSO-8927: 24/25 — COMOV8927-D-24/COMCC06-TB27-6 (6) / COMOV8927-D-25/COMCC06-TB27-7 (7)

CO-MOV-8928
- CO-ZSC-8928: 20/21 — COMOV8928-D-20/COMCC06-TB28-4 (4) / COMOV8928-D-21/COMCC06-TB28-5 (5)
- CO-ZSO-8928: 24/25 — COMOV8928-D-24/COMCC06-TB28-6 (6) / COMOV8928-D-25/COMCC06-TB28-7 (7)

REFER DWG #4663-06-02-07-322

PART OF CABLE CO-C-1311

PART OF CABLE CO-C-1361

CO-MCC-06
CO-EES-22

REFER DWG #
4663-06-02-07-322
4663-06-02-06-411
4663-06-02-06-412

PART OF CABLE CO-C-3555

1	COMCC06-TB27-30/COHTCP05-TB1210-60	60/61
2	COMCC06-TB27-31/COHTCP05-TB1210-61	
3	COMCC06-TB27-36/COHTCP05-TB1210-62	62/63
4	COMCC06-TB27-37/COHTCP05-TB1210-63	
5	COMCC06-TB28-30/COHTCP05-TB1210-64	64/65
6	COMCC06-TB28-31/COHTCP05-TB1210-65	
7	COMCC06-TB28-36/COHTCP05-TB1210-66	66/67
8	COMCC06-TB28-37/COHTCP05-TB1210-67	

TO TBDC
4663-05-03-SC-403
POWER SUPPLY

0VDC TBDC(-)-10/TB1210-68

+24VDC TBDC(+)-10/TB1210-66

NOTES:

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   - 4663-06-00-03-706 CO-TANK-22 AREA
   - 4663-06-00-03-709 CO-TANK-23 AREA
   - 4663-06-00-03-712 CO-TANK-24 AREA
   - 4663-06-00-03-715 CO-TANK-25 AREA
   - 4663-06-00-03-718 CO-TANK-26 AREA
   - 4663-06-00-03-721 CO-TANK-27 AREA
   - 4663-06-00-03-724 CO-TANK-28 AREA
   - 4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   - 4663-06-00-03-748 CO-BOOSTER PUMP AREA
   - 4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0122
UEL# 2012016-1EF-CLD-000-0122-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOODY ALBERTA
2014-MAR-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
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PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/12 SLOT 10 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-421	00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO–EES–22)

TERMINAL CONTROL PANEL (CO–HTCP–05)

CO–ASH–8690A
NC — COASH8690A–NC/COHTCP05–TB1211–1 1
COM — COASH8690A–COM/COHTCP05–TB1211–2 2
L — COASH8690A–L/COUACP02–28L 1
N — COASH8690A–N/COUACP02–28N 2
CO–P–3261 — NOTE 5
CO–C–3690 — 1 COASH8690A–NC/COHTCP05–TB1211–1 / 2 COASH8690A–COM/COHTCP05–TB1211–2 — CO–HTCP–05 TB–1211 1 2 — TB1211–2/R12–S11–1

CO–ASH–8690B
NC — COASH8690B–NC/COHTCP05–TB1211–3 1
COM — COASH8690B–COM/COHTCP05–TB1211–4 2
L — COASH8690B–L/COASH8690A–L 1
N — COASH8690B–N/COASH8690A–N 2
CO–P–3262 — NOTE 5
CO–C–3691 — 1 COASH8690B–NC/COHTCP05–TB1211–3 / 2 COASH8690B–COM/COHTCP05–TB1211–4 — 3 4 — TB1211–4/R12–S11–2

CO–ASH–8690C
NC — COASH8690C–NC/COHTCP05–TB1211–5 1
COM — COASH8690C–COM/COHTCP05–TB1211–6 2
L — COASH8690C–L/COASH8690B–L 1
N — COASH8690C–N/COASH8690B–N 2
CO–P–3263 — NOTE 5
CO–C–3692 — 1 COASH8690C–NC/COHTCP05–TB1211–5 / 2 COASH8690C–COM/COHTCP05–TB1211–6 — 5 6 — TB1211–6/R12–S11–3

CO–ASH–8690D
NC — COASH8690D–NC/COHTCP05–TB1211–7 1
COM — COASH8690D–COM/COHTCP05–TB1211–8 2
L — COASH8690D–L/COASH8690C–L 1
N — COASH8690D–N/COASH8690C–N 2
CO–P–3264 — NOTE 5
CO–C–3693 — 1 COASH8690D–NC/COHTCP05–TB1211–7 / 2 COASH8690D–COM/COHTCP05–TB1211–8 — 7 8 — TB1211–8/R12–S11–4

CO–ASH–8690E
NC — COASH8690E–NC/COHTCP05–TB1211–9 1
COM — COASH8690E–COM/COHTCP05–TB1211–10 2
CO–C–3694 — 1 COASH8690E–NC/COHTCP05–TB1211–9 / 2 COASH8690E–COM/COHTCP05–TB1211–10 — 9 10 — TB1211–10/R12–S11–5

CO–ASH–8690F
NC — COASH8690F–NC/COHTCP05–TB1211–11 1
COM — COASH8690F–COM/COHTCP05–TB1211–12 2
CO–C–3695 — 1 COASH8690F–NC/COHTCP05–TB1211–11 / 2 COASH8690F–COM/COHTCP05–TB1211–12 — 11 12 — TB1211–12/R12–S11–6

CO–ASH–8690G
NC — COASH8690G–NC/COHTCP05–TB1211–13 1
COM — COASH8690G–COM/COHTCP05–TB1211–14 2
CO–C–3696 — 1 COASH8690G–NC/COHTCP05–TB1211–13 / 2 COASH8690G–COM/COHTCP05–TB1211–14 — 13 14 — TB1211–14/R12–S11–7

CO–ASH–8690H
NC — COASH8690H–NC/COHTCP05–TB1211–15 1
COM — COASH8690H–COM/COHTCP05–TB1211–16 2
CO–C–3697 — 1 COASH8690H–NC/COHTCP05–TB1211–15 / 2 COASH8690H–COM/COHTCP05–TB1211–16 — 15 16 — TB1211–16/R12–S11–8

CO–TCMP–04
CO–YS–8690C TB–AUX 1 2 — COTCMP04–TBAUX–1/COHTCP05–TB1211–18 1 / COTCMP04–TBAUX–2/COHTCP05–TB1211–19 2
CO–YS–8690D TB–AUX 3 4 — COTCMP04–TBAUX–3/COHTCP05–TB1211–20 3 / COTCMP04–TBAUX–4/COHTCP05–TB1211–21 4
CO–YS–8690E TB–AUX 5 — COTCMP04–TBAUX–5/COHTCP05–TB1211–22 5
TB–AUX 6 — COTCMP04–TBAUX–6/COHTCP05–TB1211–23 6
CO–C–3090 — 1 COTCMP04–TBAUX–1/COHTCP05–TB1211–18 / 2 COTCMP04–TBAUX–2/COHTCP05–TB1211–19 — 17 18 19 — TB1211–17/R12–S11–9 / TB1211–19/R12–S11–10
3 COTCMP04–TBAUX–3/COHTCP05–TB1211–20 / 4 COTCMP04–TBAUX–4/COHTCP05–TB1211–21 — 20 21 — TB1211–21/R12–S11–11
5 COTCMP04–TBAUX–5/COHTCP05–TB1211–22 / 6 COTCMP04–TBAUX–6/COHTCP05–TB1211–23 — 22 23 — TB1211–23/R12–S11–12

CO–CP–22–1
CO–YS–8691A TB–1A 35 36 — COCP221–TB1A–35/COHTCP05–TB1211–24 1 / COCP221–TB1A–36/COHTCP05–TB1211–25 2
CO–YS–8691B TB–1A 11 12 — COCP221–TB1A–11/COHTCP05–TB1211–26 3 / COCP221–TB1A–12/COHTCP05–TB1211–27 4
CO–YS–8661C TB–1A 29 30 — COCP221–TB1A–29/COHTCP05–TB1211–28 5 / COCP221–TB1A–30/COHTCP05–TB1211–29 6
01
PART OF CABLE CO–C–3161
1 COCP221–TB1A–35/COHTCP05–TB1211–24 / 2 COCP221–TB1A–36/COHTCP05–TB1211–25 — 24 25 — TB1211–25/R12–S11–13
01
3 COCP221–TB1A–11/COHTCP05–TB1211–26 / 4 COCP221–TB1A–12/COHTCP05–TB1211–27 — 26 27 — TB1211–27/R12–S11–14
5 COCP221–TB1A–29/COHTCP05–TB1211–28 / 6 COCP221–TB1A–30/COHTCP05–TB1211–29 — 28 29 — TB1211–29/R12–S11–15

PART OF CABLE CO–C–3555
CO–MCC–06 (CO–EES–22)
REFER DWG # 4663–06–02–07–322 4663–06–02–06–413
9 COMCC06–TB29–30/COHTCP05–TB1211–30 / 10 COMCC06–TB29–31/COHTCP05–TB1211–31 — 30 31 — TB1211–31/R12–S11–16
11 COMCC06–TB29–36/COHTCP05–TB1211–32 / 12 COMCC06–TB29–37/COHTCP05–TB1211–33 — 32 33 — TB1211–33/R12–S11–17
34 — TB1211–34/R12–S11–18
0VDC +24VDC

DISCRETE INPUT MODULE (IC694MDL660)
RACK–12, SLOT–11

1	INPUT–1	CO–ASH–8690A CO–EES–22, SMOKE DETECTOR ALARM STATUS
2	INPUT–2	CO–ASH–8690B CO–EES–22, SMOKE DETECTOR ALARM STATUS
3	INPUT–3	CO–ASH–8690C CO–EES–22, SMOKE DETECTOR ALARM STATUS
4	INPUT–4	CO–ASH–8690D CO–EES–22, SMOKE DETECTOR ALARM STATUS
5	INPUT–5	CO–ASH–8690E CO–EES–22, HEAT DETECTOR ALARM STATUS
6	INPUT–6	CO–ASH–8690F CO–EES–22, HEAT DETECTOR ALARM STATUS
7	INPUT–7	CO–ASH–8690G CO–EES–22, HEAT DETECTOR ALARM STATUS
8	INPUT–8	CO–ASH–8690H CO–EES–22, HEAT DETECTOR ALARM STATUS
9	COM	COMMON (INPUT 1–8)
10	INPUT–9	CO–YS–8690C CO–TCMP–04, 24VDC TROUBLE ALARM STATUS
11	INPUT–10	CO–YS–8690D CO–TCMP–04, 12VDC TROUBLE ALARM STATUS
12	INPUT–11	CO–YS–8690E CO–TCMP–04, SW1321 (CONTROL) & SW1331 (RIO) TROUBLE ALARM STATUS
13	INPUT–12	CO–YS–8691A CO–EES–22, HVAC CONTROLLER (CO–CP–22–1) CONTROL POWER STATUS
14	INPUT–13	CO–YS–8691B CO–EES–22, HVAC (CO–HVAC–22–1) MALFUNCTION ALARM STATUS
15	INPUT–14	CO–YS–8691C CO–EES–22, HVAC (CO–HVAC–22–2) MALFUNCTION ALARM STATUS
16	INPUT–15	CO–ZSC–8929 (FUTURE) CO–TK–29 FIRE FOAM SOLUTION VALVE, CO–MOV–8929 CLOSED STATUS
17	INPUT–16	CO–ZSO–8929 (FUTURE) CO–TK–29 FIRE FOAM SOLUTION VALVE, CO–MOV–8929 OPEN STATUS
18	COM	COMMON (INPUT 9–16)

CONTINUES ON DWG. 4663–05–03–SC–423

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130–KSHTI".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT REQUIRES EXTERNAL 120VAC POWER. SEE DRAWING 4663–06–02–07–003.
6. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663–06–00–03–703 CO–TANK–21 AREA
   4663–06–00–03–706 CO–TANK–22 AREA
   4663–06–00–03–709 CO–TANK–23 AREA
   4663–06–00–03–712 CO–TANK–24 AREA
   4663–06–00–03–715 CO–TANK–25 AREA
   4663–06–00–03–718 CO–TANK–26 AREA
   4663–06–00–03–721 CO–TANK–27 AREA
   4663–06–00–03–724 CO–TANK–28 AREA
   4663–06–00–03–745 CO–VALVE MANIFOLD AREA
   4663–06–00–03–748 CO–BOOSTER PUMP AREA
   4663–09–01–004 BLDGS CO–EES–21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

REFERENCE DRAWINGS

DRAWING No	TITLE
–	

REV No	DATE	DESCRIPTION
00	2014–03–07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
01	2014–04–11	RE–ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	2197104	BEM	DMC	HHM	JED	DCB	UPSIDE
	2197104	JAP	PLR	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOCOTA 2014–APR–11

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

SDN# 25472–130–J5–0000–P0123
UEL# 2012016–1EF–CLD–000–0123–01

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO–HTCP–05, PLC–11/12 SLOT 11
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663–05–03–SC–422 | REV 01

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CONTINUES ON DWG. 4663-05-03-SC-422

CO-UPS-02
- CO-YS-8680E PCB19 J2-10 C0UPS02-PCB19-J210/C0HTCP05-TB1211-35 1; J2-11 C0UPS02-PCB19-J211/C0HTCP05-TB1211-36 2
- CO-YS-8680F J2-4 C0UPS02-PCB19-J24/C0HTCP05-TB1211-37 3; J2-6 C0UPS02-PCB19-J26/C0HTCP05-TB1211-38 4
- CO-YS-8680G J2-1 C0UPS02-PCB19-J21/C0HTCP05-TB1211-39 5; J2-2 C0UPS02-PCB19-J22/C0HTCP05-TB1211-40 6
- CO-YS-8680H J3-1 C0UPS02-PCB19-J31/C0HTCP05-TB1211-41 7; J3-2 C0UPS02-PCB19-J32/C0HTCP05-TB1211-42 8

CO-EHTC-03
- CO-YS-8681E TB1 1 C0YS8681E-TB1-1/C0HTCP05-TB1211-43 1; 2 C0YS8681E-TB1-2/C0HTCP05-TB1211-44 2
- NOTE 5

CO-UPS-02
- PCB19 J3-4 C0UPS02-PCB19-J3-4/C0HTCP05-TB1211-45 9
- J3-6
- J3-7 C0UPS02-PCB19-J3-9/C0HTCP05-TB1211-4610
- J3-9

CO-MCC-06 (CO-EES-22)

REFER DWG # 4663-06-02-07-323, 4663-06-02-06-414, 4663-06-02-06-415, 4663-06-02-06-416

CO-CP-21-8 (01)
- CO-YS-8696A TB-4 1 C0CP218-TB4-1/C0EWB2100-TB1-13 1; 2 C0CP218-TB4-2/C0EWB2100-TB1-14 2
- CO-YS-8696B TB-4 3 C0CP218-TB4-3/C0EWB2100-TB1-15 3; 4 C0CP218-TB4-4/C0EWB2100-TB1-16 4

CO-TCMP-05
- CO-YS-8695D TB-AUX 1 C0TCMP05-TBAUX-1/C0EWB2100-TB1-17 1; 2 C0TCMP05-TBAUX-2/C0EWB2100-TB1-18 2
- CO-YS-8695E TB-AUX 3 C0TCMP05-TBAUX-3/C0EWB2100-TB1-19 3; 4 C0TCMP05-TBAUX-4/C0EWB2100-TB1-20 4

NOTE 6 — CO-C-3716 — PART OF CABLE CO-C-1685
- 1 C0CP218-TB4-1/C0EWB2100-TB1-13 — C0-EWB-2100 TB1-13 — C0EWB2100-TB1-13/C0HTCP05-TB1211-60 13
- 2 C0CP218-TB4-2/C0EWB2100-TB1-14 — TB1-14 — C0EWB2100-TB1-14/C0HTCP05-TB1211-61 14
- 3 C0CP218-TB4-3/C0EWB2100-TB1-15 — TB1-15 — C0EWB2100-TB1-15/C0HTCP05-TB1211-62 15
- 4 C0CP218-TB4-4/C0EWB2100-TB1-16 — TB1-16 — C0EWB2100-TB1-16/C0HTCP05-TB1211-63 16

(01)

NOTE 6 — CO-C-3701
- 1 C0TCMP05-TBAUX-1/C0EWB2100-TB1-17 — C0-EWB-2100 TB1-17 — C0EWB2100-TB1-17/C0HTCP05-TB1211-64 17
- 2 C0TCMP05-TBAUX-2/C0EWB2100-TB1-18 — TB1-18 — C0EWB2100-TB1-18/C0HTCP05-TB1211-65 18
- 3 C0TCMP05-TBAUX-3/C0EWB2100-TB1-19 — TB1-19 — C0EWB2100-TB1-19/C0HTCP05-TB1211-66 19
- 4 C0TCMP05-TBAUX-4/C0EWB2100-TB1-20 — TB1-20 — C0EWB2100-TB1-20/C0HTCP05-TB1211-67 20

TO TBDC 4663-05-03-SC-403 POWER SUPPLY
- OVDC — TBDC(-)-33/TB1211-68
- +24VDC — TBDC(+)-33/TB1211-66

PART OF CABLE CO-C-3041
- 1 C0UPS02-PCB19-J210/C0HTCP05-TB1211-35 — 35 — TB1211-36/R12-S11-19
- 2 C0UPS02-PCB19-J211/C0HTCP05-TB1211-36 — 36

PART OF CABLE CO-C-3041
- 3 C0UPS02-PCB19-J24/C0HTCP05-TB1211-37 — 37 — TB1211-38/R12-S11-20
- 4 C0UPS02-PCB19-J26/C0HTCP05-TB1211-38 — 38

PART OF CABLE CO-C-3041
- 5 C0UPS02-PCB19-J21/C0HTCP05-TB1211-39 — 39 — TB1211-40/R12-S11-21
- 6 C0UPS02-PCB19-J22/C0HTCP05-TB1211-40 — 40

PART OF CABLE CO-C-3041
- 7 C0UPS02-PCB19-J31/C0HTCP05-TB1211-41 — 41 — TB1211-42/R12-S11-22
- 8 C0UPS02-PCB19-J32/C0HTCP05-TB1211-42 — 42

CO-C-3131
- 1 C0YS8681E-TB1-1/C0HTCP05-TB1211-43 — 43 — TB1211-44/R12-S11-23
- 2 C0YS8681E-TB1-2/C0HTCP05-TB1211-44 — 44

PART OF CABLE CO-C-3041
- 9 C0UPS02-PCB19-J3-4/C0HTCP05-TB1211-45 — 45 — TB1211-46/R12-S11-24
- 10 C0UPS02-PCB19-J3-9/C0HTCP05-TB1211-46 — 46

PART OF CABLE CO-C-3555
- 13 C0MCC06-TB30-30/C0HTCP05-TB1211-47 — 47 — TB1211-48/R12-S11-25
- 14 C0MCC06-TB30-31/C0HTCP05-TB1211-48 — 48
- 15 C0MCC06-TB30-36/C0HTCP05-TB1211-49 — 49 — TB1211-50/R12-S11-26
- 16 C0MCC06-TB30-37/C0HTCP05-TB1211-50 — 50
- TB1211-51/R12-S11-27 — 51
- 17 C0MCC06-TB31-30/C0HTCP05-TB1211-52 — 52 — TB1211-53/R12-S11-28
- 18 C0MCC06-TB31-31/C0HTCP05-TB1211-53 — 53
- 19 C0MCC06-TB31-36/C0HTCP05-TB1211-54 — 54 — TB1211-55/R12-S11-29
- 20 C0MCC06-TB31-37/C0HTCP05-TB1211-55 — 55
- 21 C0MCC06-TB32-30/C0HTCP05-TB1211-56 — 56 — TB1211-57/R12-S11-30
- 22 C0MCC06-TB32-31/C0HTCP05-TB1211-57 — 57
- 23 C0MCC06-TB32-36/C0HTCP05-TB1211-58 — 58 — TB1211-59/R12-S11-31
- 24 C0MCC06-TB32-37/C0HTCP05-TB1211-59 — 59
- 68 — TB1211-68/R12-S11-36

OVDC +24VDC — CO-HTCP-05 TB-1211

DISCRETE INPUT MODULE (IC694MDL660) RACK-12, SLOT-11

19	INPUT-17	C0-YS-8680E C0-UPS-02, UTILITY AC FAIL STATUS
20	INPUT-18	C0-YS-8680F C0-UPS-02, ON BYPASS STATUS
21	INPUT-19	C0-YS-8680G C0-UPS-02, COMMON TROUBLE ALARM STATUS
22	INPUT-20	C0-YS-8680H C0-UPS-02, LOW DC VOLTAGE ALARM STATUS
23	INPUT-21	C0-YS-8681E C0-EHTC-33, NORTH TANK AREA ELECTRIC HEAT TRACE CONTROLLER COMMON TROUBLE
24	INPUT-22	C0-YS-8680K C0-UPS-02, GND FAULT ALARM STATUS
25	INPUT-23	C0-ZSC-8930 (FUTURE) C0-TK-30, FIRE FOAM SOLUTION VALVE C0-MOV-8930 CLOSED STATUS
26	INPUT-24	C0-ZSO-8930 (FUTURE) C0-TK-30, FIRE FOAM SOLUTION VALVE C0-MOV-8930 OPEN STATUS
27	COM	COMMON (INPUT 17-24)
28	INPUT-25	C0-ZSC-8931 (FUTURE) C0-TK-31, FIRE FOAM SOLUTION VALVE C0-MOV-8931 CLOSED STATUS
29	INPUT-26	C0-ZSO-8931 (FUTURE) C0-TK-31, FIRE FOAM SOLUTION VALVE C0-MOV-8931 OPEN STATUS
30	INPUT-27	C0-ZSC-8932 (FUTURE) C0-TK-32, FIRE FOAM SOLUTION VALVE C0-MOV-8932 CLOSED STATUS
31	INPUT-28	C0-ZSO-8932 (FUTURE) C0-TK-32, FIRE FOAM SOLUTION VALVE C0-MOV-8932 OPEN STATUS
32	INPUT-29	C0-YS-8696A C0-FSB-21, HVAC CONTROLLER CONTROLLER (C0-CP-21-8 CONTROL POWER STATUS
33	INPUT-30	C0-YS-8696B C0-FSB-21, HVAC (C0-HVAC-21-8) MALFUNCTION ALARM STATUS
34	INPUT-31	C0-YS-8695D C0-TCMP-05, 24VDC TROUBLE ALARM STATUS
35	INPUT-32	C0-YS-8695E C0-TCMP-05, 12VDC TROUBLE ALARM STATUS
36	COM	COMMON (INPUT 25-32)

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. REFER TO EHTL PANEL. SEE DRAWING 4663-06-00-03-07-117.
6. OFFICE BUILDING CONTRACTOR TO SUPPLY, INSTALL, MARK AND TERMINATE ALL OFFICE BUILDING WIRING.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 C0-TANK-21 AREA
   4663-06-00-03-706 C0-TANK-22 AREA
   4663-06-00-03-709 C0-TANK-23 AREA
   4663-06-00-03-712 C0-TANK-24 AREA
   4663-06-00-03-715 C0-TANK-25 AREA
   4663-06-00-03-718 C0-TANK-26 AREA
   4663-06-00-03-721 C0-TANK-27 AREA
   4663-06-00-03-724 C0-TANK-28 AREA
   4663-06-00-03-745 C0-VALVE MANIFOLD AREA
   4663-06-00-03-748 C0-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS C0-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0124
UEL# 2012016-1EF-CLD-000-0124-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	DVC	HHM	JED	DCB	UPSIDE
01	2014-04-17	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	TAE	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER JAMES DOODY ALBERTA

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

C0-HTCP-05, PLC-11/12 SLOT 11 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-423 | REV 01

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

---TIME---DESIGNFILE---

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CO-T-12

CO-YS-8658A TBC 2 3 — CO12-TBC-2/C0HTCP05-TB1212-1 1; CO12-TBC-3/C0HTCP05-TB1212-2 2

CO-YS-8658B TBA 8 9 — CO12-TBA-8/C0HTCP05-TB1212-3 3; CO12-TBA-9/C0HTCP05-TB1212-4 4

CO-YS-8658C TBC 5 6 — CO12-TBC-5/C0HTCP05-TB1212-5 5; CO12-TBC-6/C0HTCP05-TB1212-6 6

CO-YS-8658D TBC 8 9 — CO12-TBC-8/C0HTCP05-TB1212-7 7; CO12-TBC-9/C0HTCP05-TB1212-8 8

PART OF CABLE CO-C-1756

CO-SWBD-03, SECTION 1A

CO-YS-8658E B16M1 B17M1 — C0SWBD03-1A-B16M1/C0HTCP05-TB1212-9 1; C0SWBD03-1A-B17M1/C0HTCP05-TB1212-10 2

CO-YS-8658F B18M1 B19M1 — C0SWBD03-1A-B18M1/C0HTCP05-TB1212-11 3; C0SWBD03-1A-B19M1/C0HTCP05-TB1212-12 4

PART OF CABLE CO-C-3001

CO-SWBD-03, SECTION 2A

CO-YS-8658G 41M 42M — C0SWBD03-2A-41M/C0HTCP05-TB1212-13 5; C0SWBD03-2A-42M/C0HTCP05-TB1212-14 6

CO-YS-8658H 38M 39M — C0SWBD03-2A-38M/C0HTCP05-TB1212-15 7; C0SWBD03-2A-39M/C0HTCP05-TB1212-16 8

CO-YS-8658J B16F1 B17F1 — C0SWBD03-2A-B16F1/C0HTCP05-TB1212-18 9; C0SWBD03-2A-B17F1/C0HTCP05-TB1212-19 10

CO-YS-8658K B18F1 B19F1 — C0SWBD03-2A-B18F1/C0HTCP05-TB1212-20 11; C0SWBD03-2A-B19F1/C0HTCP05-TB1212-21 12

CO-YS-8658L B16F2 B17F2 — C0SWBD03-2A-B16F2/C0HTCP05-TB1212-22 13; C0SWBD03-2A-B17F2/C0HTCP05-TB1212-23 14

CO-YS-8658M B18F2 B19F2 — C0SWBD03-2A-B18F2/C0HTCP05-TB1212-24 15; C0SWBD03-2A-B19F2/C0HTCP05-TB1212-25 16

CO-SWBD-04, SECTION 1A

CO-YS-8659A B16M1 B17M1 — C0SWBD04-1A-B16M1/C0HTCP05-TB1212-26 1; C0SWBD04-1A-B17M1/C0HTCP05-TB1212-27 2

CO-YS-8659B B18M1 B19M1 — C0SWBD04-1A-B18M1/C0HTCP05-TB1212-28 3; C0SWBD04-1A-B19M1/C0HTCP05-TB1212-29 4

PART OF CABLE CO-C-3005

CO-SWBD-04, SECTION 2A

CO-YS-8659C 41M 42M — C0SWBD04-2A-41M/C0HTCP05-TB1212-30 5; C0SWBD04-2A-42M/C0HTCP05-TB1212-31 6

CO-YS-8659D 38M 39M — C0SWBD04-2A-38M/C0HTCP05-TB1212-32 7; C0SWBD04-2A-39M/C0HTCP05-TB1212-33 8

CO-HTCP-05 TB-1212

1 C0T12-TBC-2/C0HTCP05-TB1212-1	1	TB1212-2/R12-S12-1	
2 C0T12-TBC-3/C0HTCP05-TB1212-2	2		
3 C0T12-TBA-8/C0HTCP05-TB1212-3	3	TB1212-4/R12-S12-2	
4 C0T12-TBA-9/C0HTCP05-TB1212-4	4		
5 C0T12-TBC-5/C0HTCP05-TB1212-5	5	TB1212-6/R12-S12-3	
6 C0T12-TBC-6/C0HTCP05-TB1212-6	6		
7 C0T12-TBC-8/C0HTCP05-TB1212-7	7	TB1212-8/R12-S12-4	
8 C0T12-TBC-9/C0HTCP05-TB1212-8	8		
1 C0SWBD03-1A-B16M1/C0HTCP05-TB1212-9	9	TB1212-10/R12-S12-5	
2 C0SWBD03-1A-B17M1/C0HTCP05-TB1212-10	10		
3 C0SWBD03-1A-B18M1/C0HTCP05-TB1212-11	11	TB1212-12/R12-S12-6	
4 C0SWBD03-1A-B19M1/C0HTCP05-TB1212-12	12		
5 C0SWBD03-2A-41M/C0HTCP05-TB1212-13	13	TB1212-14/R12-S12-7	
6 C0SWBD03-2A-42M/C0HTCP05-TB1212-14	14		
7 C0SWBD03-2A-38M/C0HTCP05-TB1212-15	15	TB1212-16/R12-S12-8	
8 C0SWBD03-2A-39M/C0HTCP05-TB1212-16	16		
	17	TB1212-17/R12-S12-9	
9 C0SWBD03-2A-B16F1/C0HTCP05-TB1212-18	18	TB1212-19/R12-S12-10	
10 C0SWBD03-2A-B17F1/C0HTCP05-TB1212-19	19		
11 C0SWBD03-2A-B18F1/C0HTCP05-TB1212-20	20	TB1212-21/R12-S12-11	
12 C0SWBD03-2A-B19F1/C0HTCP05-TB1212-21	21		
13 C0SWBD03-2A-B16F2/C0HTCP05-TB1212-22	22	TB1212-23/R12-S12-12	
14 C0SWBD03-2A-B17F2/C0HTCP05-TB1212-23	23		
15 C0SWBD03-2A-B18F2/C0HTCP05-TB1212-24	24	TB1212-25/R12-S12-13	
16 C0SWBD03-2A-B19F2/C0HTCP05-TB1212-25	25		
1 C0SWBD04-1A-B16M1/C0HTCP05-TB1212-26	26	TB1212-27/R12-S12-14	
2 C0SWBD04-1A-B17M1/C0HTCP05-TB1212-27	27		
3 C0SWBD04-1A-B18M1/C0HTCP05-TB1212-28	28	TB1212-29/R12-S12-15	
4 C0SWBD04-1A-B19M1/C0HTCP05-TB1212-29	29		
5 C0SWBD04-2A-41M/C0HTCP05-TB1212-30	30	TB1212-31/R12-S12-16	
6 C0SWBD04-2A-42M/C0HTCP05-TB1212-31	31		
7 C0SWBD04-2A-38M/C0HTCP05-TB1212-32	32	TB1212-33/R12-S12-17	
8 C0SWBD04-2A-39M/C0HTCP05-TB1212-33	33		
	34	TB1212-34/R12-S12-18	

0VDC +24VDC

DISCRETE INPUT MODULE (IC694MDL660)
RACK-12, SLOT-12

1	INPUT-1	CO-YS-8658A CO-T-12, VACUUM ALARM STATUS
2	INPUT-2	CO-YS-8658B CO-T-12, HIGH TEMPERATURE ALARM STATUS
3	INPUT-3	CO-YS-8658C CO-T-12, HIGH PRESSURE ALARM STATUS
4	INPUT-4	CO-YS-8658D CO-T-12, PRESSURE RELIEF DEVICE ALARM STATUS
5	INPUT-5	CO-YS-8658E CO-SWBD-03, MAIN BREAKER CLOSED STATUS
6	INPUT-6	CO-YS-8658F CO-SWBD-03, MAIN BREAKER OPEN STATUS
7	INPUT-7	CO-YS-8658G CO-SWBD-03, UNDERVOLTAGE ALARM STATUS
8	INPUT-8	CO-YS-8658H CO-SWBD-03, PHASE SEQUENCE REVERSAL ALARM STATUS
9	COM	COMMON (INPUT 1-8)
10	INPUT-9	CO-YS-8658J CO-SWBD-03, CO-MCC-02, MAIN BREAKER CLOSED STATUS
11	INPUT-10	CO-YS-8658K CO-SWBD-03, CO-MCC-02, MAIN BREAKER OPEN STATUS
12	INPUT-11	CO-YS-8658L CO-SWBD-03, CO-ATS-02, MAIN BREAKER CLOSED STATUS
13	INPUT-12	CO-YS-8658M CO-SWBD-03, CO-ATS-02, MAIN BREAKER OPEN STATUS
14	INPUT-13	CO-YS-8659A CO-SWBD-04, EMERGENCY SUPPLY MAIN BREAKER CLOSED STATUS
15	INPUT-14	CO-YS-8659B CO-SWBD-04, EMERGENCY SUPPLY MAIN BREAKER OPEN STATUS
16	INPUT-15	CO-YS-8659C CO-SWBD-04, UNDERVOLTAGE ALARM STATUS
17	INPUT-16	CO-YS-8659D CO-SWBD-04, PHASE SEQUENCE REVERSAL ALARM STATUS
18	COM	COMMON (INPUT 9-16)

CONTINUES ON DWG. 4663-05-03-SC-425

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0125
UEL# 2012016-1EF-CLD-000-0125-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-07-06-083	CO-T-12, 4160V, 2MVA TRANSFORMER INTERCONNECTION WIRING DIAGRAM

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOUGLAS BEAMENT 23848 2014-MAR-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 12
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-424 | REV 00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

CONTINUES ON DWG. 4663-05-03-SC-424

CO-SWBD-04, SECTION 2A

CO-YS-8659E	75	CO5WBD04-2A-75/C0HTCP05-TB1212-35	9	
	75A	CO5WBD04-2A-75A/C0HTCP05-TB1212-36	10	
CO-YS-8659F	74	CO5WBD04-2A-74/C0HTCP05-TB1212-37	11	
	74A	CO5WBD04-2A-74A/C0HTCP05-TB1212-38	12	
CO-YS-8659G	404	CO5WBD04-2A-404/C0HTCP05-TB1212-39	13	
	405	CO5WBD04-2A-405/C0HTCP05-TB1212-40	14	
CO-YS-8659H	401	CO5WBD04-2A-401/C0HTCP05-TB1212-41	15	
	402	CO5WBD04-2A-402/C0HTCP05-TB1212-42	16	
CO-YS-8659J	104	CO5WBD04-2A-104/C0HTCP05-TB1212-43	17	
	105	CO5WBD04-2A-105/C0HTCP05-TB1212-44	18	

CO-SWBD-04, SECTION 3A

CO-YS-8659K	B16F1	CO5WBD04-3A-B16F1/C0HTCP05-TB1212-45	19	
	B17F1	CO5WBD04-3A-B17F1/C0HTCP05-TB1212-46	20	
CO-YS-8659L	B18F1	CO5WBD04-3A-B18F1/C0HTCP05-TB1212-47	21	
	B19F1	CO5WBD04-3A-B19F1/C0HTCP05-TB1212-48	22	

CO-MCC-02, SECTION 1F-D

CO-YS-8658N	41	COMCC02-1FD-41/C0HTCP05-TB1212-49	1	PART OF CABLE CO-C-3045
	42	COMCC02-1FD-42/C0HTCP05-TB1212-50	2	
CO-YS-8658O	38	COMCC02-1FD-38/C0HTCP05-TB1212-52	3	
	39	COMCC02-1FD-39/C0HTCP05-TB1212-53	4	

CO-MCC-04, SECTION 1F-D

CO-YS-8659M	41	COMCC04-1FD-41/C0HTCP05-TB1212-54	1	PART OF CABLE CO-C-3046
	42	COMCC04-1FD-42/C0HTCP05-TB1212-55	2	
CO-YS-8659N	38	COMCC04-1FD-38/C0HTCP05-TB1212-56	3	
	39	COMCC04-1FD-39/C0HTCP05-TB1212-57	4	

CO-YS-8690A	NC	CO5S8690A-NC/C0HTCP05-TB1212-58	1	CO-C-3070
	COM	CO5S8690A-COM/C0HTCP05-TB1212-59	2	
CO-YS-8690B	NC	CO5S8690B-NC/C0HTCP05-TB1212-60	1	CO-C-3071
	COM	CO5S8690B-COM/C0HTCP05-TB1212-61	2	

TO TBDC 4663-05-03-SC-403 POWER SUPPLY

OVDC TBDC(-)-34/TB1212-68

+24VDC TBDC(+)-34/TB1212-66

0VDC +24VDC

CO-HTCP-05 TB-1212

DISCRETE INPUT MODULE (IC694MDL660) RACK-12, SLOT-12

9	CO5WBD04-2A-75/C0HTCP05-TB1212-35	35	TB1212-35/R12-S12-19	19	INPUT-17	CO-YS-8659E CO-ATS-02, EMERGENCY SUPPLY AVAILABLE STATUS
10	CO5WBD04-2A-75A/C0HTCP05-TB1212-36	36				
11	CO5WBD04-2A-74/C0HTCP05-TB1212-37	37	TB1212-36/R12-S12-20	20	INPUT-18	CO-YS-8659F CO-ATS-02, NORMAL SUPPLY AVAILABLE STATUS
12	CO5WBD04-2A-74A/C0HTCP05-TB1212-38	38				
13	CO5WBD04-2A-404/C0HTCP05-TB1212-39	39	TB1212-40/R12-S12-21	21	INPUT-19	CO-YS-8659G CO-ATS-02, EMERGENCY SUPPLY POSITION STATUS
14	CO5WBD04-2A-405/C0HTCP05-TB1212-40	40				
15	CO5WBD04-2A-401/C0HTCP05-TB1212-41	41	TB1212-42/R12-S12-22	22	INPUT-20	CO-YS-8659H CO-ATS-02, NORMAL SUPPLY POSITION STATUS
16	CO5WBD04-2A-402/C0HTCP05-TB1212-42	42				
17	CO5WBD04-2A-104/C0HTCP05-TB1212-43	43	TB1212-44/R12-S12-23	23	INPUT-21	CO-YS-8659J CO-ATS-02, COMMON ALARM STATUS
18	CO5WBD04-2A-105/C0HTCP05-TB1212-44	44				
19	CO5WBD04-3A-B16F1/C0HTCP05-TB1212-45	45	TB1212-46/R12-S12-24	24	INPUT-22	CO-YS-8659K CO-SWBD-04, CO-MCC-04, MAIN BREAKER CLOSED STATUS
20	CO5WBD04-3A-B17F1/C0HTCP05-TB1212-46	46				
21	CO5WBD04-3A-B18F1/C0HTCP05-TB1212-47	47	TB1212-48/R12-S12-25	25	INPUT-23	CO-YS-8659L CO-SWBD-04, CO-MCC-04, MAIN BREAKER OPEN STATUS
22	CO5WBD04-3A-B19F1/C0HTCP05-TB1212-48	48				
1	COMCC02-1FD-41/C0HTCP05-TB1212-49	49	TB1212-50/R12-S12-26	26	INPUT-24	CO-YS-8658N CO-MCC-02, UNDERVOLTAGE ALARM STATUS
2	COMCC02-1FD-42/C0HTCP05-TB1212-50	50				
		51	TB1212-51/R12-S12-27	27	COM	COMMON (INPUT 17-24)
3	COMCC02-1FD-38/C0HTCP05-TB1212-52	52	TB1212-53/R12-S12-28	28	INPUT-25	CO-YS-8658O CO-MCC-02, PHASE SEQUENCE REVERSAL ALARM STATUS
4	COMCC02-1FD-39/C0HTCP05-TB1212-53	53				
1	COMCC04-1FD-41/C0HTCP05-TB1212-54	54	TB1212-55/R12-S12-29	29	INPUT-26	CO-YS-8659M CO-MCC-04, UNDERVOLTAGE ALARM STATUS
2	COMCC04-1FD-42/C0HTCP05-TB1212-55	55				
3	COMCC04-1FD-38/C0HTCP05-TB1212-56	56	TB1212-57/R12-S12-30	30	INPUT-27	CO-YS-8659N CO-MCC-04, PHASE SEQUENCE REVERSAL ALARM STATUS
4	COMCC04-1FD-39/C0HTCP05-TB1212-57	57				
1	CO5S8690A-NC/C0HTCP05-TB1212-58	58	TB1212-59/R12-S12-31	31	INPUT-28	CO-YS-8690A CO-EES-22, INTRUSION ALARM STATUS
2	CO5S8690A-COM/C0HTCP05-TB1212-59	59				
1	CO5S8690B-NC/C0HTCP05-TB1212-60	60	TB1212-61/R12-S12-32	32	INPUT-29	CO-YS-8690B CO-EES-22, INTRUSION ALARM STATUS
2	CO5S8690B-COM/C0HTCP05-TB1212-61	61				
		62	TB1212-63/R12-S12-33	33	INPUT-30	SPARE
		63				
		64	TB1212-65/R12-S12-34	34	INPUT-31	SPARE
		65				
		66	TB1212-67/R12-S12-35	35	INPUT-32	SPARE
		67				
		68	TB1212-68/R12-S12-36	36	COM	COMMON (INPUT 25-32)

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0126
UEL# 2012016-1EF-CLD-000-0126-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOORN 2014-MAR-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/12 SLOT 12 DISCRETE INPUT I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-03-SC-425 | REV 00

TIME DESIGNFILE

TC_A1_BR.DWG 594X841

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-05)

DISCRETE OUTPUT MODULE (IC694MDL740) RACK-13, SLOT-04

+24VDC INPUT	DC+	1	R13-S4-1/TB1304-1
CO-YA-8658A CO-SWBD-03, MAIN BREAKER SHUNT TRIP COMMAND	OUTPUT-1	2	R13-S4-2/TB1304-2
CO-YA-8658B CO-SWBD-03, CO-MCC-02, MAIN BREAKER SHUNT TRIP COMMAND	OUTPUT-2	3	R13-S4-3/TB1304-4
CO-YA-8658C CO-SWBD-03, CO-ATS-02, MAIN BREAKER SHUNT TRIP COMMAND	OUTPUT-3	4	R13-S4-4/TB1304-6
CO-YA-8659A CO-SWBD-04, EMERGENCY SUPPLY MAIN BREAKER SHUNT TRIP COMMAND	OUTPUT-4	5	R13-S4-5/TB1304-8
CO-YA-8659B CO-SWBD-04, CO-MCC-04, MAIN BREAKER SHUNT TRIP COMMAND	OUTPUT-5	6	R13-S4-6/TB1304-10
SPARE	OUTPUT-6	7	R13-S4-7/TB1304-12
SPARE	OUTPUT-7	8	R13-S4-8/TB1304-14
SPARE	OUTPUT-8	9	R13-S4-9/TB1304-16
COMMON (INPUT 1-8)	COM	10	R13-S4-10/TB1304-18
+24VDC INPUT	DC+	11	R13-S4-11/TB1304-20
SPARE	OUTPUT-9	12	R13-S4-12/TB1304-21
SPARE	OUTPUT-10	13	R13-S4-13/TB1304-23
CO-YA-8690B FIRE BEACON (RED) LOCATED ON EXTERIOR OF CO-EES-22	OUTPUT-11	14	R13-S4-14/TB1304-25
CO-YA-8698C EVACUATION HORN LOCATED ON CO-EES-22 COMMAND	OUTPUT-12	15	R13-S4-15/TB1304-27
CO-YA-8698D EVACUATION HORN LOCATED ON CO-EES-22 COMMAND	OUTPUT-13	16	R13-S4-16/TB1304-29
SPARE	OUTPUT-14	17	R13-S4-17/TB1304-31
CO-YA-8695B FIRE BEACON (RED) LOCATED ON EXTERIOR OF CO-FSB-21	OUTPUT-15	18	R13-S4-18/TB1304-33
SPARE	OUTPUT-16	19	R13-S4-19/TB1304-35
COMMON (INPUT 9-16)	1-COM	20	R13-S4-20/TB1304-37

CO-HTCP-05 TB-1304

TB1304-2/TBRLY1-RL01-A1 | TB1304-3/TBRLY1-RL01-A2 → TB-RLY-1 RL01 (A1/A2, 11/14) → COSWBD03-1A-STM1/COHTCP05-TBRLY1-RL01-11 1 | COSWBD03-1A-B10M1/COHTCP05-TBRLY1-RL01-14 2

TB1304-4/TBRLY1-RL02-A1 | TB1304-5/TBRLY1-RL02-A2 → RL02 → COSWBD03-2A-STF1/COHTCP05-TBRLY1-RL02-11 3 | COSWBD03-2A-B10F1/COHTCP05-TBRLY1-RL02-14 4

TB1304-6/TBRLY1-RL03-A1 | TB1304-7/TBRLY1-RL03-A2 → RL03 → COSWBD03-2A-STF2/COHTCP05-TBRLY1-RL03-11 5 | COSWBD03-2A-B10F2/COHTCP05-TBRLY1-RL03-14 6

TB1304-8/TBRLY1-RL04-A1 | TB1304-9/TBRLY1-RL04-A2 → RL04 → COSWBD04-2A-STM1/COHTCP05-TBRLY1-RL04-11 1 | COSWBD04-2A-B10M1/COHTCP05-TBRLY1-RL04-14 2

TB1304-10/TBRLY1-RL05-A1 | TB1304-11/TBRLY1-RL05-A2 → RL05 → COSWBD04-3A-STF1/COHTCP05-TBRLY1-RL05-11 3 | COSWBD04-3A-B10F1/COHTCP05-TBRLY1-RL05-14 4

TB1304-12/TBRLY1-RL06-A1 | TB1304-13/TBRLY1-RL06-A2 → RL06

TB1304-14/TBRLY1-RL07-A1 | TB1304-15/TBRLY1-RL07-A2 → RL07

TB1304-16/TBRLY1-RL08-A1 | TB1304-17/TBRLY1-RL08-A2 → RL08

TB1304-21/TBRLY1-RL09-A1 | TB1304-22/TBRLY1-RL09-A2 → RL09

TB1304-23/TBRLY1-RL10-A1 | TB1304-24/TBRLY1-RL10-A2 → RL10

TB1304-25/TBRLY1-RL11-A1 | TB1304-26/TBRLY1-RL11-A2 → RL11 → TBRLY1-RL11-11/TBAUX-1 | TBRLY1-RL11-14/TBAUX-6

NOTE 6 TB-AUX: 1, 6, 11

COYAB690B-1/COHTCP05-TBAUX-6 1 | COYAB690B-3/COHTCP05-TBAUX-11 2 → CO-C-3065 → COYAB690B-1/COHTCP05-TBAUX-6 1 | COYAB690B-3/COHTCP05-TBAUX-11 2 → CO-YA-8690B (RED)

TB1304-27/TBRLY1-RL12-A1 | TB1304-28/TBRLY1-RL12-A2 → RL12 → TBRLY1-RL12-11/TBAUX-3 | TBRLY1-RL12-14/TBAUX-8

TB-AUX: 3, 8, 13

COYAB698C-L/COHTCP05-TBAUX-8 1 | COYAB698C-N/COHTCP05-TBAUX-13 2 → CO-C-3062 → COYAB698C-L/COHTCP01-TBAUX-11 1 | COYAB698C-N/COHTCP01-TBAUX-19 2 → CO-YA-8698C

TB1304-29/TBRLY1-RL13-A1 | TB1304-30/TBRLY1-RL13-A2 → RL13 → TBRLY1-RL13-11/TBAUX-4 | TBRLY1-RL13-14/TBAUX-9

TB-AUX: 4, 9, 14

COYAB698D-L/COHTCP05-TBAUX-9 1 | COYAB698D-N/COHTCP05-TBAUX-14 2 → CO-C-3063 → COYAB698D-L/COHTCP01-TBAUX-12 1 | COYAB698D-N/COHTCP01-TBAUX-20 2 → CO-YA-8698D

TB1304-31/TBRLY1-RL14-A1 | TB1304-32/TBRLY1-RL14-A2 → RL14

TB1304-33/TBRLY1-RL15-A1 | TB1304-34/TBRLY1-RL15-A2 → RL15 → TBRLY1-RL15-11/TBAUX-2 | TBRLY1-RL15-14/TBAUX-10

NOTE 6 TB-AUX: 2, 7, 12

COEUB2100-TB2-1/COHTCP05-TBAUX-7 1 | COEUB2100-TB2-2/COHTCP05-TBAUX-12 2 → PART OF CABLE CO-C-1687 → CO-EUB-2100 TB2-1, TB2-2 → NOTE 7 CO-C-3720 → COYAB695B-1/COEUB2100-TB2-1 1 | COYAB695B-3/COEUB2100-TB2-2 2 → CO-YA-8695B (RED)

TB1304-35/TBRLY1-RL16-A1 | TB1304-36/TBRLY1-RL16-A2 → RL16

TO TBDC 4663-05-03-SC-403

POWER SUPPLY

0VDC ← TBDC(-)35/TB1304-37

+24VDC ← TBDC(+)35/TB1304-20

PART OF CABLE CO-C-3000 → CO-SWBD-03, SECTION 1A

1 COSWBD03-1A-STM1/COHTCP05-TBRLY1-RL01-11 | 2 COSWBD03-1A-B10M1/COHTCP05-TBRLY1-RL01-14 → STM1 B10M1 → CO-YA-8658A

CO-SWBD-03, SECTION 2A

3 COSWBD03-2A-STF1/COHTCP05-TBRLY1-RL02-11 | 4 COSWBD03-2A-B10F1/COHTCP05-TBRLY1-RL02-14 → STF1 B10F1 → CO-YA-8658B

5 COSWBD03-2A-STF2/COHTCP05-TBRLY1-RL03-11 | 6 COSWBD03-2A-B10F2/COHTCP05-TBRLY1-RL03-14 → STF2 B10F2 → CO-YA-8658D

PART OF CABLE CO-C-3004 → CO-SWBD-04, SECTION 2A

1 COSWBD04-2A-STM1/COHTCP05-TBRLY1-RL04-11 | 2 COSWBD04-2A-B10M1/COHTCP05-TBRLY1-RL04-14 → STM1 B10M1 → CO-YA-8659A

CO-SWBD-04, SECTION 3A

3 COSWBD04-3A-STF1/COHTCP05-TBRLY1-RL05-11 | 4 COSWBD04-3A-B10F1/COHTCP05-TBRLY1-RL05-14 → STF1 B10F1 → CO-YA-8659B

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21
6. FOR TB-AUX TERMINAL BLOCK DETAIL SEE DRAWING 4663-05-03-SC-401.
7. OFFICE BUILDING CONTRACTOR TO SUPPLY, INSTALL, MARK AND TERMINATE ALL OFFICE BUILDING WIRING.

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL.

SDN# 25472-130-J5-0000-P0127
UEL# 2012016-1EF-CLD-000-0127-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 2014-MAR-12

PERMIT/ ENG. APPROVAL — DATE

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/13 SLOT 04 DISCRETE OUTPUT - STATIC I/O WIRING DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-428	00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-05)

DISCRETE OUTPUT MODULE (IC694MDL740) RACK-13, SLOT-05

CO-HTCP-05 TB-1305

+24VDC INPUT	DC+	1	R13-S5-1/TB1305-1	1
CO-HS-8571SP CO-MXM-27-1, PRODUCT TANK MIXER 1 STOP COMMAND	OUTPUT-1	2	R13-S5-2/TB1305-2	2, 3
CO-HS-8571ST CO-MXM-27-1, PRODUCT TANK MIXER 1 START COMMAND	OUTPUT-2	3	R13-S5-3/TB1305-4	4, 5
CO-HS-8572SP CO-MXM-27-2, PRODUCT TANK MIXER 2 STOP COMMAND	OUTPUT-3	4	R13-S5-4/TB1305-6	6, 7
CO-HS-8572ST CO-MXM-27-2, PRODUCT TANK MIXER 2 START COMMAND	OUTPUT-4	5	R13-S5-5/TB1305-8	8, 9
CO-HS-8573SP CO-MXM-27-3, PRODUCT TANK MIXER 3 STOP COMMAND	OUTPUT-5	6	R13-S5-6/TB1305-10	10, 11
CO-HS-8573ST CO-MXM-27-3, PRODUCT TANK MIXER 3 START COMMAND	OUTPUT-6	7	R13-S5-7/TB1305-12	12, 13
SPARE	OUTPUT-7	8	R13-S5-8/TB1305-14	14, 15
SPARE	OUTPUT-8	9	R13-S5-9/TB1305-16	16, 17
COMMON (INPUT 1-8)	COM	10	R13-S5-10/TB1305-18	18, 19
+24VDC INPUT	DC+	11	R13-S5-11/TB1305-20	20
CO-HS-8581SP CO-MXM-28-1, PRODUCT TANK MIXER 1 STOP COMMAND	OUTPUT-9	12	R13-S5-12/TB1305-21	21, 22
CO-HS-8581ST CO-MXM-28-1, PRODUCT TANK MIXER 1 START COMMAND	OUTPUT-10	13	R13-S5-13/TB1305-23	23, 24
CO-HS-8582SP CO-MXM-28-2, PRODUCT TANK MIXER 2 STOP COMMAND	OUTPUT-11	14	R13-S5-14/TB1305-25	25, 26
CO-HS-8582ST CO-MXM-28-2, PRODUCT TANK MIXER 2 START COMMAND	OUTPUT-12	15	R13-S5-15/TB1305-27	27, 28
CO-HS-8583SP CO-MXM-28-3, PRODUCT TANK MIXER 3 STOP COMMAND	OUTPUT-13	16	R13-S5-16/TB1305-29	29, 30
CO-HS-8583ST CO-MXM-28-3, PRODUCT TANK MIXER 3 START COMMAND	OUTPUT-14	17	R13-S5-17/TB1305-31	31, 32
SPARE	OUTPUT-15	18	R13-S5-18/TB1305-33	33, 34
CO-YA-8696 CO-FSB-21, HVAC CONTROLLER CONTROLLER (CO-CP-21-8) TRIP COMMAND	OUTPUT-16	19	R13-S5-19/TB1305-35	35, 36
COMMON (INPUT 9-16)	1-COM	20	R13-S5-20/TB1305-37	37

TO TBDC 4663-05-03-SC-403 POWER SUPPLY

0VDC TBDC(-)15/TB1305-37

+24VDC TBDC(+)15/TB1305-20

TB-RLY-2

TB1305-2/TBRLY2-RL17-A1	RL17	COMCC02-10FC-2/COHTCP05-TBRLY2-RL17-11	1	CO-C-3300	COMCC02-10FC-2/COHTCP05-TBRLY2-RL17-11
TB1305-3/TBRLY2-RL17-A2		COMCC02-10FC-3/COHTCP05-TBRLY2-RL17-14	2		COMCC02-10FC-3/COHTCP05-TBRLY2-RL17-14
TB1305-4/TBRLY2-RL18-A1	RL18	COMCC02-10FC-8/COHTCP05-TBRLY2-RL18-11	3		
TB1305-5/TBRLY2-RL18-A2		COMCC02-10FC-9/COHTCP05-TBRLY2-RL18-14	4		
TB1305-6/TBRLY2-RL19-A1	RL19	COMCC02-10FH-2/COHTCP05-TBRLY2-RL19-11	5		
TB1305-7/TBRLY2-RL19-A2		COMCC02-10FH-3/COHTCP05-TBRLY2-RL19-14	6		
TB1305-8/TBRLY2-RL20-A1	RL20	COMCC02-10FH-8/COHTCP05-TBRLY2-RL20-11	7		
TB1305-9/TBRLY2-RL20-A2		COMCC02-10FH-9/COHTCP05-TBRLY2-RL20-14	8		
TB1305-10/TBRLY2-RL21-A1	RL21	COMCC02-9FC-2/COHTCP05-TBRLY2-RL21-11	9		
TB1305-11/TBRLY2-RL21-A2		COMCC02-9FC-3/COHTCP05-TBRLY2-RL21-14	10		
TB1305-12/TBRLY2-RL22-A1	RL22	COMCC02-9FC-8/COHTCP05-TBRLY2-RL22-11	11		
TB1305-13/TBRLY2-RL22-A2		COMCC02-9FC-9/COHTCP05-TBRLY2-RL22-14	12		
TB1305-14/TBRLY2-RL23-A1	RL23				
TB1305-15/TBRLY2-RL23-A2					
TB1305-16/TBRLY2-RL24-A1	RL24				
TB1305-17/TBRLY2-RL24-A2					
TB1305-21/TBRLY2-RL25-A1	RL25	COMCC02-10RC-2/COHTCP05-TBRLY2-RL25-11	1	CO-C-3302	COMCC02-10RC-2/COHTCP05-TBRLY2-RL25-11
TB1305-22/TBRLY2-RL25-A2		COMCC02-10RC-3/COHTCP05-TBRLY2-RL25-14	2		COMCC02-10RC-3/COHTCP05-TBRLY2-RL25-14
TB1305-23/TBRLY2-RL26-A1	RL26	COMCC02-10RC-8/COHTCP05-TBRLY2-RL26-11	3		
TB1305-24/TBRLY2-RL26-A2		COMCC02-10RC-9/COHTCP05-TBRLY2-RL26-14	4		
TB1305-25/TBRLY2-RL27-A1	RL27	COMCC02-10RH-2/COHTCP05-TBRLY2-RL27-11	5		
TB1305-26/TBRLY2-RL27-A2		COMCC02-10RH-3/COHTCP05-TBRLY2-RL27-14	6		
TB1305-27/TBRLY2-RL28-A1	RL28	COMCC02-10RH-8/COHTCP05-TBRLY2-RL28-11	7		
TB1305-28/TBRLY2-RL28-A2		COMCC02-10RH-9/COHTCP05-TBRLY2-RL28-14	8		
TB1305-29/TBRLY2-RL29-A1	RL29	COMCC02-9RC-2/COHTCP05-TBRLY2-RL29-11	9		
TB1305-30/TBRLY2-RL29-A2		COMCC02-9RC-3/COHTCP05-TBRLY2-RL29-14	10		
TB1305-31/TBRLY2-RL30-A1	RL30	COMCC02-9RC-8/COHTCP05-TBRLY2-RL30-11	11		
TB1305-32/TBRLY2-RL30-A2		COMCC02-9RC-9/COHTCP05-TBRLY2-RL30-14	12		
TB1305-33/TBRLY2-RL31-A1	RL31				
TB1305-34/TBRLY2-RL31-A2					
TB1305-35/TBRLY2-RL32-A1	RL32	COEJB2100-TB2-3/COHTCP05-TBRLY2-RL32-11	3	PART OF CABLE CO-C-1687	CO-EJB-2100 TB2-3
TB1305-36/TBRLY2-RL32-A2		COEJB2100-TB2-4/COHTCP05-TBRLY2-RL32-14	4		CO-EJB-2100 TB2-4

CO-MCC-02, SECTION 10F-C

COMCC02-10FC-2/COHTCP05-TBRLY2-RL17-11	2	CO-HS-8571SP
COMCC02-10FC-3/COHTCP05-TBRLY2-RL17-14	3	
COMCC02-10FC-8/COHTCP05-TBRLY2-RL18-11	8	CO-HS-8571ST
COMCC02-10FC-9/COHTCP05-TBRLY2-RL18-14	9	

CO-MCC-02, SECTION 10F-H

COMCC02-10FH-2/COHTCP05-TBRLY2-RL19-11	2	CO-HS-8572SP
COMCC02-10FH-3/COHTCP05-TBRLY2-RL19-14	3	
COMCC02-10FH-8/COHTCP05-TBRLY2-RL20-11	8	CO-HS-8572ST
COMCC02-10FH-9/COHTCP05-TBRLY2-RL20-14	9	

CO-MCC-02, SECTION 9F-C

COMCC02-9FC-2/COHTCP05-TBRLY2-RL21-11	2	CO-HS-8573SP
COMCC02-9FC-3/COHTCP05-TBRLY2-RL21-14	3	
COMCC02-9FC-8/COHTCP05-TBRLY2-RL22-11	8	CO-HS-8573ST
COMCC02-9FC-9/COHTCP05-TBRLY2-RL22-14	9	

CO-MCC-02, SECTION 10R-C

COMCC02-10RC-2/COHTCP05-TBRLY2-RL25-11	2	CO-HS-8581SP
COMCC02-10RC-3/COHTCP05-TBRLY2-RL25-14	3	
COMCC02-10RC-8/COHTCP05-TBRLY2-RL26-11	8	CO-HS-8581ST
COMCC02-10RC-9/COHTCP05-TBRLY2-RL26-14	9	

CO-MCC-02, SECTION 10R-H

COMCC02-10RH-2/COHTCP05-TBRLY2-RL27-11	2	CO-HS-8582SP
COMCC02-10RH-3/COHTCP05-TBRLY2-RL27-14	3	
COMCC02-10RH-8/COHTCP05-TBRLY2-RL28-11	8	CO-HS-8582ST
COMCC02-10RH-9/COHTCP05-TBRLY2-RL28-14	9	

CO-MCC-02, SECTION 9R-C

COMCC02-9RC-2/COHTCP05-TBRLY2-RL29-11	2	CO-HS-8583SP
COMCC02-9RC-3/COHTCP05-TBRLY2-RL29-14	3	
COMCC02-9RC-8/COHTCP05-TBRLY2-RL30-11	8	CO-HS-8583ST
COMCC02-9RC-9/COHTCP05-TBRLY2-RL30-14	9	

NOTE 6 CO-C-3721

CO-CP-21-8 (FSB)

COCP218-XX/COEJB2100-TB2-3	XX	CO-YA-8696
COCP218-XX/COEJB2100-TB2-4	XX	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHIT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21
6. OFFICE BUILDING CONTRACTOR TO SUPPLY, INSTALL, MARK AND TERMINATE ALL OFFICE BUILDING WIRING.

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0128
UEL# 2012016-1EF-CLD-000-0128-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY 2014-MAR-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

Upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/13 SLOT 05 DISCRETE OUTPUT - STATIC I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-429 | REV 00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-05)

DISCRETE OUTPUT MODULE (IC694MDL740)
RACK-13, SLOT-06

CO-HTCP-05 TB-1306

+24VDC INPUT	DC+	1	R13-S6-1/TB1306-1	1				
CO-HS-8591SP (FUTURE) CO-MXM-29-1, PRODUCT TANK MIXER 1 STOP COMMAND	OUTPUT-1	2	R13-S6-2/TB1306-2	2	TB1306-2/TBRLY3-RL33-A1	RL33	11	TB-RLY-3
				3	TB1306-3/TBRLY3-RL33-A2		14	
CO-HS-8591ST (FUTURE) CO-MXM-29-1, PRODUCT TANK MIXER 1 START COMMAND	OUTPUT-2	3	R13-S6-3/TB1306-4	4	TB1306-4/TBRLY3-RL34-A1	RL34	11	
				5	TB1306-5/TBRLY3-RL34-A2		14	
CO-HS-8592SP (FUTURE) CO-MXM-29-2, PRODUCT TANK MIXER 2 STOP COMMAND	OUTPUT-3	4	R13-S6-4/TB1306-6	6	TB1306-6/TBRLY3-RL35-A1	RL35	11	
				7	TB1306-7/TBRLY3-RL35-A2		14	
CO-HS-8592ST (FUTURE) CO-MXM-29-2, PRODUCT TANK MIXER 2 START COMMAND	OUTPUT-4	5	R13-S6-5/TB1306-8	8	TB1306-8/TBRLY3-RL36-A1	RL36	11	
				9	TB1306-9/TBRLY3-RL36-A2		14	
CO-HS-8593SP (FUTURE) CO-MXM-29-3, PRODUCT TANK MIXER 3 STOP COMMAND	OUTPUT-5	6	R13-S6-6/TB1306-10	10	TB1306-10/TBRLY3-RL37-A1	RL37	11	
				11	TB1306-11/TBRLY3-RL37-A2		14	
CO-HS-8593ST (FUTURE) CO-MXM-29-3, PRODUCT TANK MIXER 3 START COMMAND	OUTPUT-6	7	R13-S6-7/TB1306-12	12	TB1306-12/TBRLY3-RL38-A1	RL38	11	
				13	TB1306-13/TBRLY3-RL38-A2		14	
SPARE	OUTPUT-7	8	R13-S6-8/TB1306-14	14	TB1306-14/TBRLY3-RL39-A1	RL39	11	
				15	TB1306-15/TBRLY3-RL39-A2		14	
SPARE	OUTPUT-8	9	R13-S6-9/TB1306-16	16	TB1306-16/TBRLY3-RL40-A1	RL40	11	
				17	TB1306-17/TBRLY3-RL40-A2		14	
COMMON (INPUT 1-8)	COM	10	R13-S6-10/TB1306-18	18 ↑ 19 ↓				
+24VDC INPUT	DC+	11	R13-S6-11/TB1306-20	20				
CO-HS-8601SP (FUTURE) CO-MXM-30-1, PRODUCT TANK MIXER 1 STOP COMMAND	OUTPUT-9	12	R13-S6-12/TB1306-21	21	TB1306-21/TBRLY3-RL41-A1	RL41	11	
				22	TB1306-22/TBRLY3-RL41-A2		14	
CO-HS-8601ST (FUTURE) CO-MXM-30-1, PRODUCT TANK MIXER 1 START COMMAND	OUTPUT-10	13	R13-S6-13/TB1306-23	23	TB1306-23/TBRLY3-RL42-A1	RL42	11	
				24	TB1306-24/TBRLY3-RL42-A2		14	
CO-HS-8602SP (FUTURE) CO-MXM-30-2, PRODUCT TANK MIXER 2 STOP COMMAND	OUTPUT-11	14	R13-S6-14/TB1306-25	25	TB1306-25/TBRLY3-RL43-A1	RL43	11	
				26	TB1306-26/TBRLY3-RL43-A2		14	
CO-HS-8602ST (FUTURE) CO-MXM-30-2, PRODUCT TANK MIXER 2 START COMMAND	OUTPUT-12	15	R13-S6-15/TB1306-27	27	TB1306-27/TBRLY3-RL44-A1	RL44	11	
				28	TB1306-28/TBRLY3-RL44-A2		14	
CO-HS-8603SP (FUTURE) CO-MXM-30-3, PRODUCT TANK MIXER 3 STOP COMMAND	OUTPUT-13	16	R13-S6-16/TB1306-29	29	TB1306-29/TBRLY3-RL45-A1	RL45	11	
				30	TB1306-30/TBRLY3-RL45-A2		14	
CO-HS-8603ST (FUTURE) CO-MXM-30-3, PRODUCT TANK MIXER 3 START COMMAND	OUTPUT-14	17	R13-S6-17/TB1306-31	31	TB1306-31/TBRLY3-RL46-A1	RL46	11	
				32	TB1306-32/TBRLY3-RL46-A2		14	
CO-YA-8691 CO-EES-22, HVAC CONTROLLER (CO-CP-22-1) TRIP COMMAND	OUTPUT-15	18	R13-S6-18/TB1306-33	33	TB1306-33/TBRLY3-RL47-A1	RL47	11	
				34	TB1306-34/TBRLY3-RL47-A2		14	
CO-YA-8692 NORTH YARD LIGHTING CONTACTOR CLOSE COMMAND	OUTPUT-16	19	R13-S6-19/TB1306-35	35	TB1306-35/TBRLY3-RL48-A1	RL48	11	
				36	TB1306-36/TBRLY3-RL48-A2		14	
COMMON (INPUT 9-16)	1-COM	20	R13-S6-20/TB1306-37	37				

TO TBDC 4663-05-03-SC-403 POWER SUPPLY

0VDC — TBDC(-)16/TB1306-37

+24VDC — TBDC(+)16/TB1306-20

01 COCP221-TB3A-43/COHTCP05-TBRLY3-RL47-11 1
COCP221-TB3A-45/COHTCP05-TBRLY3-RL47-14 2

CO-C-3163

CO-C-3022

CO-MCC-04, SECTION 9F-A

01 TB3A
1 COCP221-TB3A-43/COHTCP05-TBRLY3-RL47-11 — 43
2 COCP221-TB3A-45/COHTCP05-TBRLY3-RL47-14 — 45
CO-YA-8691

1 COMCC04-9FA-2/COHTCP05-TBRLY3-RL48-11 — 2
2 COMCC04-9FA-3/COHTCP05-TBRLY3-RL48-14 — 3
CO-YA-8692

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0129
UEL# 2012016-1EF-CLD-000-0129-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
01	2014-04-11	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE
2197104	JAP	PLR	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER JAMES DOUGLAS ALBERTA 2014-APR-11

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/13 SLOT 06
DISCRETE OUTPUT - STATIC
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-430 | REV 01

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

-TIME- -DESIGNFILE-

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-05)

DISCRETE OUTPUT MODULE (IC694MDL740)
RACK-13, SLOT-07

CO-HTCP-05 TB-1307

+24VDC INPUT	DC+	1	R13-S7-1/TB1307-1	1		
CO-HS-8611SP (FUTURE) CO-MXM-31-1, PRODUCT TANK MIXER 1 STOP COMMAND	OUTPUT-1	2	R13-S7-2/TB1307-2	2 3	TB1307-2/TBRLY4-RL49-A1 TB1307-3/TBRLY4-RL49-A2	TB-RLY-4 RL49
CO-HS-8611ST (FUTURE) CO-MXM-31-1, PRODUCT TANK MIXER 1 START COMMAND	OUTPUT-2	3	R13-S7-3/TB1307-4	4 5	TB1307-4/TBRLY4-RL50-A1 TB1307-5/TBRLY4-RL50-A2	RL50
CO-HS-8612SP (FUTURE) CO-MXM-31-2, PRODUCT TANK MIXER 2 STOP COMMAND	OUTPUT-3	4	R13-S7-4/TB1307-6	6 7	TB1307-6/TBRLY4-RL51-A1 TB1307-7/TBRLY4-RL51-A2	RL51
CO-HS-8612ST (FUTURE) CO-MXM-31-2, PRODUCT TANK MIXER 2 START COMMAND	OUTPUT-4	5	R13-S7-5/TB1307-8	8 9	TB1307-8/TBRLY4-RL52-A1 TB1307-9/TBRLY4-RL52-A2	RL52
CO-HS-8613SP (FUTURE) CO-MXM-31-3, PRODUCT TANK MIXER 3 STOP COMMAND	OUTPUT-5	6	R13-S7-6/TB1307-10	10 11	TB1307-10/TBRLY4-RL53-A1 TB1307-11/TBRLY4-RL53-A2	RL53
CO-HS-8613ST (FUTURE) CO-MXM-31-3, PRODUCT TANK MIXER 3 START COMMAND	OUTPUT-6	7	R13-S7-7/TB1307-12	12 13	TB1307-12/TBRLY4-RL54-A1 TB1307-13/TBRLY4-RL54-A2	RL54
SPARE	OUTPUT-7	8	R13-S7-8/TB1307-14	14 15	TB1307-14/TBRLY4-RL55-A1 TB1307-15/TBRLY4-RL55-A2	RL55
SPARE	OUTPUT-8	9	R13-S7-9/TB1307-16	16 17	TB1307-16/TBRLY4-RL56-A1 TB1307-17/TBRLY4-RL56-A2	RL56
COMMON (INPUT 1-8)	COM	10	R13-S7-10/TB1307-18	18 19		
+24VDC INPUT	DC+	11	R13-S7-11/TB1307-20	20		
CO-HS-8621SP (FUTURE) CO-MXM-32-1, PRODUCT TANK MIXER 1 STOP COMMAND	OUTPUT-9	12	R13-S7-12/TB1307-21	21 22	TB1307-21/TBRLY4-RL57-A1 TB1307-22/TBRLY4-RL57-A2	RL57
CO-HS-8621ST (FUTURE) CO-MXM-32-1, PRODUCT TANK MIXER 1 START COMMAND	OUTPUT-10	13	R13-S7-13/TB1307-23	23 24	TB1307-23/TBRLY4-RL58-A1 TB1307-24/TBRLY4-RL58-A2	RL58
CO-HS-8622SP (FUTURE) CO-MXM-32-2, PRODUCT TANK MIXER 2 STOP COMMAND	OUTPUT-11	14	R13-S7-14/TB1307-25	25 26	TB1307-25/TBRLY4-RL59-A1 TB1307-26/TBRLY4-RL59-A2	RL59
CO-HS-8622ST (FUTURE) CO-MXM-32-2, PRODUCT TANK MIXER 2 START COMMAND	OUTPUT-12	15	R13-S7-15/TB1307-27	27 28	TB1307-27/TBRLY4-RL60-A1 TB1307-28/TBRLY4-RL60-A2	RL60
CO-HS-8623SP (FUTURE) CO-MXM-32-3, PRODUCT TANK MIXER 3 STOP COMMAND	OUTPUT-13	16	R13-S7-16/TB1307-29	29 30	TB1307-29/TBRLY4-RL61-A1 TB1307-30/TBRLY4-RL61-A2	RL61
CO-HS-8623ST (FUTURE) CO-MXM-32-3, PRODUCT TANK MIXER 3 START COMMAND	OUTPUT-14	17	R13-S7-17/TB1307-31	31 32	TB1307-31/TBRLY4-RL62-A1 TB1307-32/TBRLY4-RL62-A2	RL62
SPARE	OUTPUT-15	18	R13-S7-18/TB1307-33	33 34	TB1307-33/TBRLY4-RL63-A1 TB1307-34/TBRLY4-RL63-A2	RL63
SPARE	OUTPUT-16	19	R13-S7-19/TB1307-35	35 36	TB1307-35/TBRLY4-RL64-A1 TB1307-36/TBRLY4-RL64-A2	RL64
COMMON (INPUT 9-16)	1-COM	20	R13-S7-20/TB1307-37	37		

TO TBDC
4663-05-03-SC-403
POWER SUPPLY

0VDC — TBDC(-)17/TB1307-37
+24VDC — TBDC(+)17/TB1307-20

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
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   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0130
UEL# 2012016-1EF-CLD-000-0130-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	HRM	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY
2014-MAR-12.

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DATE

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver
upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/13 SLOT 07
DISCRETE OUTPUT - STATIC
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-431 | REV 00

TIME - DESIGNFILE

TC_A1_BR.DWG 594X841

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

FIELD

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-13, SLOT-08
R13S08

CO-HS-8427ACL CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427A CLOSE COMMAND	OUT 1 NO	1	R13-S8-2/TB1308-1
	OUT 1	2	
CO-HS-8427AOP CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427A OPEN COMMAND	OUT 2 NO	3	R13-S8-4/TB1308-3
	OUT 2	4	
CO-HS-8427BCL CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427B CLOSE COMMAND	OUT 3 NO	5	R13-S8-6/TB1308-5
	OUT 3	6	
CO-HS-8427BOP CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427B OPEN COMMAND	OUT 4 NO	7	R13-S8-8/TB1308-7
	OUT 4	8	
CO-HS-8427CCL CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427C CLOSE COMMAND	OUT 5 NO	9	R13-S8-10/TB1308-9
	OUT 5	10	
CO-HS-8427COP CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427C OPEN COMMAND	OUT 6 NO	11	R13-S8-12/TB1308-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8427DCL CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427D CLOSE COMMAND	OUT 7 NO	14	R13-S8-15/TB1308-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8427DOP CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427D OPEN COMMAND	OUT 8 NO	17	R13-S8-18/TB1308-15
	OUT 8	18	
CO-HS-8427ECL CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427E CLOSE COMMAND	OUT 9 NO	19	R13-S8-20/TB1308-17
	OUT 9	20	
CO-HS-8427EOP CO-TK-27, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8427E OPEN COMMAND	OUT 10 NO	21	R13-S8-22/TB1308-19
	OUT 10	22	
CO-HS-8428ACL CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428A CLOSE COMMAND	OUT 11 NO	23	R13-S8-24/TB1308-21
	OUT 11	24	
CO-HS-8428AOP CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428A OPEN COMMAND	OUT 12 NO	25	R13-S8-26/TB1308-23
	OUT 12	26	
CO-HS-8428BCL CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428B CLOSE COMMAND	OUT 13 NO	27	R13-S8-28/TB1308-25
	OUT 13	28	
CO-HS-8428BOP CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428B OPEN COMMAND	OUT 14 NO	29	R13-S8-30/TB1308-27
	OUT 14	30	
NO CONNECTION	NC	31	
CO-HS-8428CCL CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428C CLOSE COMMAND	OUT 15 NO	32	R13-S8-33/TB1308-29
	OUT 15	33	
NO CONNECTION	NC	34	
CO-HS-8428COP CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428C OPEN COMMAND	OUT 16 NO	35	R13-S8-36/TB1308-31
	OUT 16	36	

TO TBDC
4663-05-03-SC-403
POWER SUPPLY

+24VDC → TBDC(+)18/R13-S8-35
0VDC → TBDC(-)18/TB1308-20

CO-HTCP-05 TB-1308

1	CO-MOV-8427A-51/CO-HTCP05-TB1308-1	1
2	CO-MOV-8427A-32/CO-HTCP05-TB1308-2	2
3	CO-MOV-8427A-52/CO-HTCP05-TB1308-3	3
4	CO-MOV-8427A-53/CO-HTCP05-TB1308-4	4
5	CO-MOV-8427B-51/CO-HTCP05-TB1308-5	1
6	CO-MOV-8427B-32/CO-HTCP05-TB1308-6	2
7	CO-MOV-8427B-52/CO-HTCP05-TB1308-7	3
8	CO-MOV-8427B-53/CO-HTCP05-TB1308-8	4
9	CO-MOV-8427C-51/CO-HTCP05-TB1308-9	1
10	CO-MOV-8427C-32/CO-HTCP05-TB1308-10	2
11	CO-MOV-8427C-52/CO-HTCP05-TB1308-11	3
12	CO-MOV-8427C-53/CO-HTCP05-TB1308-12	4
13	CO-MOV-8427D-51/CO-HTCP05-TB1308-13	1
14	CO-MOV-8427D-32/CO-HTCP05-TB1308-14	2
15	CO-MOV-8427D-52/CO-HTCP05-TB1308-15	3
16	CO-MOV-8427D-53/CO-HTCP05-TB1308-16	4
17	CO-MOV-8427E-51/CO-HTCP05-TB1308-17	1
18	CO-MOV-8427E-32/CO-HTCP05-TB1308-18	2
19	CO-MOV-8427E-52/CO-HTCP05-TB1308-19	3
20	CO-MOV-8427E-53/CO-HTCP05-TB1308-20	4
21	CO-MOV-8428A-51/CO-HTCP05-TB1308-21	1
22	CO-MOV-8428A-32/CO-HTCP05-TB1308-22	2
23	CO-MOV-8428A-52/CO-HTCP05-TB1308-23	3
24	CO-MOV-8428A-53/CO-HTCP05-TB1308-24	4
25	CO-MOV-8428B-51/CO-HTCP05-TB1308-25	1
26	CO-MOV-8428B-32/CO-HTCP05-TB1308-26	2
27	CO-MOV-8428B-52/CO-HTCP05-TB1308-27	3
28	CO-MOV-8428B-53/CO-HTCP05-TB1308-28	4
29	CO-MOV-8428C-51/CO-HTCP05-TB1308-29	1
30	CO-MOV-8428C-32/CO-HTCP05-TB1308-30	2
31	CO-MOV-8428C-52/CO-HTCP05-TB1308-31	3
32	CO-MOV-8428C-53/CO-HTCP05-TB1308-32	4

PART OF CABLE CO-C-1306

CO-MOV-8427A

1	CO-MOV-8427A-51/CO-HTCP05-TB1308-1	51	CO-HS-8427ACL
2	CO-MOV-8427A-32/CO-HTCP05-TB1308-2	32	
3	CO-MOV-8427A-52/CO-HTCP05-TB1308-3	52	CO-HS-8427AOP
4	CO-MOV-8427A-53/CO-HTCP05-TB1308-4	53	

PART OF CABLE CO-C-1307

CO-MOV-8427B

1	CO-MOV-8427B-51/CO-HTCP05-TB1308-5	51	CO-HS-8427BCL
2	CO-MOV-8427B-32/CO-HTCP05-TB1308-6	32	
3	CO-MOV-8427B-52/CO-HTCP05-TB1308-7	52	CO-HS-8427BOP
4	CO-MOV-8427B-53/CO-HTCP05-TB1308-8	53	

PART OF CABLE CO-C-1308

CO-MOV-8427C

1	CO-MOV-8427C-51/CO-HTCP05-TB1308-9	51	CO-HS-8427CCL
2	CO-MOV-8427C-32/CO-HTCP05-TB1308-10	32	
3	CO-MOV-8427C-52/CO-HTCP05-TB1308-11	52	CO-HS-8427COP
4	CO-MOV-8427C-53/CO-HTCP05-TB1308-12	53	

PART OF CABLE CO-C-1309

CO-MOV-8427D

1	CO-MOV-8427D-51/CO-HTCP05-TB1308-13	51	CO-HS-8427DCL
2	CO-MOV-8427D-32/CO-HTCP05-TB1308-14	32	
3	CO-MOV-8427D-52/CO-HTCP05-TB1308-15	52	CO-HS-8427DOP
4	CO-MOV-8427D-53/CO-HTCP05-TB1308-16	53	

PART OF CABLE CO-C-1310

CO-MOV-8427E

1	CO-MOV-8427E-51/CO-HTCP05-TB1308-17	51	CO-HS-8427ECL
2	CO-MOV-8427E-32/CO-HTCP05-TB1308-18	32	
3	CO-MOV-8427E-52/CO-HTCP05-TB1308-19	52	CO-HS-8427EOP
4	CO-MOV-8427E-53/CO-HTCP05-TB1308-20	53	

PART OF CABLE CO-C-1356

CO-MOV-8428A

1	CO-MOV-8428A-51/CO-HTCP05-TB1308-21	51	CO-HS-8428ACL
2	CO-MOV-8428A-32/CO-HTCP05-TB1308-22	32	
3	CO-MOV-8428A-52/CO-HTCP05-TB1308-23	52	CO-HS-8428AOP
4	CO-MOV-8428A-53/CO-HTCP05-TB1308-24	53	

PART OF CABLE CO-C-1357

CO-MOV-8428B

1	CO-MOV-8428B-51/CO-HTCP05-TB1308-25	51	CO-HS-8428BCL
2	CO-MOV-8428B-32/CO-HTCP05-TB1308-26	32	
3	CO-MOV-8428B-52/CO-HTCP05-TB1308-27	52	CO-HS-8428BOP
4	CO-MOV-8428B-53/CO-HTCP05-TB1308-28	53	

PART OF CABLE CO-C-1358

CO-MOV-8428C

1	CO-MOV-8428C-51/CO-HTCP05-TB1308-29	51	CO-HS-8428CCL
2	CO-MOV-8428C-32/CO-HTCP05-TB1308-30	32	
3	CO-MOV-8428C-52/CO-HTCP05-TB1308-31	52	CO-HS-8428COP
4	CO-MOV-8428C-53/CO-HTCP05-TB1308-32	53	

NOTES:

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2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0131
UEL# 2012016-1EF-CLD-000-0131-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY
2014-MAR-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

Upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/13 SLOT 08
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-432 | REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)

FIELD

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-13, SLOT-09

R13S09

CO-HS-8428DCL CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428D CLOSE COMMAND	OUT 1 NO	1	R13-S9-2/TB1309-1
	OUT 1	2	
CO-HS-8428DOP CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428D OPEN COMMAND	OUT 2 NO	3	R13-S9-4/TB1309-3
	OUT 2	4	
CO-HS-8428ECL CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428E CLOSE COMMAND	OUT 3 NO	5	R13-S9-6/TB1309-5
	OUT 3	6	
CO-HS-8428EOP CO-TK-28, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8428E OPEN COMMAND	OUT 4 NO	7	R13-S9-8/TB1309-7
	OUT 4	8	
CO-HS-8429ACL (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429A CLOSE COMMAND	OUT 5 NO	9	R13-S9-10/TB1309-9
	OUT 5	10	
CO-HS-8429AOP (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429A OPEN COMMAND	OUT 6 NO	11	R13-S9-12/TB1309-11
	OUT 6	12	
NO CONNECTION	NC	13	
CO-HS-8429BCL (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429B CLOSE COMMAND	OUT 7 NO	14	R13-S9-15/TB1309-13
	OUT 7	15	
NO CONNECTION	NC	16	
CO-HS-8429BOP (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429B OPEN COMMAND	OUT 8 NO	17	R13-S9-18/TB1309-15
	OUT 8	18	
CO-HS-8429CCL (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429C CLOSE COMMAND	OUT 9 NO	19	R13-S9-20/TB1309-17
	OUT 9	20	
CO-HS-8429COP (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429C OPEN COMMAND	OUT 10 NO	21	R13-S9-22/TB1309-19
	OUT 10	22	
CO-HS-8429DCL (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429D CLOSE COMMAND	OUT 11 NO	23	R13-S9-24/TB1309-21
	OUT 11	24	
CO-HS-8429DOP (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429D OPEN COMMAND	OUT 12 NO	25	R13-S9-26/TB1309-23
	OUT 12	26	
CO-HS-8429ECL (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429E CLOSE COMMAND	OUT 13 NO	27	R13-S9-28/TB1309-25
	OUT 13	28	
CO-HS-8429EOP (FUTURE) CO-TK-29, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8429E OPEN COMMAND	OUT 14 NO	29	R13-S9-30/TB1309-27
	OUT 14	30	
NO CONNECTION	NC	31	
CO-HS-8430ACL (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430A CLOSE COMMAND	OUT 15 NO	32	R13-S9-33/TB1309-29
	OUT 15	33	
NO CONNECTION	NC	34	
CO-HS-8430AOP (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430A OPEN COMMAND	OUT 16 NO	35	R13-S9-36/TB1309-31
	OUT 16	36	

TO TBDC
4663-05-03-SC-403
POWER SUPPLY

+24VDC — TBDC(+)19/R13-S9-35

0VDC — TBDC(-)19/TB1309-20

CO-HTCP-05
TB-1309

1	COMOV8428D-51/COHTCP05-TB1309-1	1	PART OF CABLE CO-C-1359
2	COMOV8428D-32/COHTCP05-TB1309-2	2	
3	COMOV8428D-52/COHTCP05-TB1309-3	3	
4	COMOV8428D-53/COHTCP05-TB1309-4	4	
5	COMOV8428E-51/COHTCP05-TB1309-5	1	PART OF CABLE CO-C-1360
6	COMOV8428E-32/COHTCP05-TB1309-6	2	
7	COMOV8428E-52/COHTCP05-TB1309-7	3	
8	COMOV8428E-53/COHTCP05-TB1309-8	4	

CO-MOV-8428D

1	COMOV8428D-51/COHTCP05-TB1309-1	51	CO-HS-8428DCL
2	COMOV8428D-32/COHTCP05-TB1309-2	32	
3	COMOV8428D-52/COHTCP05-TB1309-3	52	CO-HS-8428DOP
4	COMOV8428D-53/COHTCP05-TB1309-4	53	

CO-MOV-8428E

1	COMOV8428E-51/COHTCP05-TB1309-5	51	CO-HS-8428ECL
2	COMOV8428E-32/COHTCP05-TB1309-6	32	
3	COMOV8428E-52/COHTCP05-TB1309-7	52	CO-HS-8428EOP
4	COMOV8428E-53/COHTCP05-TB1309-8	53	

NOTES:

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   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
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   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0132
UEL# 2012016-1EF-CLD-000-0132-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOOLEY ALBERTA

2014-MAR-12

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/13 SLOT 09
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-433 | REV 00

TIMED DESIGN FILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-05)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-13, SLOT-10

CO-HTCP-05
TB-1310

CO-HS-8430BCL (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430B CLOSE COMMAND	OUT 1 NO	1	R13-S10-2/TB1310-1	1
	OUT 1	2		2
CO-HS-8430BOP (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430B OPEN COMMAND	OUT 2 NO	3	R13-S10-4/TB1310-3	3
	OUT 2	4		4
CO-HS-8430CCL (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430C CLOSE COMMAND	OUT 3 NO	5	R13-S10-6/TB1310-5	5
	OUT 3	6		6
CO-HS-8430COP (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430C OPEN COMMAND	OUT 4 NO	7	R13-S10-8/TB1310-7	7
	OUT 4	8		8
CO-HS-8430DCL (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430D CLOSE COMMAND	OUT 5 NO	9	R13-S10-10/TB1310-9	9
	OUT 5	10		10
CO-HS-8430DOP (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430D OPEN COMMAND	OUT 6 NO	11	R13-S10-12/TB1310-11	11
	OUT 6	12		12
NO CONNECTION	NC	13		
CO-HS-8430ECL (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430E CLOSE COMMAND	OUT 7 NO	14	R13-S10-15/TB1310-13	13
	OUT 7	15		14
NO CONNECTION	NC	16		
CO-HS-8430EOP (FUTURE) CO-TK-30, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8430E OPEN COMMAND	OUT 8 NO	17	R13-S10-18/TB1310-15	15
	OUT 8	18		16
CO-HS-8431ACL (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431A CLOSE COMMAND	OUT 9 NO	19	R13-S10-20/TB1310-17	17
	OUT 9	20		18
CO-HS-8431AOP (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431A OPEN COMMAND	OUT 10 NO	21	R13-S10-22/TB1310-19	19
	OUT 10	22		20
CO-HS-8431BCL (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431B CLOSE COMMAND	OUT 11 NO	23	R13-S10-24/TB1310-21	21
	OUT 11	24		22
CO-HS-8431BOP (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431B OPEN COMMAND	OUT 12 NO	25	R13-S10-26/TB1310-23	23
	OUT 12	26		24
CO-HS-8431CCL (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431C CLOSE COMMAND	OUT 13 NO	27	R13-S10-28/TB1310-25	25
	OUT 13	28		26
CO-HS-8431COP (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431C OPEN COMMAND	OUT 14 NO	29	R13-S10-30/TB1310-27	27
	OUT 14	30		28
NO CONNECTION	NC	31		
CO-HS-8431DCL (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431D CLOSE COMMAND	OUT 15 NO	32	R13-S10-33/TB1310-29	29
	OUT 15	33		30
NO CONNECTION	NC	34		
CO-HS-8431DOP (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431D OPEN COMMAND	OUT 16 NO	35	R13-S10-36/TB1310-31	31
	OUT 16	36		32

TO TBDC
4663-05-03-SC-403
POWER SUPPLY

+24VDC — TBDC(+)20/R13-S10-35
0VDC — TBDC(-)20/TB1310-20

NOTES:

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   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0133
UEL# 2012016-1EF-CLD-000-0133-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	HHM	SRL	JED	DCB	UPSIDE
	2014-MAR-12	2014-MAR-12	2014-MAR-12	2014-MAR-12	2014-MAR-12	

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

PROFESSIONAL ENGINEER ALBERTA — JAMES DOORNBOS — 2014-MAR-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DATE

REV. NO.	DATE	PERMIT NUMBER:

TransCanada — In business to deliver
Upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/13 SLOT 10 DISCRETE OUTPUT - RELAY I/O WIRING DIAGRAM

SCALE	DRAWING No	REV.
N.T.S.	4663-05-03-SC-434	00

TIME DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-05)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-13, SLOT-11

CO-HTCP-05
TB-1311

CO-HS-8431ECL (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431E CLOSE COMMAND	OUT 1 NO	1	R13-S11-2/TB1311-1	1
	OUT 1	2		2
CO-HS-8431EOP (FUTURE) CO-TK-31, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8431E OPEN COMMAND	OUT 2 NO	3	R13-S11-4/TB1311-3	3
	OUT 2	4		4
CO-HS-8432ACL (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432A CLOSE COMMAND	OUT 3 NO	5	R13-S11-6/TB1311-5	5
	OUT 3	6		6
CO-HS-8432AOP (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432A OPEN COMMAND	OUT 4 NO	7	R13-S11-8/TB1311-7	7
	OUT 4	8		8
CO-HS-8432BCL (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432B CLOSE COMMAND	OUT 5 NO	9	R13-S11-10/TB1311-9	9
	OUT 5	10		10
CO-HS-8432BOP (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432B OPEN COMMAND	OUT 6 NO	11	R13-S11-12/TB1311-11	11
	OUT 6	12		12
NO CONNECTION	NC	13		
CO-HS-8432CCL (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432C CLOSE COMMAND	OUT 7 NO	14	R13-S11-15/TB1311-13	13
	OUT 7	15		14
NO CONNECTION	NC	16		
CO-HS-8432COP (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432C OPEN COMMAND	OUT 8 NO	17	R13-S11-18/TB1311-15	15
	OUT 8	18		16
CO-HS-8432DCL (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432D CLOSE COMMAND	OUT 9 NO	19	R13-S11-20/TB1311-17	17
	OUT 9	20		18
CO-HS-8432DOP (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432D OPEN COMMAND	OUT 10 NO	21	R13-S11-22/TB1311-19	19
	OUT 10	22		20
CO-HS-8432ECL (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432E CLOSE COMMAND	OUT 11 NO	23	R13-S11-24/TB1311-21	21
	OUT 11	24		22
CO-HS-8432EOP (FUTURE) CO-TK-32, HEAVY/LIGHT OIL TO/FROM KHTT TANK MANIFOLD, CO-MOV-8432E OPEN COMMAND	OUT 12 NO	25	R13-S11-26/TB1311-23	23
	OUT 12	26		24
SPARE	OUT 13 NO	27	R13-S11-28/TB1311-25	25
	OUT 13	28		26
SPARE	OUT 14 NO	29	R13-S11-30/TB1311-27	27
	OUT 14	30		28
NO CONNECTION	NC	31		
SPARE	OUT 15 NO	32	R13-S11-33/TB1311-29	29
	OUT 15	33		30
NO CONNECTION	NC	34		
SPARE	OUT 16 NO	35	R13-S11-36/TB1311-31	31
	OUT 16	36		32

TO TBDC
4663-05-03-SC-403
POWER SUPPLY

+24VDC — TBDC(+)21/R13-S11-35
0VDC — TBDC(-)21/TB1311-20

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   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0134
UEL# 2012016-1EF CLD-000-0134-01

REFERENCE DRAWINGS

DRAWING No	TITLE
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REVISION

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APPROVAL

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PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

PROFESSIONAL ENGINEER JAMES DOODY ALBERTA

2014-MAR-12

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

DATE

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/13 SLOT 11
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-435 | REV 00

TIME-DESIGNFILE

ID

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22) | FIELD

TERMINAL CONTROL PANEL (CO-HTCP-05)

DISCRETE OUTPUT MODULE (IC694MDL916)
RACK-13, SLOT-12

CO-HTCP-05
TB-1312

SPARE	OUT 1 NO	1	R13-S12-2/TB1312-1	1, 2
	OUT 1	2		
SPARE	OUT 2 NO	3	R13-S12-4/TB1312-3	3, 4
	OUT 2	4		
SPARE	OUT 3 NO	5	R13-S12-6/TB1312-5	5, 6
	OUT 3	6		
SPARE	OUT 4 NO	7	R13-S12-8/TB1312-7	7, 8
	OUT 4	8		
SPARE	OUT 5 NO	9	R13-S12-10/TB1312-9	9, 10
	OUT 5	10		
SPARE	OUT 6 NO	11	R13-S12-12/TB1312-11	11, 12
	OUT 6	12		
NO CONNECTION	NC	13		
SPARE	OUT 7 NO	14	R13-S12-15/TB1312-13	13, 14
	OUT 7	15		
NO CONNECTION	NC	16		
SPARE	OUT 8 NO	17	R13-S12-18/TB1312-15	15, 16
	OUT 8	18		
SPARE	OUT 9 NO	19	R13-S12-20/TB1312-17	17, 18
	OUT 9	20		
SPARE	OUT 10 NO	21	R13-S12-22/TB1312-19	19, 20
	OUT 10	22		
SPARE	OUT 11 NO	23	R13-S12-24/TB1312-21	21, 22
	OUT 11	24		
SPARE	OUT 12 NO	25	R13-S12-26/TB1312-23	23, 24
	OUT 12	26		
SPARE	OUT 13 NO	27	R13-S12-28/TB1312-25	25, 26
	OUT 13	28		
SPARE	OUT 14 NO	29	R13-S12-30/TB1312-27	27, 28
	OUT 14	30		
NO CONNECTION	NC	31		
SPARE	OUT 15 NO	32	R13-S12-33/TB1312-29	29, 30
	OUT 15	33		
NO CONNECTION	NC	34		
SPARE	OUT 16 NO	35	R13-S12-36/TB1312-31	31, 32
	OUT 16	36		

TO TBDC
4663-05-03-SC-403
POWER SUPPLY

+24VDC — TBDC(+)22/R13-S12-35
0VDC — TBDC(-)22/TB1312-20

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-00-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0135
UEL# 2012016-1EF-CLD-000-0135-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	HHM	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA — JAMES DOODY — 2014-MAR-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver
upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

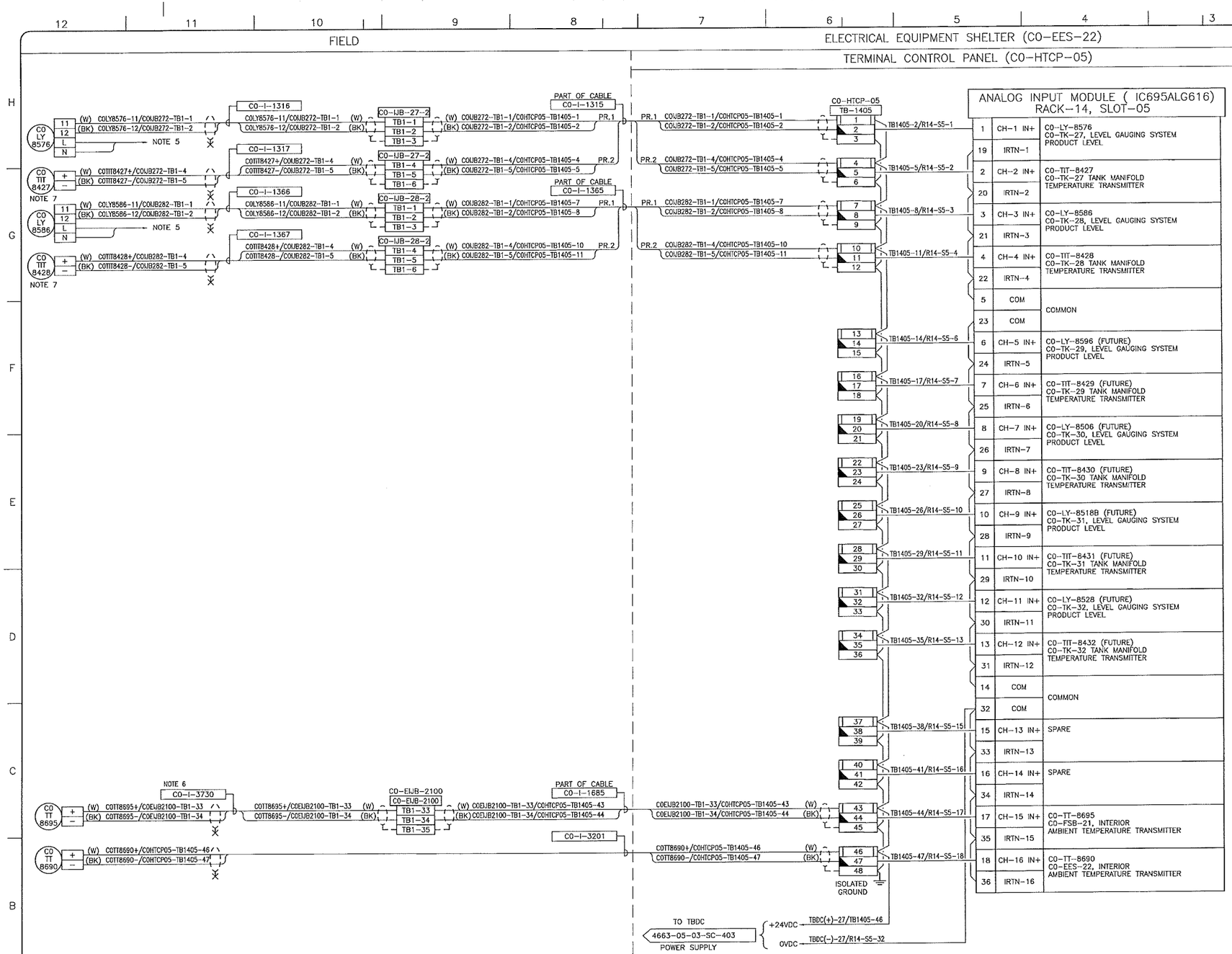
FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/13 SLOT 12 DISCRETE OUTPUT - RELAY I/O WIRING DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-436	00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT REQUIRES EXTERNAL 120VAC POWER.
6. OFFICE BUILDING CONTRACTOR TO SUPPLY, INSTALL, MARK AND TERMINATE ALL OFFICE BUILDING WIRING.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0136
UEL# 2012016-1EF-CLD-000-0136-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
-	

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	219710-4	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL
	DATE
PROFESSIONAL ENGINEER JAMES DOOLEY ALBERTA 2014-MAR-12	PERMIT TO PRACTICE UPSIDE ENGINEERING LTD. PERMIT NUMBER: P 5508 The Association of Professional Engineers, Geologists and Geophysicists of Alberta
REV. NO.	DATE / PERMIT NUMBER:

TransCanada — In business to deliver
upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663	CHAINAGE:	DISCIPLINE # 05

CO-HTCP-05, PLC-11/14 SLOT 05 ANALOG INPUT - SINGLE ENDED I/O WIRING DIAGRAM

SCALE N.T.S.	DRAWING No 4663-05-03-SC-441	REV 00

TIME - DESIGNFILE

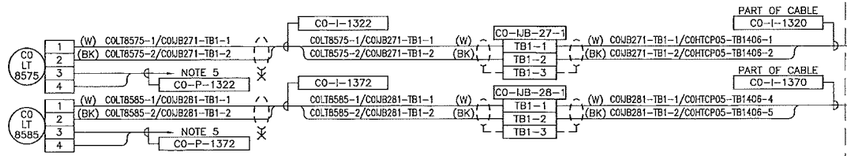
TC_A1_BR.DWG 594X841

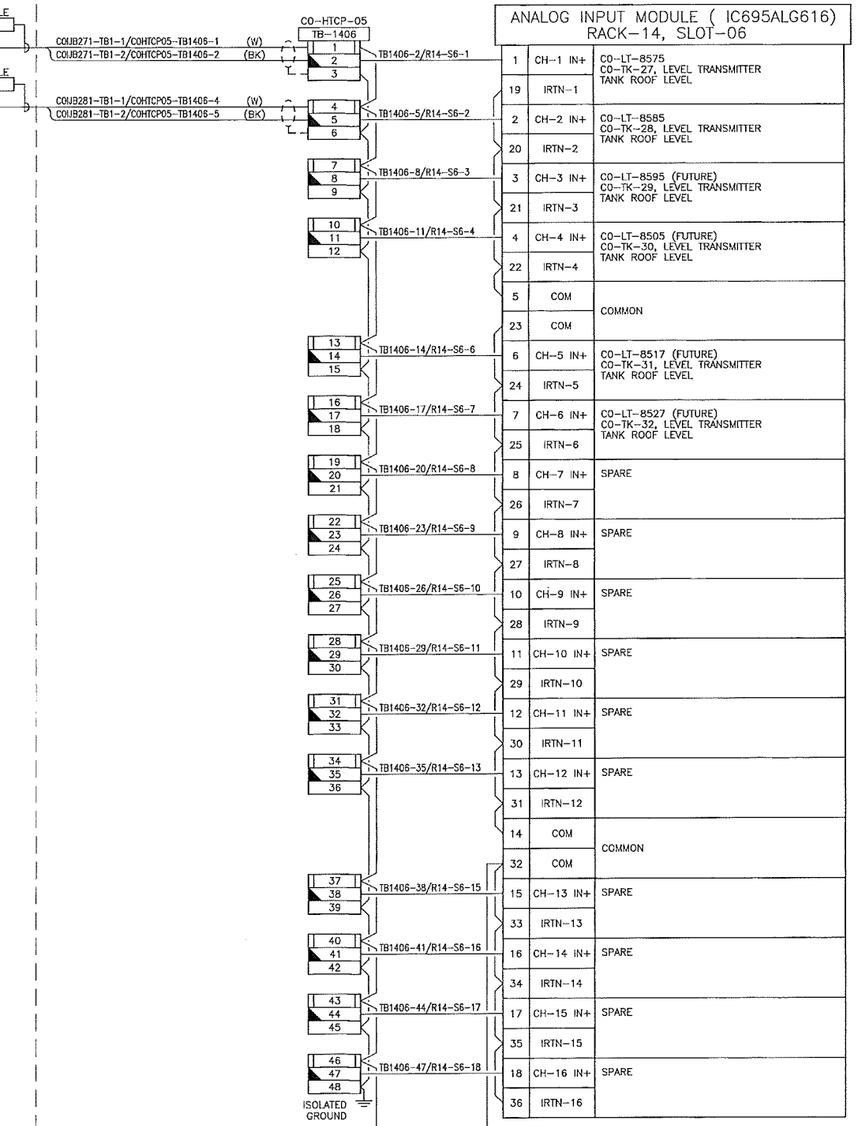
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)





ANALOG INPUT MODULE (IC695ALG616)
RACK-14, SLOT-06

1	CH-1 IN+	CO-LT-8575 CO-TK-27, LEVEL TRANSMITTER TANK ROOF LEVEL
19	IRTN-1	
2	CH-2 IN+	CO-LT-8585 CO-TK-28, LEVEL TRANSMITTER TANK ROOF LEVEL
20	IRTN-2	
3	CH-3 IN+	CO-LT-8595 (FUTURE) CO-TK-29, LEVEL TRANSMITTER TANK ROOF LEVEL
21	IRTN-3	
4	CH-4 IN+	CO-LT-8505 (FUTURE) CO-TK-30, LEVEL TRANSMITTER TANK ROOF LEVEL
22	IRTN-4	
5	COM	COMMON
23	COM	
6	CH-5 IN+	CO-LT-8517 (FUTURE) CO-TK-31, LEVEL TRANSMITTER TANK ROOF LEVEL
24	IRTN-5	
7	CH-6 IN+	CO-LT-8527 (FUTURE) CO-TK-32, LEVEL TRANSMITTER TANK ROOF LEVEL
25	IRTN-6	
8	CH-7 IN+	SPARE
26	IRTN-7	
9	CH-8 IN+	SPARE
27	IRTN-8	
10	CH-9 IN+	SPARE
28	IRTN-9	
11	CH-10 IN+	SPARE
29	IRTN-10	
12	CH-11 IN+	SPARE
30	IRTN-11	
13	CH-12 IN+	SPARE
31	IRTN-12	
14	COM	COMMON
32	COM	
15	CH-13 IN+	SPARE
33	IRTN-13	
16	CH-14 IN+	SPARE
34	IRTN-14	
17	CH-15 IN+	SPARE
35	IRTN-15	
18	CH-16 IN+	SPARE
36	IRTN-16	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT REQUIRES EXTERNAL 120VAC POWER. SEE DRAWING 4663-05-00-SC-107 & 108.
6. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0137
UEL# 2012016-1EF-CLD-000-0137-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER JAMES DOODY ALBERTA
2014-MAR-12

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/14 SLOT 06
ANALOG INPUT - SINGLE ENDED
I/O WIRING DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-442	00

TIME---DESIGNFILE

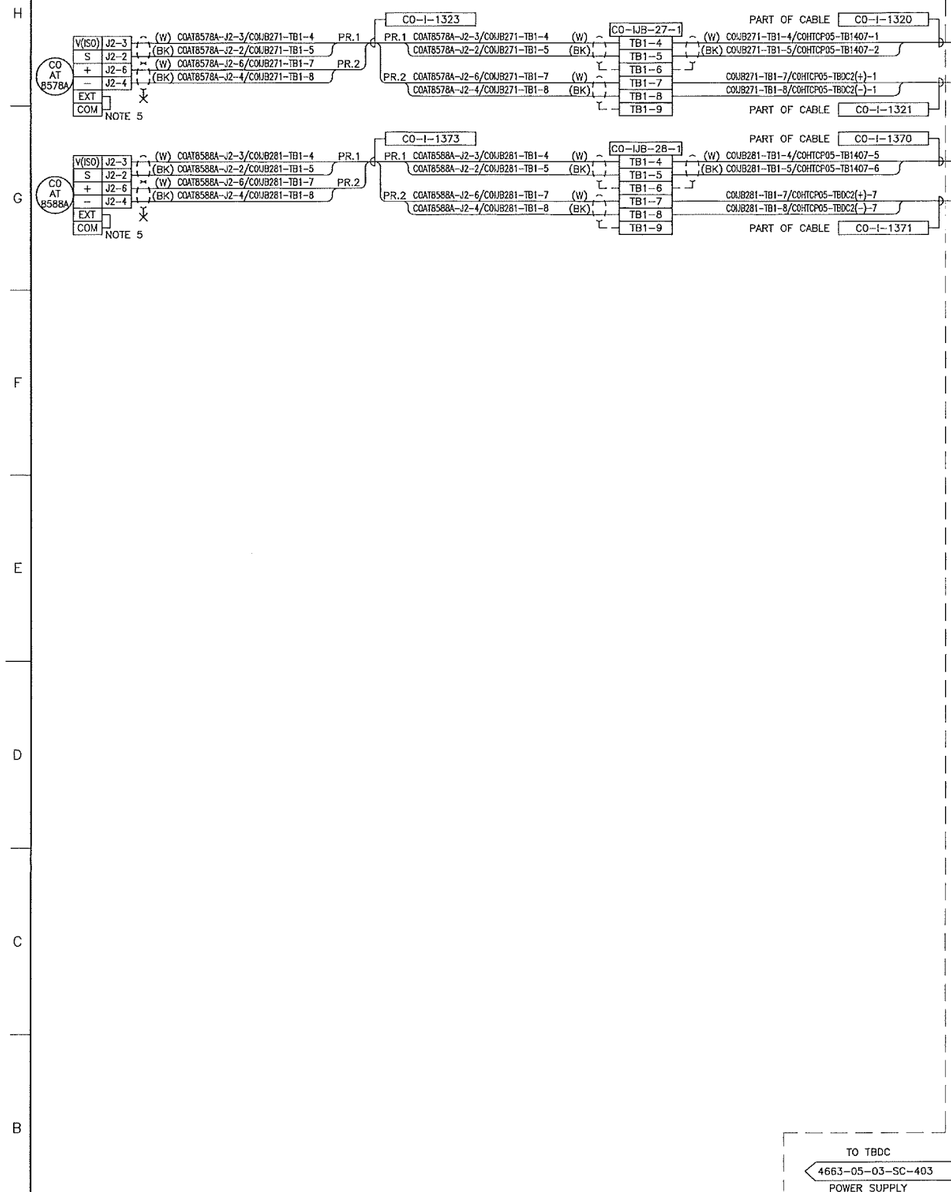
TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
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4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT DIP SWITCH POSITION.
6. FOR CONTINUATION OF 24VDC POWER SOURCE WIRING, SEE DWG 4663-05-03-SC-404.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
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   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0138
UEL# 2012016-1EF-CLD-000-0138-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOUGLAS BERTRAM 29845
2014-MAR-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

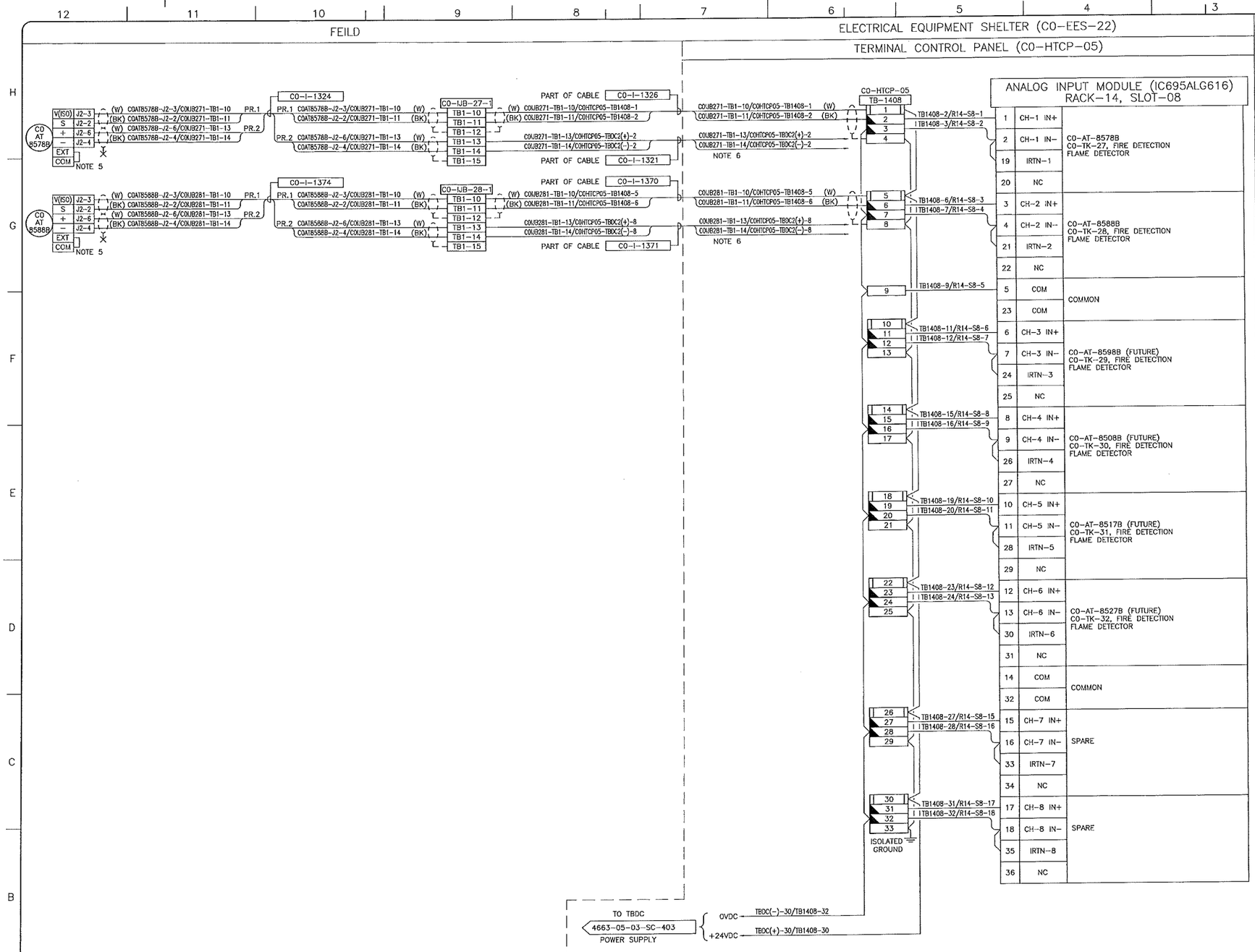
FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/14 SLOT 07
ANALOG INPUT - DIFFERENTIAL
I/O WIRING DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-443	00

TIME---DESIGNFILE

ID---TC_A1_BR.DWG 594X841



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT DIP SWITCH POSITION.
6. FOR CONTINUATION OF 24VDC POWER SOURCE WIRING, SEE DWG 4663-05-03-SC-404.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0139
UEL# 2012016-1EF-CLD-000-0139-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
-	

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOORNBOS 2014-MAR-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

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KEYSTONE HARDISTY TANK TERMINAL

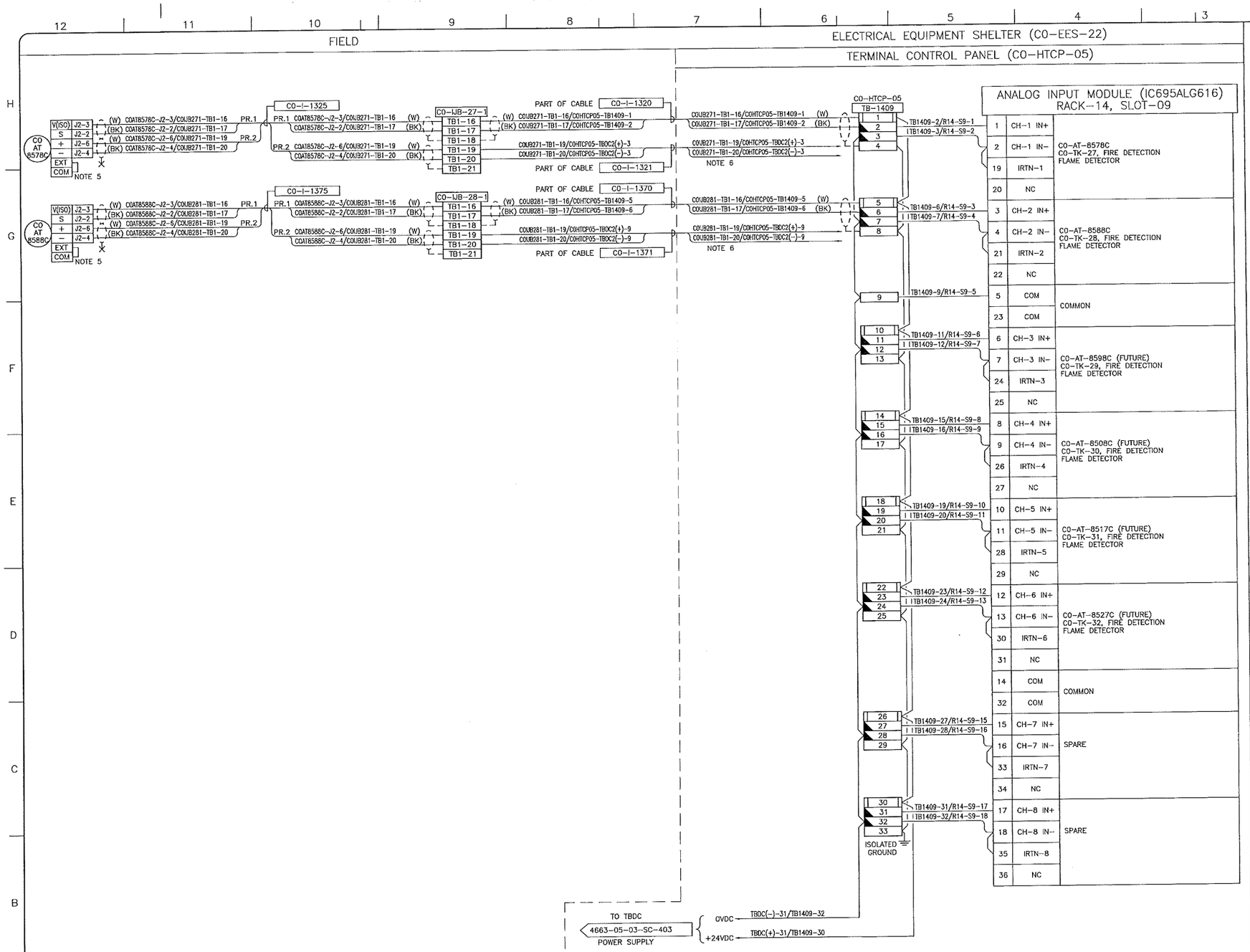
FM # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/14 SLOT 08 ANALOG INPUT - DIFFERENTIAL I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-444 | REV 00

TC_A1_BR.DWG 594X841

TIME — DESIGNFILE



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT DIP SWITCH POSITION.
6. FOR CONTINUATION OF 24VDC POWER SOURCE WIRING, SEE DWG 4663-05-03-SC-404.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
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   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0140
UEL# 2012016-1EF-CLD-000-0140-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
-	

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 23553

2014-MAR-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver
upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

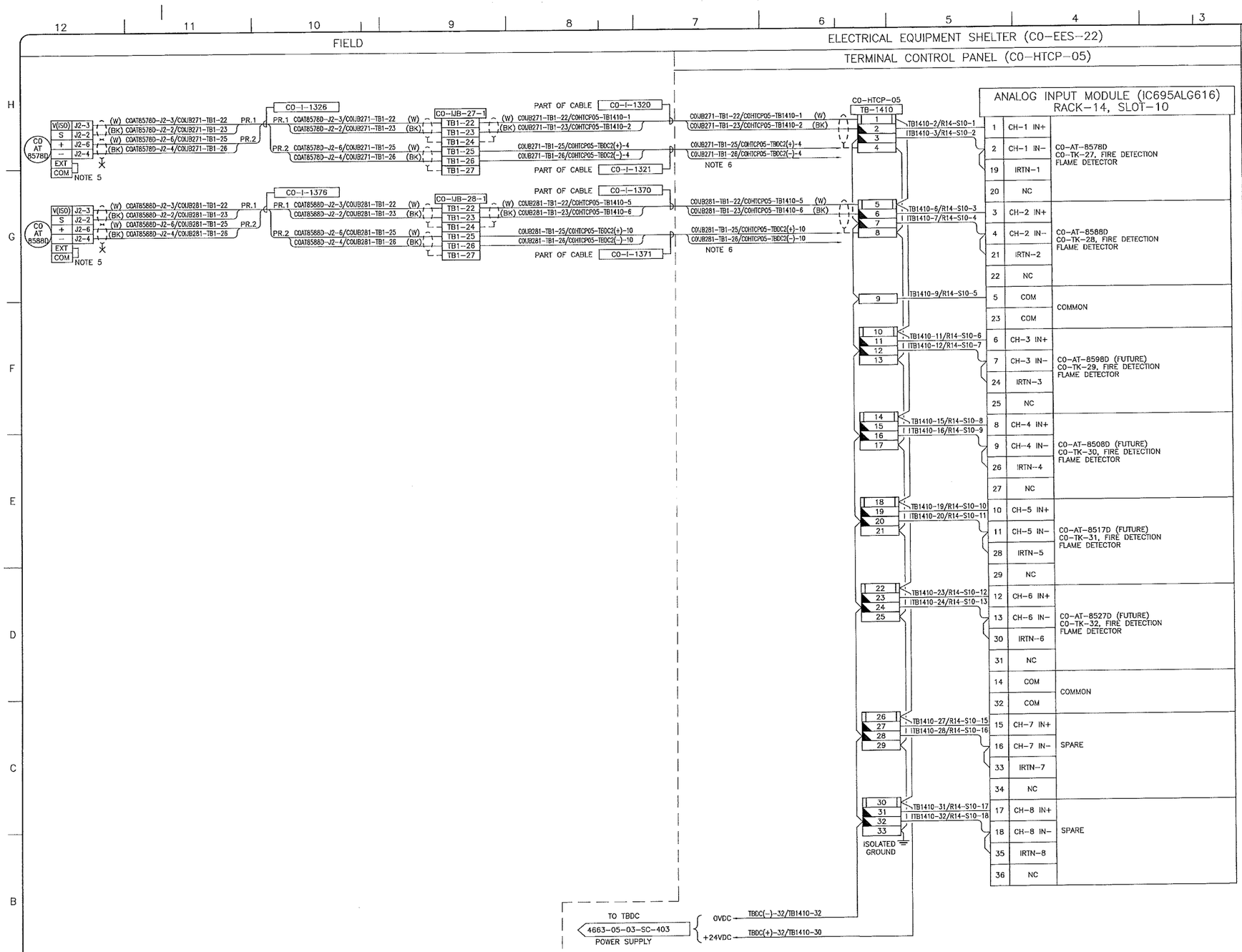
FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-HTCP-05, PLC-11/14 SLOT 09 ANALOG INPUT - DIFFERENTIAL I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-445 | REV 00

TC_A1_BR.DWG 594X841

TIME----DESIGNFILE



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT DIP SWITCH POSITION.
6. FOR CONTINUATION OF 24VDC POWER SOURCE WIRING, SEE DWG 4663-05-03-SC-404.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
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   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0141
UEL# 2012016-1EF-CLD-000-0141-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
-	

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL
	DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY
2014-MAR-12

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/14 SLOT 10 ANALOG INPUT - DIFFERENTIAL I/O WIRING DIAGRAM

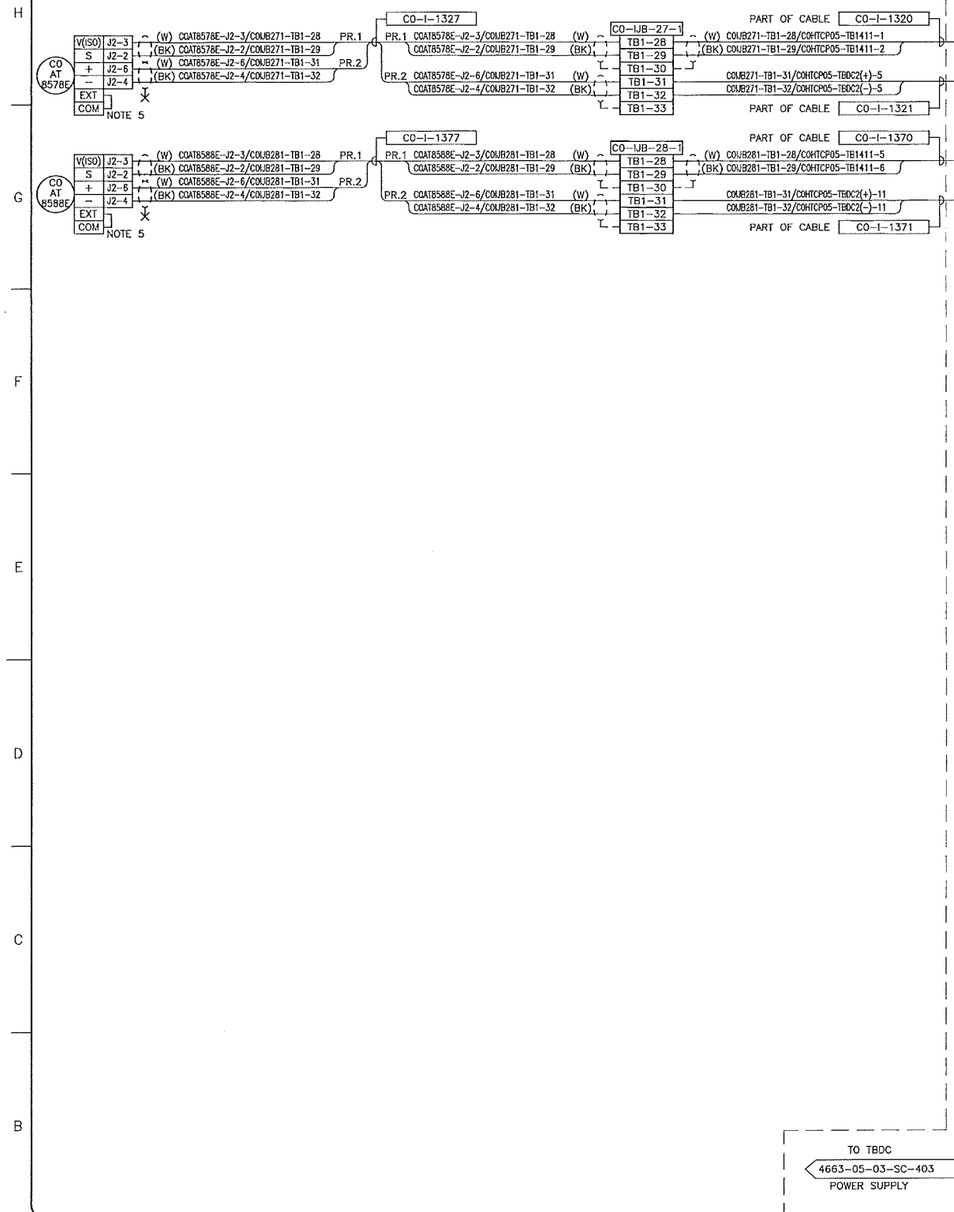
SCALE	DRAWING No	REV
N.T.S.	4663-05-03-SC-446	00

TIME
DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT DIP SWITCH POSITION.
6. FOR CONTINUATION OF 24VDC POWER SOURCE WIRING, SEE DWG 4663-05-03-SC-404.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0142
UEL# 2012016-1EF-CLD-000-0142-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DVC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER JAMES DOUGLAS BRUCE ALBERTA
2014-MAR-12

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663	CHAINAGE:	DISCIPLINE # 05

CO-HTCP-05, PLC-11/14 SLOT 11 ANALOG INPUT - DIFFERENTIAL I/O WIRING DIAGRAM

SCALE N.T.S.	DRAWING No 4663-05-03-SC-447	REV 00

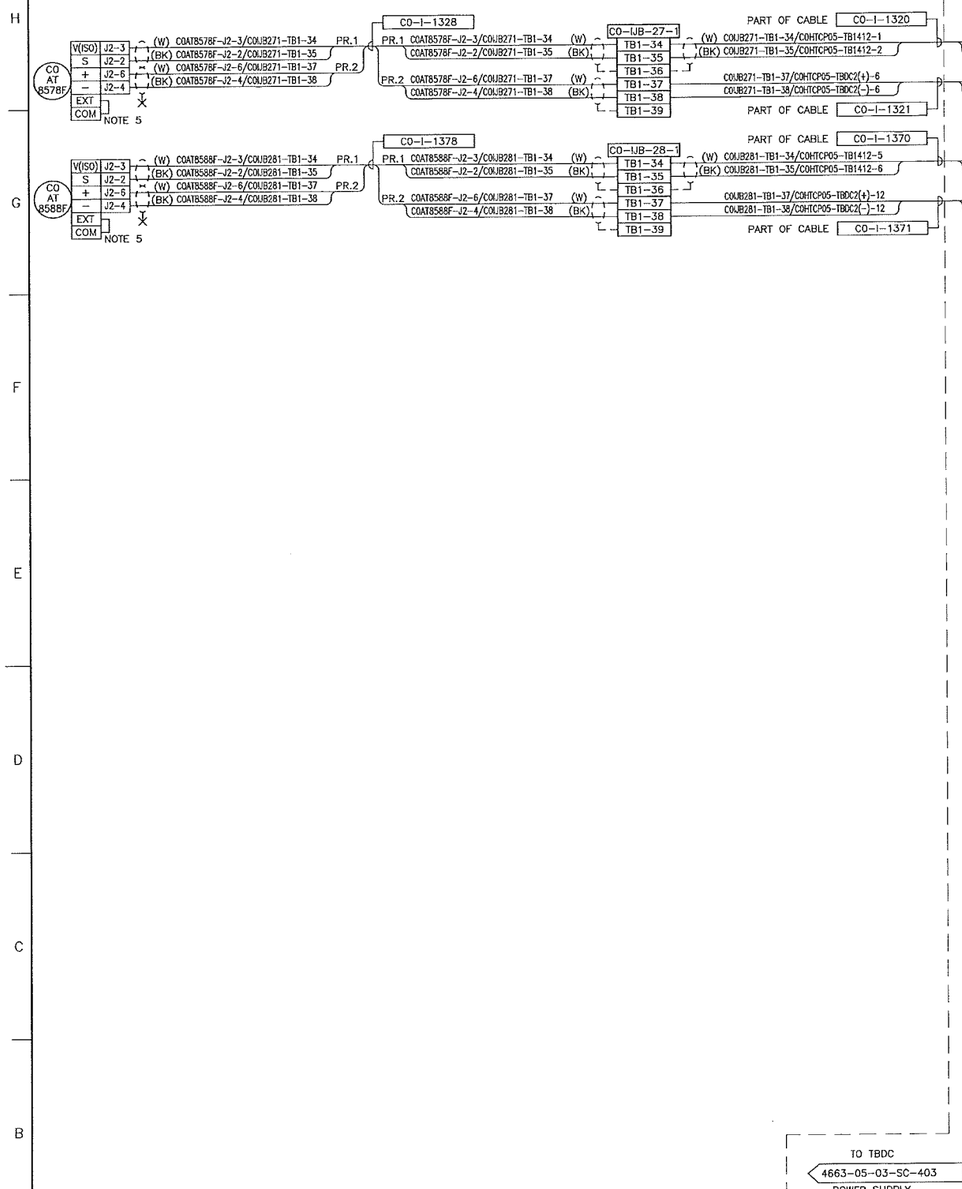
TC_A1_BR.DWG 594X841

TIME ---- DESIGNFILE

FIELD

ELECTRICAL EQUIPMENT SHELTER (CO-EES-22)

TERMINAL CONTROL PANEL (CO-HTCP-05)



ANALOG INPUT MODULE (IC695ALG616)
RACK-14, SLOT-12

1	CH-1 IN+	CO-AT-8578F CO-TK-27, FIRE DETECTION FLAME DETECTOR
2	CH-1 IN-	
19	IRTN-1	
20	NC	
3	CH-2 IN+	CO-AT-8588F CO-TK-28, FIRE DETECTION FLAME DETECTOR
4	CH-2 IN-	
21	IRTN-2	
22	NC	
5	COM	COMMON
23	COM	
6	CH-3 IN+	SPARE
7	CH-3 IN-	
24	IRTN-3	
25	NC	
8	CH-4 IN+	SPARE
9	CH-4 IN-	
26	IRTN-4	
27	NC	
10	CH-5 IN+	SPARE
11	CH-5 IN-	
28	IRTN-5	
29	NC	
12	CH-6 IN+	SPARE
13	CH-6 IN-	
30	IRTN-6	
31	NC	
14	COM	COMMON
32	COM	
15	CH-7 IN+	SPARE
16	CH-7 IN-	
33	IRTN-7	
34	NC	
17	CH-8 IN+	SPARE
18	CH-8 IN-	
35	IRTN-8	
36	NC	

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT DIP SWITCH POSITION.
6. FOR CONTINUATION OF 24VDC POWER SOURCE WIRING, SEE DWG 4663-05-03-SC-404.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0143
UEL# 2012016-1EF-CLD-000-0143-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY

2014-MAR-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

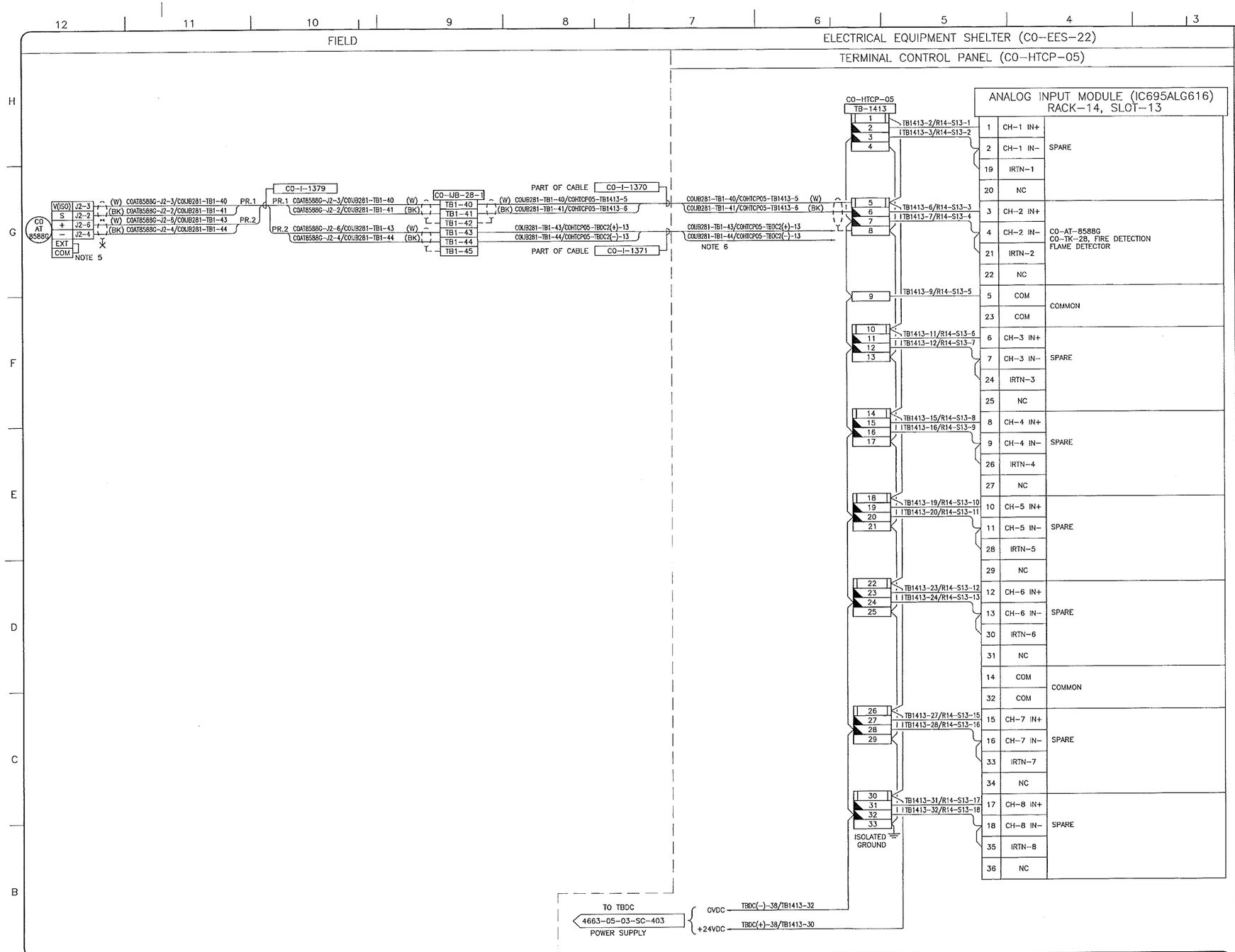
CO-HTCP-05, PLC-11/14 SLOT 12
ANALOG INPUT - DIFFERENTIAL
I/O WIRING DIAGRAM

SCALE	DRAWING No	REV.
N.T.S.	4663-05-03-SC-448	00

TIME DESIGNFILE

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
5. INSTRUMENT DIP SWITCH POSITION.
6. FOR CONTINUATION OF 24VDC POWER SOURCE WIRING, SEE DWG 4663-05-03-SC-404.
7. FOR INSTRUMENT LOCATIONS REFER TO INSTRUMENT LOCATION PLAN DWGS OR SAFETY PLAN DWG LISTED BELOW:
   4663-06-00-03-703 CO-TANK-21 AREA
   4663-06-00-03-706 CO-TANK-22 AREA
   4663-06-00-03-709 CO-TANK-23 AREA
   4663-06-00-03-712 CO-TANK-24 AREA
   4663-06-00-03-715 CO-TANK-25 AREA
   4663-06-00-03-718 CO-TANK-26 AREA
   4663-06-00-03-721 CO-TANK-27 AREA
   4663-06-00-03-724 CO-TANK-28 AREA
   4663-06-00-03-745 CO-VALVE MANIFOLD AREA
   4663-06-00-03-748 CO-BOOSTER PUMP AREA
   4663-09-01-004 BLDGS CO-EES-21, 22, AND VES 21

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

SDN# 25472-130-J5-0000-P0144
UEL# 2012016-1EF-CLD-000-0144-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION
00	2014-03-07	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL						
PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOOBAY

2014-MAR-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.

PERMIT NUMBER: P 5508

The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TransCanada In business to deliver

upside Engineering Ltd.

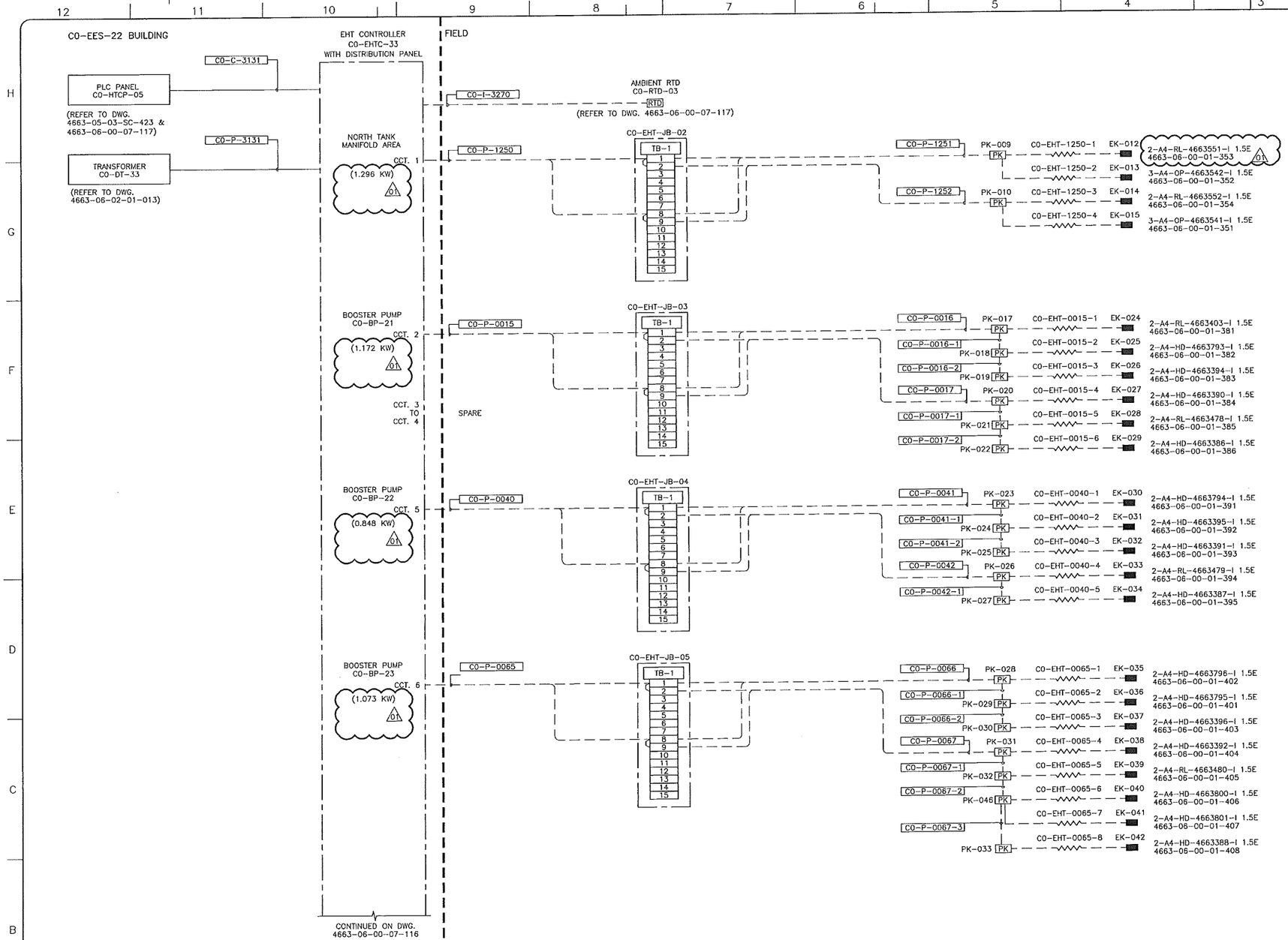
KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

CO-HTCP-05, PLC-11/14 SLOT 13 ANALOG INPUT - DIFFERENTIAL I/O WIRING DIAGRAM

SCALE	DRAWING No	REV.
N.T.S.	4663-05-03-SC-449	00

TIME DESIGNFILE



NOTES:

1. ELECTRICAL INSTALLATIONS TO CONFORM TO LATEST CEC CODE. ALL EQUIPMENT TAGS TO BE PREFIXED WITH '130-KSHTT-'
2. ALL CABLES SHALL ENTER AT THE BOTTOM OF THE JUNCTION BOX.

LEGEND:

- [PK] – POWER CONNECTION KIT (PK)
- ■ – END TERMINATION KIT (EK)
- ∿∿∿ – TRACER
- [RTD] – RTD

CO P XXXX
- CABLE TAG IDENTIFIER
- P=POWER, I=INSTRUMENT AND C=CONTROL CABLE
- UNIT #

SDN# 25472-130-EH--0000-P0115
UEL# 2012016-1EF-EWD-000-0815-01

REFERENCE DRAWINGS	
DRAWING No	TITLE
4663-06-00-07-118	ELECTRICAL HEAT TRACING CONTROL\CO-EHTC-33\INTERCONNEC. WIRING DIAG. SHT. 2
4663-06-00-07-119	ELECTRICAL HEAT TRACING CONTROL\CO-EHTC-33\INTERCONNEC. WIRING DIAG. SHT. 3

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2014-01-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	PRG	PLR	HHM	JED	DCB	UPSIDE
01	2014-04-11	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	PRG	PLR	HHM	JED	DCB	UPSIDE
				PRG	PLR				

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-APR-15

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		06

ELECTRICAL HEAT TRACING CONTROLLER CO-EHTC-33 BLOCK WIRING DIAGRAM SHEET 1

SCALE	DRAWING No	REV
N.T.S.	4663-06-00-07-115	01

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841

CO-EES-22 BUILDING

EHT CONTROLLER
CO-EHTC-33
WITH DISTRIBUTION PANEL

FIELD

CONTINUED FROM DWG. 4663-06-00-07-115

BOOSTER PUMP
CO-BP-24
CCT. 7
(2.867 KW) 01

CO-P-0090

CO-EHT-JB-06
TB-1 (1–15)

CCT. 8 TO CCT. 9 — SPARE 01

CO-P-0091	PK-034	CO-EHT-0090-1	EK-043	2-A4-HD-4663797-I 1.5E 4663-06-00-01-421
CO-P-0091-1	PK-035	CO-EHT-0090-2	EK-044	2-A4-RL-4663577-I 1.5E 4663-06-00-01-418
CO-P-0091-2	PK-036	CO-EHT-0090-3	EK-045	2-A4-HD-4663792-I 1.5E 4663-06-00-01-413
CO-P-0091-3	PK-037	CO-EHT-0090-4	EK-046	2-A4-HD-4663397-I 1.5E 4663-06-00-01-411
CO-P-0091-4	PK-038	CO-EHT-0090-5	EK-047	2-A4-HD-4663393-I 1.5E 4663-06-00-01-414
CO-P-0092	PK-039	CO-EHT-0090-6	EK-048	2-A4-RL-4663481-I 1.5E 4663-06-00-01-415
CO-P-0092-1	PK-047	CO-EHT-0090-7	EK-049	2-A4-HD-4663798-I 1.5E 4663-06-00-01-419
		CO-EHT-0090-8	EK-050	2-A4-HD-4663799-I 1.5E 4663-06-00-01-420
CO-P-0092-2	PK-040	CO-EHT-0090-9	EK-051	2-A4-HD-4663389-I 1.5E 4663-06-00-01-412
CO-P-0092-3	PK-041	CO-EHT-0090-10	EK-052	2-A4-RL-4663489-I 1.5E 4663-06-00-01-416
CO-P-0092-4	PK-042	CO-EHT-0090-11	EK-053	2-A4-RL-4663576-I 1.5E 4663-06-00-01-417

EAST SUMP TANK
CO-OST-21
CO-P-0106
PK-001 — CO-EHT-0090-12 — EK-001
3-A4-OP-4663381-I 1.5E
4663-06-00-01-301
4663-06-00-01-302
4663-06-00-01-304
4663-06-00-01-305

TANK
CO-TK-27
CCT. 10
(4.238 KW) 01
CO-P-1335

CO-EHT-JB-16
TB-1 (1–15)

CCT. 11 — SPARE

CO-P-1336
PK-053 — CO-EHT-1335-1 — EK-081
CO-EHT-1335-2 — EK-082
6-A5-FW-4663548-I 1.5E
4663-06-00-01-261
4663-06-00-01-262

01

CO-EHT-JB-17
TB-1 (1–15)

TANK
CO-TK-28
CCT. 12
(2.992 KW) 01
CO-P-1385

CO-P-1386
PK-054 — CO-EHT-1385-1 — EK-083
CO-EHT-1385-2 — EK-084
6-A5-FW-4663549-I 1.5E
4663-06-00-01-271
4663-06-00-01-272

CCT. 13 — SPARE

CONTINUED ON DWG. 4663-06-00-07-120 01

NOTES:

1. ELECTRICAL INSTALLATIONS TO CONFORM TO LATEST CEC CODE. ALL EQUIPMENT TAGS TO BE PREFIXED WITH '130-KSHT-'
2. ALL CABLES SHALL ENTER AT THE BOTTOM OF THE JUNCTION BOX. 01

LEGEND:

- PK – POWER CONNECTION KIT (PK)
- EK – END TERMINATION KIT (EK)
- TRACER
- RTD – RTD

CO P XXXX
- CABLE TAG IDENTIFIER
- P=POWER, I=INSTRUMENT AND C=CONTROL CABLE
- UNIT #

SDN# 25472-130-EH-0000-P0116
UEL# 2012016-1EF-EWD-000-0816-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-00-07-115	ELECTRICAL HEAT TRACING CONTROL\CO-EHTC-33\BLOCK WIRING DIAG. SHT. 1
4663-06-00-07-116	ELECTRICAL HEAT TRACING CONTROL\CO-EHTC-33\BLOCK WIRING DIAG. SHT. 2

REVISION

REV No	DATE	DESCRIPTION
00	2014-01-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
01	2014-04-11	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	PRG	PLR	HHM	JED	DCB	UPSIDE
2197104	PRG	PLR	HHM	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER ALBERTA — JAMES DOODY — 2014-APR-15

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

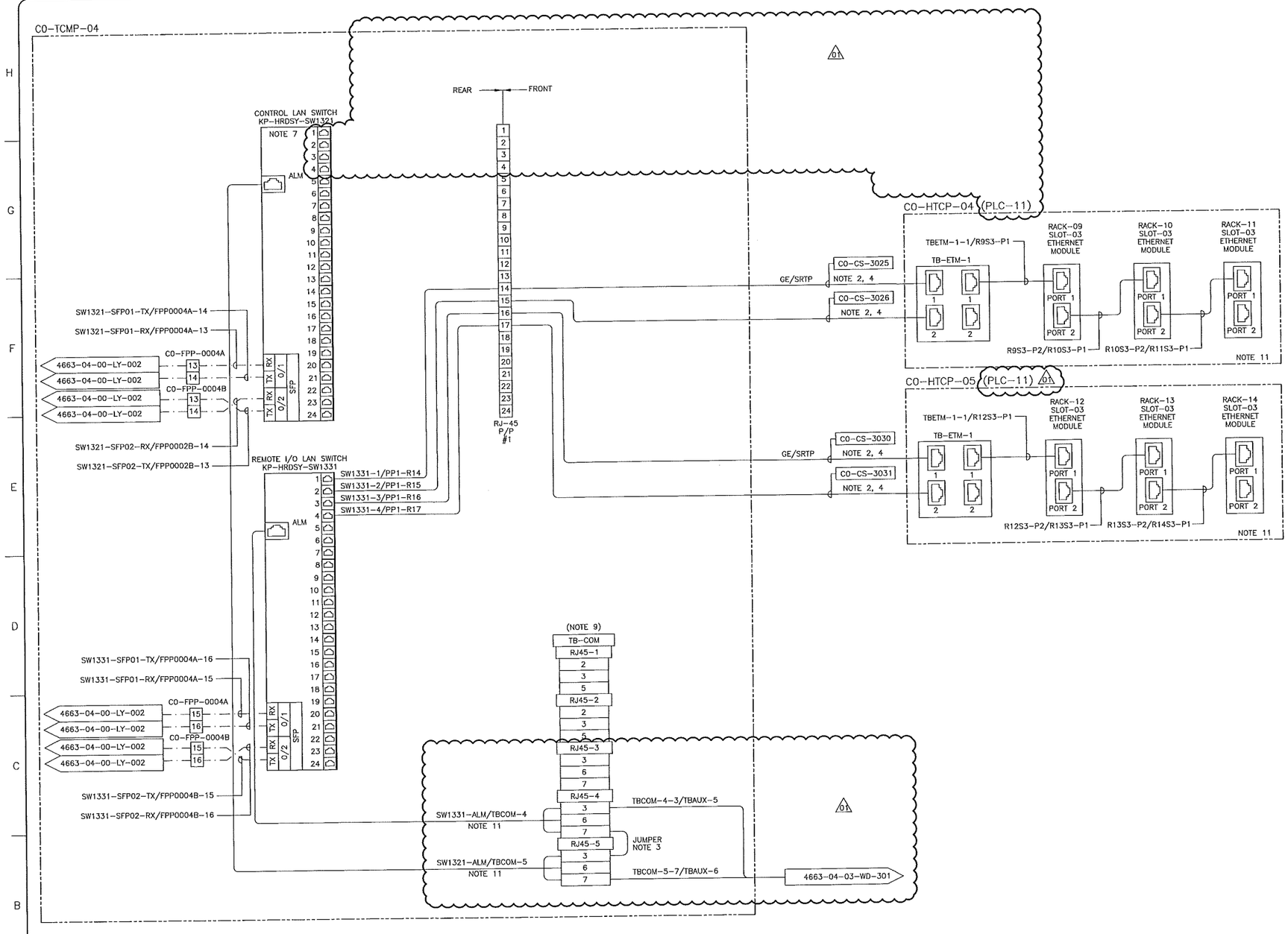
FIA # 4663 | CHAINAGE: | DISCIPLINE # 06

ELECTRICAL HEAT TRACING CONTROLLER CO-EHTC-33 BLOCK WIRING DIAGRAM SHEET 2

SCALE N.T.S. | DRAWING No 4663-06-00-07-116 | REV 01

TMC — DESIGNFILE

TC_A1_BR.DWG 594X841



NOTES:

1. NOT USED.
2. BY EES VENDOR.
3. BY PANEL VENDOR.
4. CAT 6 STRAIGHT THROUGH CABLE.
5. NOT USED.
6. WIRING INTERNAL TO PANELS/CABINETS IS COMPLETED BY PANEL/CABINET MANUFACTURER.
7. PORTS 1-24 ARE 100 BASE T.
8. NOT USED.
9. SCREW TERMINALS ON FIELD SIDE, RJ45 SOCKET ON OTHER.
10. NOT USED.
11. CABLE TO BE TAGGED AT BOTH ENDS WHEN INSTALLED BETWEEN DEVICES IN SAME PANEL.

LEGEND:

- FIBER OPTIC
- FIBER OPTIC PATCH CORD
- COPPER WIRE

ABBREVIATIONS:

MEWS	– MEASUREMENT ENGINEERING WORKSTATION
FOC	– FIBRE OPTIC CONVERTOR
HMI	– HUMAN MACHINE INTERFACE
M/TCP	– MODBUS TRANSMISSION PROTOCOL
SCADA	– SUPERVISORY CONTROL AND DATA ACQUISITION
SYB	– SYBERVISOR
TKM	– TANKMASTER
MB	– METERBANK
PLC	– PROGRAMMABLE LOGIC CONTROLLER
FBM	– FIELD BUS MODEM
RTG	– REMOTE TANK GAUGE
FCU	– FIELD COMMUNICATION UNIT
MRF	– MULTI-FUNCTION RELAY
MM	– MULTI-MODE
P/P	– PATCH PANEL
PLS	– PROGRAMMABLE LOGIC SOLVER
CCTV	– CLOSED CIRCUIT TELEVISION
EES	– ELECTRICAL EQUIPMENT SHELTER
MCC	– MOTOR CONTROL CENTER
TCP	– TERMINAL CONTROL PANEL
TCMP	– TERMINAL COMMUNICATION PANEL
BPM	– BOOSTER PUMP MOTOR
B	– POWER QUALITY METER
FPP	– FIBRE PATCH PANEL
TCP/IP	– TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL
ESB	– ELECTRICAL SERVICE BUILDING
GE/SRTP	– GENERAL ELECTRIC/SECURE REAL TIME TRANSFER PROTOCOL
HE	– HARDISTY EAST
KVM	– KEYBOARD, VIDEO AND MOUSE
ILO	– INTEGRATED LIGHT OUT
FW	– FIREWALL

SDN# 25472-130-J1-0000-P0090
UEL# 2012016-1EF-CSY-000-0090-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-04-00-LY-002	HARDISTY KHTT TERMINAL FIBER OPTIC WIRING DIAGRAM
4663-05-03-SC-411	KHTT CO-HTCP-05, PLC-11/12 SLOT 05 DISCRETE INPUT I/O WIRING DIAGRAM

REVISION

REV No.	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
01	2013-11-20	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
2197104	RQC	DMC	SRL	JED	DCB	UPSIDE
	RQC	DMC	SRL	JED	DCB	

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER JAMES DOODY ALBERTA
2013-NOV-20

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
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REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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KEYSTONE HARDISTY TANK TERMINAL

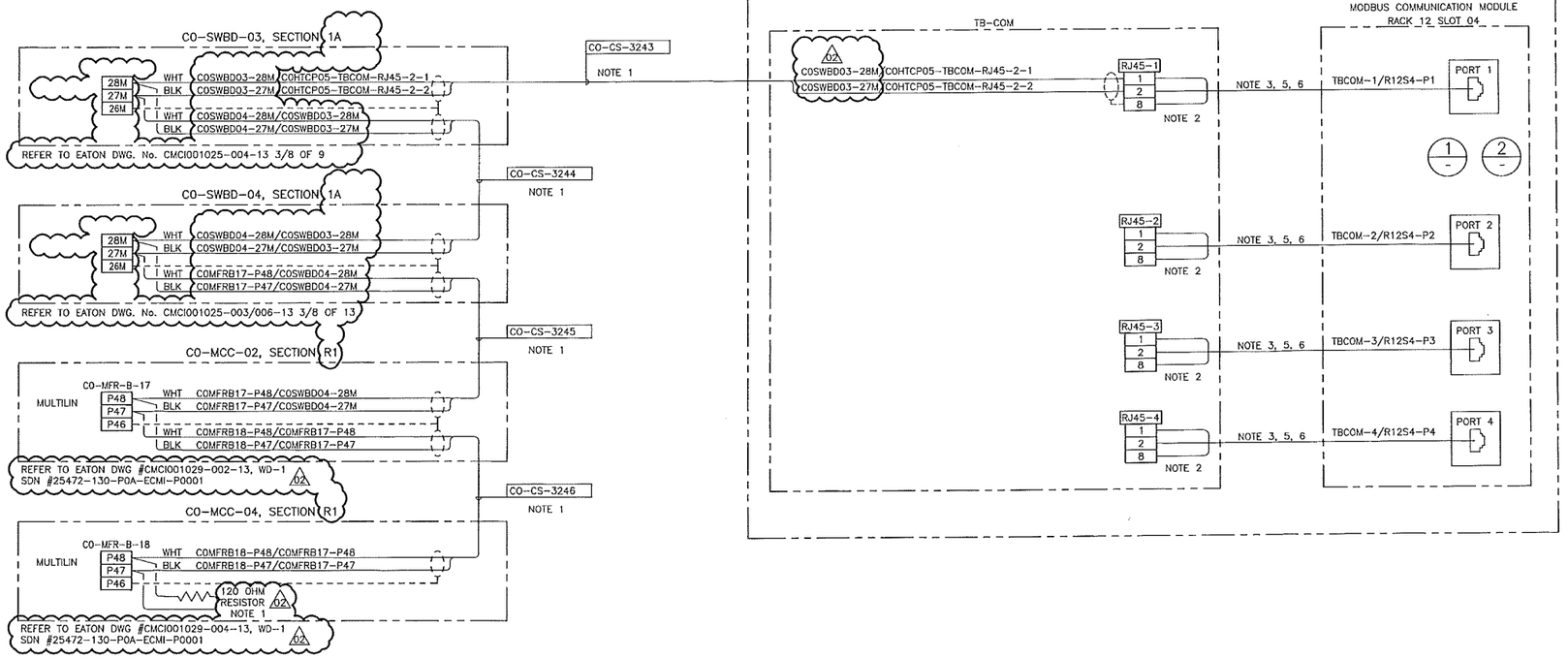
FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

HARDISTY KHTT TERMINAL
CO-EES-22
CONTROL SYSTEM WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-00-SC-090 | REV 01

TC_A1_BR.DWG 594X841

TIME— —DESIGNFILE

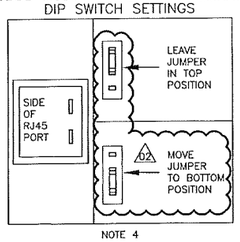


MODBUS MODULE RJ45 PINOUT
(RS485 HALF DUPLEX)

PIN	SIGNAL
1	TX+/RX+(DI)
2	– 02
3	TX–/RX–(DO)
4	TERMINATION
5	GND
6	–
7	–
8	GND

DETAIL 1

MODBUS MODULE INTERNAL TERMINATION
DIP SWITCH SETTINGS



NOTE 4

DETAIL 2

NOTES:

1. BY EES VENDOR.
2. RJ-45 TERMINAL BLOCK WITH SCREWED TERMINALS ON FIELD SIDE & RJ CONNECTOR ON TERMINAL PLC SIDE.
3. CAT 6 STRAIGHT THROUGH CABLE WITH RJ-45 CONNECTOR ON BOTH ENDS.
4. TO ENABLE 120 OHM TERMINATION RESISTOR FOR RJ-45 MODBUS PORT.
5. BY PANEL VENDOR.
6. CABLE TO BE TAGGED AT BOTH ENDS WHEN INSTALLED BETWEEN DEVICES IN SAME PANEL.

MODBUS COMMUNICATION MODULE PORT ASSIGNMENTS:

PORT 1 – CO-SWBD-03/04, CO-MCC-03/04
(BAUD RATE = 19.2K PARITY NONE)
PORT 2 – SPARE
PORT 3 – SPARE
PORT 4 – SPARE

ABBREVIATIONS:

MEWS	– MEASUREMENT ENGINEERING WORKSTATION
FOC	– FIBER OPTIC CONVERTOR
HMI	– HUMAN MACHINE INTERFACE
M/TCP	– MODBUS TRANSMISSION PROTOCOL
SCADA	– SUPERVISORY CONTROL AND DATA ACQUISITION
SYB	– SYBERVISOR
TKM	– TANKMASTER
MB	– METERBANK
PLC	– PROGRAMMABLE LOGIC CONTROLLER
FBM	– FIELD BUS MODEM
RTG	– REMOTE TANK GAUGE
FCU	– FIELD COMMUNICATION UNIT
MFR	– MULTI-FUNCTION RELAY
MM	– MULTI-MODE
P/P	– PATCH PANEL
PLS	– PROGRAMMABLE LOGIC SOLVER
CCTV	– CLOSED CIRCUIT TELEVISION
EES	– ELECTRICAL EQUIPMENT SHELTER
MCC	– MOTOR CONTROL CENTER
TCP	– TERMINAL CONTROL PANEL
TCMP	– TERMINAL COMMUNICATION PANEL
BPM	– BOOSTER PUMP MOTOR
B	– POWER QUALITY METER
FPP	– FIBER PATCH PANEL
TCP/IP	– TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL
ESB	– ELECTRICAL SERVICE BUILDING
GE/SRTP	– GENERAL ELECTRIC/SECURE REAL TIME TRANSFER PROTOCOL
HE	– HARDISTY EAST
KVM	– KEYBOARD, VIDEO AND MOUSE
ILO	– INTEGRATED LIGHT OUT
FW	– FIREWALL

LEGEND:

——— COPPER WIRE

– – – – – – FIBER OPTIC

•• EXISTING EQUIPMENT OR CONNECTION

SDN# 25472-130-J1-0000-P0091
UEL# 2012016-1EF-CSY-000-0091-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-06-02-07-035	CO-EES-22 MODBUS INTERCONNECTION WIRING DIAGRAM

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
01	2013-11-20	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
02	2014-02-12	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
2197104	RQC	DMC	SRL	JED	DCB	UPSIDE
2197104	JBM	DMC	SRL	JED	DCB	UPSIDE
	UH	DL	SRL	JED	DCB	

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-FEB-13

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
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KEYSTONE HARDISTY TANK TERMINAL

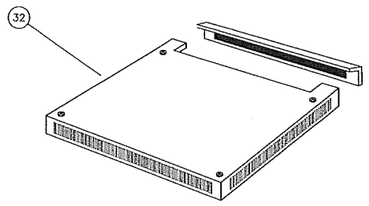
FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

CO-EES-22
MODBUS RS485 NETWORK (CO-EES-22)
INTERCONNECTING WIRING DIAGRAM

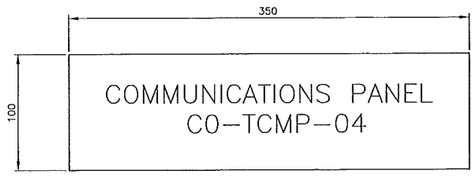
SCALE N.T.S. | DRAWING No 4663-05-00-SC-091 | REV 02

TIME-DESIGN FILE

TC_A1_BR.DWG 594X841

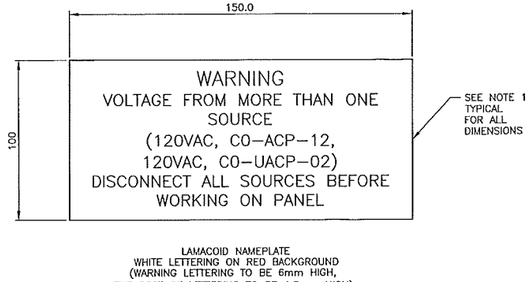


ROOF PLATE
SCALE N.T.S



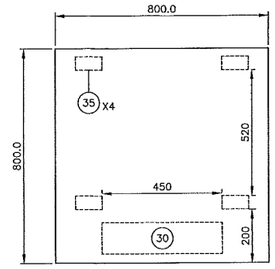
LAMACOID NAMEPLATE
BLACK LETTERING ON WHITE
BACKGROUND (LETTERING 20mm HIGH)
NP1

DETAIL 1
SCALE N.T.S.

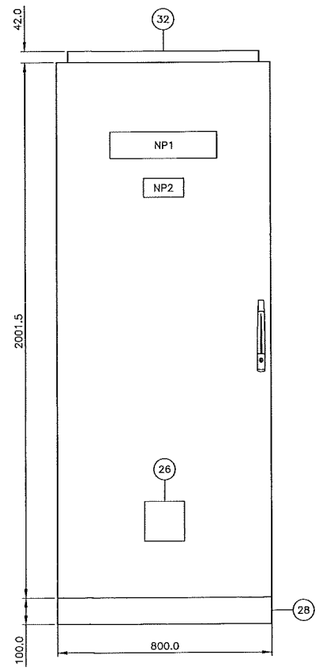


LAMACOID NAMEPLATE
WHITE LETTERING ON RED BACKGROUND
(WARNING LETTERING TO BE 6mm HIGH,
THE REST OF LETTERING TO BE 4.8mm HIGH)
NP2

DETAIL 2
SCALE N.T.S.



FRONT TOP VIEW
SCALE N.T.S



FRONT VIEW
SCALE: N.T.S

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. FRONT DOOR SHALL BE PROVIDED WITH NAMEPLATE AND WARNING AS SHOWN.
3. PANEL VENDOR TO FINALIZE PANEL LAYOUT.
4. BILL OF MATERIAL SHOWN ON DWG 4663-04-03-PA-303.

SDN# 25472-130-TO-0000-P0301
UEL# 2012016-1EF-CAB-000-0401-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-04-03-PA-302	KHTT COMMUNICATION PANEL CO-TCMP-04 LAYOUT SHT 2 OF 2
4663-04-03-PA-303	KHTT COMMUNICATION PANEL CO-TCMP-04 BILL OF MATERIAL

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER PROVINCE OF ALBERTA
2013-OCT-03

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663	CHAINAGE:	DISCIPLINE # 04

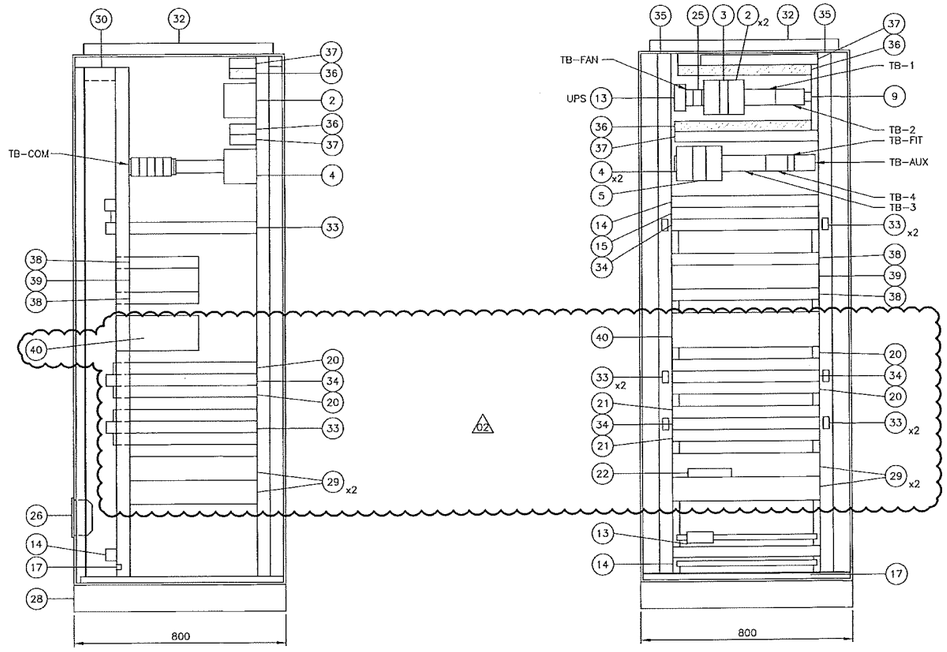
KHTT COMMUNICATION PANEL
CO-TCMP-04 (CO-EES-22)
PANEL LAYOUT SHEET 1 OF 2

SCALE 1:10	DRAWING No 4663-04-03-PA-301	REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TIME---DESIGNFILE



LEFT SIDE
(INSIDE WALL)

FRONT VIEW
(DOOR REMOVED)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. FRONT DOOR SHALL BE PROVIDED WITH NAMEPLATE AND WARNING AS SHOWN.
3. PANEL VENDOR TO FINALIZE PANEL LAYOUT.
4. BILL OF MATERIAL SHOWN ON DWG 4663-04-03-PA-303. △02

SDN# 25472-130-TO-0000-P0302
UEL# 2012016-1EF-CAB-000-0402-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-04-03-PA-301	KHTT COMMUNICATION PANEL CO-TCMP-04 LAYOUT SHT 1 OF 2
4663-04-03-PA-303	KHTT COMMUNICATION PANEL CO-TCMP-04 BILL OF MATERIAL

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
01	2013-11-20	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
02	2014-02-12	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
2197104	MAF	DMC	SRL	JED	DCB	UPSIDE
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-FEB-12

PERMIT/ ENG. APPROVAL

DATE

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UPSIDE ENGINEERING LTD.
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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 04

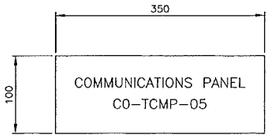
KHTT COMMUNICATION PANEL CO-TCMP-04 (CO-EES-22) PANEL LAYOUT SHEET 2 OF 2

SCALE N.T.S. | DRAWING No 4663-04-03-PA-302 | REV. 02

TIME - DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

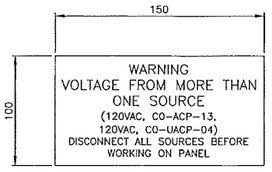


NP1

LAMACOID NAMEPLATE
BLACK LETTERING ON WHITE
BACKGROUND (LETTERING 20mm HIGH)

DETAIL 1
SCALE N.T.S.

SEE NOTE 1

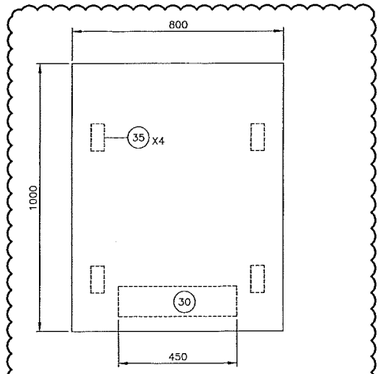


NP2

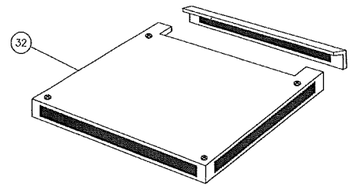
LAMACOID NAMEPLATE
WHITE LETTERING ON RED BACKGROUND
(WARNING LETTERING TO BE 6mm HIGH,
THE REST OF LETTERING TO BE 4.8mm HIGH)

DETAIL 2
SCALE N.T.S.

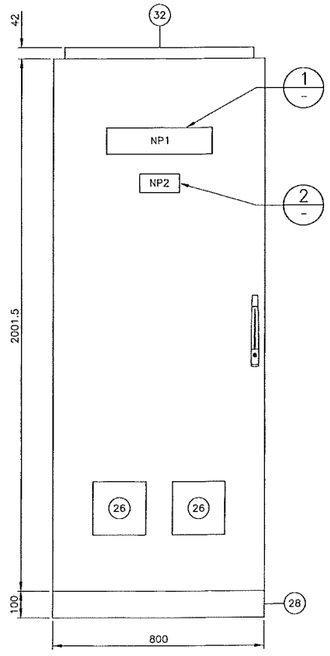
SEE NOTE 1



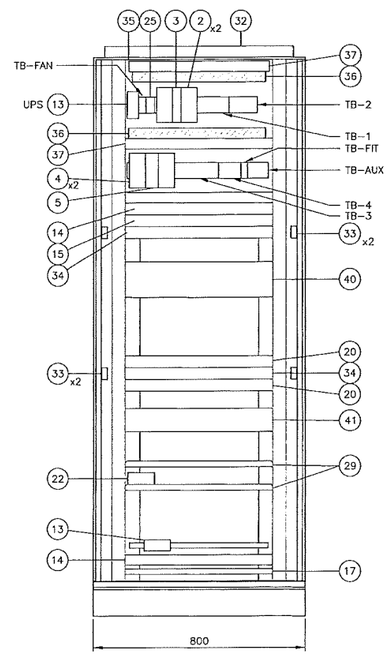
FRONT TOP VIEW
SCALE N.T.S



ROOF PLATE
SCALE N.T.S

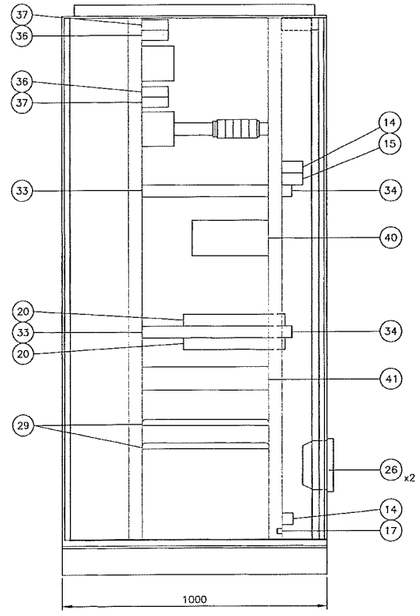


FRONT VIEW
SCALE N.T.S



FRONT VIEW
(DOOR REMOVED)

02



RIGHT VIEW
(DOOR REMOVED)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. FRONT DOOR SHALL BE PROVIDED WITH NAMEPLATE AND WARNING AS SHOWN.
3. PANEL VENDOR TO FINALIZE PANEL LAYOUT.
4. BILL OF MATERIAL SHOWN ON DWG 4663-04-03-PA-402.

SDN# 25472-130-TO-0000-P0401
UEL# 2012016-1EF-CAB-000-0501-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-04-03-PA-402	KHTT COMMUNICATION PANEL CO-TCMP-05 BILL OF MATERIAL

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
01	2013-11-20	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
02	2014-02-12	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DVC	SRL	JED	DCB	UPSIDE
2197104	MAF	DVC	SRL	JED	DCB	UPSIDE
2197104	BEM	DVC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA — JAMES DOOLEY — 2014-FEB-12

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

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The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

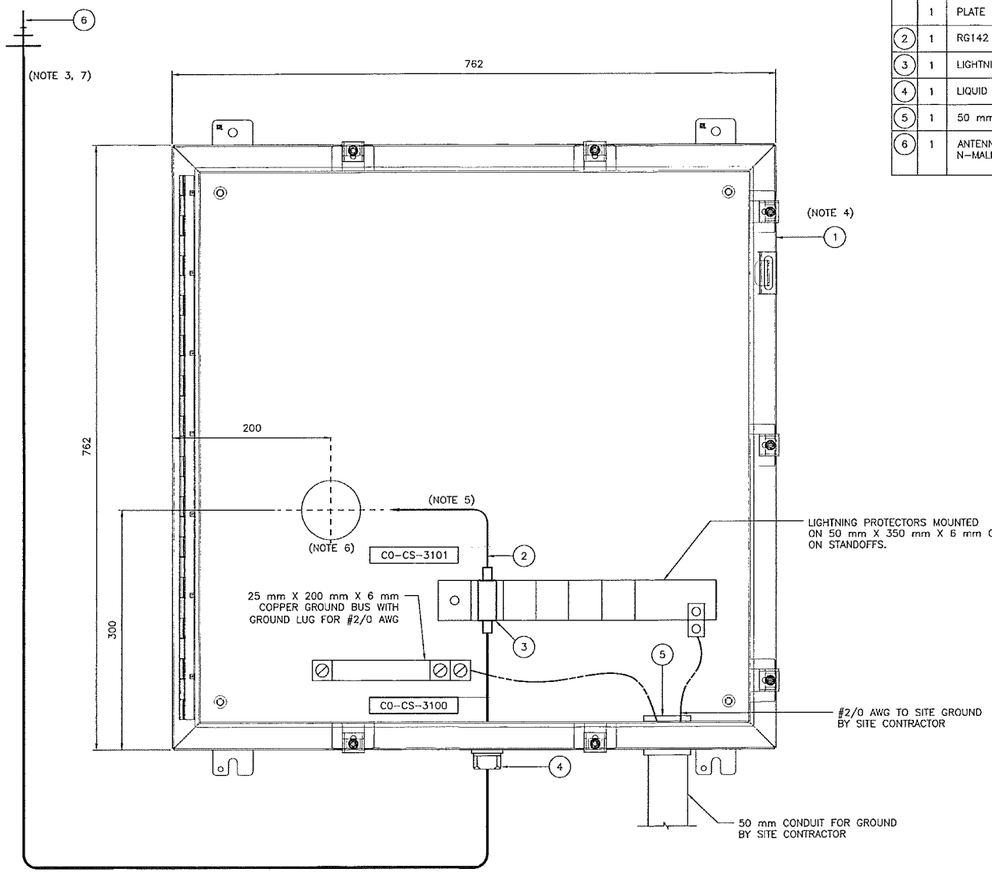
FIA # 4663 | CHAINAGE: | DISCIPLINE # 04

KHTT COMMUNICATION PANEL
CO-TCMP-05 (CO-FSB-21)
PANEL LAYOUT

SCALE 1:10 | DRAWING No 4663-04-03-PA-401 | REV 02

TC_A1_BR.DWG 594X841

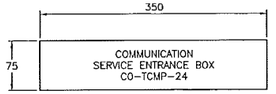
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS



SERVICE ENTRANCE BOX (CO-TCMP-24)

SCALE: N.T.S

(SHOWN WITH DOOR REMOVED)



LAMACOID NAMEPLATE
BLACK LETTER ON
WHITE BACKGROUND

DETAIL 1
SCALE : N.T.S.

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	MANUFACTURER	PART NO.	REMARKS
1	1	NEMA 4 762H x 760W x 200D PANEL ANSI 61 GRAY	HOFFMAN	A30H30BLP	NOTE 8
	1	PLATE	HOFFMAN	A30P30	
2	1	RG142 COAXIAL CABLE 2m LONG, TNC-MALE TO N-MALE	–	–	NOTE 9
3	1	LIGHTNING PROTECTORS (CELL)	POLYPHASER	IS-B850LN-C2	NOTE 8
4	1	LIQUID TIGHT NON-METALLIC STRAIN RELIEF CONNECTION	SKINTOP	S2112	NOTE 8
5	1	50 mm CONDUIT GROUNDING BUSHING	THOMAS & BETTS	BG200-14-20	SUPPLIED AND INSTALLED BY SITE CONTRACTOR
6	1	ANTENNA: COMES WITH LMR400 ULTRAFLEX CABLE AND N-MALE CONNECTORS	WAVELINK	PRO806-14-4030 NICG-KG	NOTE 3

NOTES:

1. LEAVE AND CABLE SLACK AROUND THE INSIDE PERIMETER.
2. LEAVE 75 mm AROUND SIDES/TOP/BOTTOM FOR CABLE MANAGEMENT.
3. YAGI WILL BE SUPPLIED BY TCPL, MAST BY VENDOR, EES VENDOR WILL HAVE ANTENNA AND CABLE REMOVED FOR SHIPMENT AND REINSTALLATION WILL BE BY SITE CONTRACTOR.
4. PANEL MUST BE NEMA 4 CERTIFIED PANEL.
5. THE CABLE SHALL PENETRATE IN TO CO-EES-22 THRU THE 75 mm SLEEVE AND SHALL RUN IN TO COMMUNICATION CABINET CO-TCMP-04 THE FINAL DESTINATION OF THE CABLE SHALL BE AT A LEVEL BETWEEN 150 mm (3RU) AND 225 mm (5RU) HEIGHT FROM BOTTOM OF THE CABINET.
6. 75 mm SLEEVE TO BE INSTALLED BY EES VENDOR, LOCATION TO BE FIELD VERIFIED.
7. YAGI ANTENNA IS MOUNTED ON MAST FIXED TO EES EXTERIOR WALL. REFER TO 4663-08-00-~~30~~-300 DETAIL 4.
8. SUPPLIED BY PANEL VENDOR. ID
9. SUPPLIED BY TCPL AND INSTALLED BY VENDOR.

SDN# 25472-130-T70-0000-P0027
UEL# 2012016-1EF-EWD-000-0713-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-04-03-WD-080	KHTT COMMUNICATION PANELS CO-TCMP-02 (CO-EES-21)

REVISION

REV No	DATE	DESCRIPTION
00	2014-02-12	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	JIM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER ALBERTA JAMES DOODY 2014-FEB-12

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
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KEYSTONE HARDISTY TANK TERMINAL

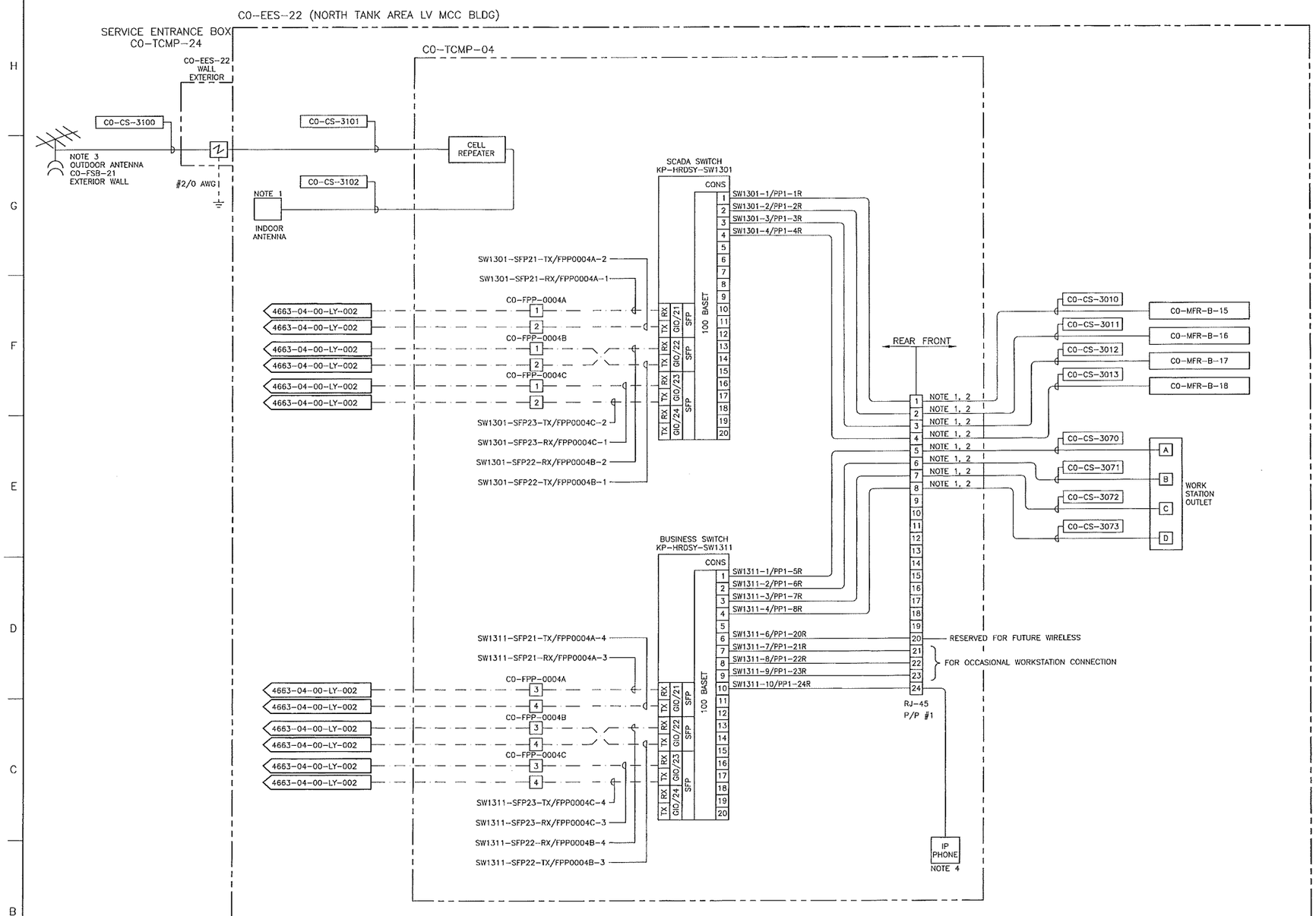
FIA # 4663	CHAINAGE:	DISCIPLINE # 04

KHTT COMMUNICATION PANELS
CO-TCMP-24 (CO-EES-22)
COMMUNICATIONS SERVICE ENTRANCE BOX LAYOUT

SCALE N.T.S.	DRAWING No 4663-04-03-WD-024	REV 00

TIME — DESIGNFILE

TC_A1_BR.DWG 594X841



NOTES:

1. BY EES VENDOR.
2. CAT 6 STRAIGHT THROUGH CABLE.
3. YAGI IS MOUNTED ON MAST FIXED TO EXTERIOR WALL.
4. RESERVED FOR IP PHONE CONNECTION, PROVIDED BY TCPL MOUNTED ON INSIDE OF PANEL.

LEGEND:

------	FIBER OPTIC (FOR THIS DWG)
– · – · –	FIBER OPTIC PATCH CORD (FOR THIS DWG)
———	COPPER WIRE (FOR THIS DWG)
	SURGE ARRESTOR
SM	SINGLE-MODE
MM	MULTI-MODE
CO-CS-XXXX	CABLE TAG
XXXX-XX-XX-XX-XXX	FROM/TO ARROW

ABBREVIATIONS:

CCTV	– CLOSED CIRCUIT TELEVISION
EES	– ELECTRICAL EQUIPMENT SHELTER
FPP	– FIBER PATCH PANEL
HMI	– HUMAN MACHINE INTERFACE
HTCP	– HARDISTY TERMINAL CONTROL PANEL
P/P	– PATCH PANEL
PLC	– PROGRAMMABLE LOGIC CONTROLLER
SCADA	– SUPERVISORY CONTROL AND DATA ACQUISITION
TCMP	– TERMINAL COMMUNICATION PANEL

SDN# 25472-130-T70-0000-P0090
UEL# 2012016-1EF-EWD-000-0090-01

REFERENCE DRAWINGS

DRAWING No	TITLE
4663-04-00-LY-002	HARDISTY KHTT TERMINAL FIBER OPTIC WIRING DIAGRAM

REVISION

REV No	DATE	DESCRIPTION
00	2014-02-12	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY
2014 Feb 12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

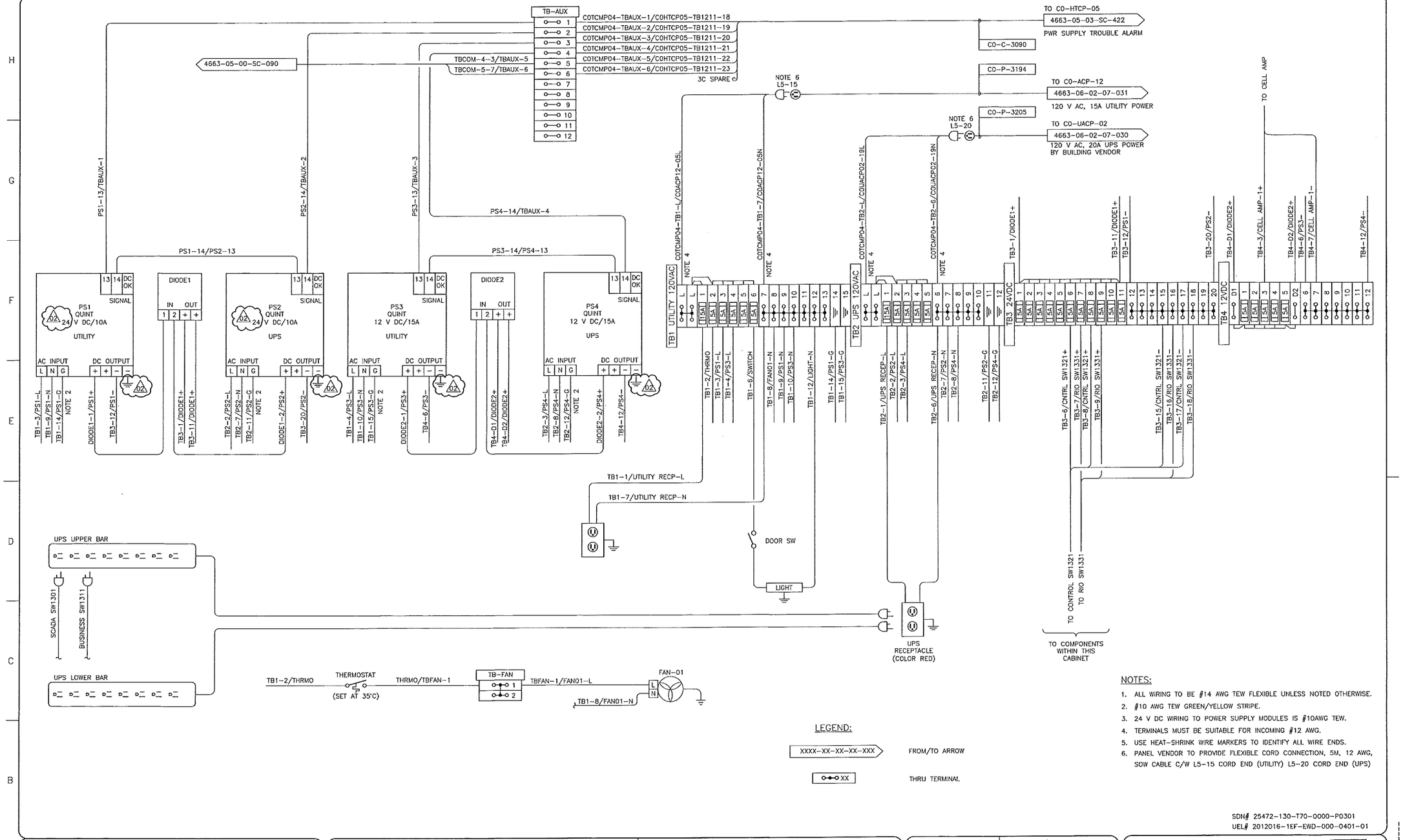
FIA # 4663 | CHAINAGE: | DISCIPLINE # 04

KHTT COMMUNICATION PANELS
CO-TCMP-04 (CO-EES-22)
COMMUNICATIONS WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-04-00-WD-090 | REV 00

TC_A1_BR.DWG 594X841

TIME — DESIGNFILE



NOTES:

1. ALL WIRING TO BE #14 AWG TEW FLEXIBLE UNLESS NOTED OTHERWISE.
2. #10 AWG TEW GREEN/YELLOW STRIPE.
3. 24 V DC WIRING TO POWER SUPPLY MODULES IS #10AWG TEW.
4. TERMINALS MUST BE SUITABLE FOR INCOMING #12 AWG.
5. USE HEAT-SHRINK WIRE MARKERS TO IDENTIFY ALL WIRE ENDS.
6. PANEL VENDOR TO PROVIDE FLEXIBLE CORD CONNECTION, 5M, 12 AWG, SOW CABLE C/W L5-15 CORD END (UTILITY) L5-20 CORD END (UPS)

LEGEND:

XXXX-XX-XX-XX-XXX — FROM/TO ARROW

XX — THRU TERMINAL

SDN# 25472-130-T70-0000-P0301
UEL# 2012016-1EF-EWD-000-0401-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
01	2013-11-20	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)
02	2014-02-12	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
2197104	MAF	DMC	SRL	JED	DCB	UPSIDE
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE
	SKC	DMC	SRL	JED	DCB	

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER JAMES DODD ALBERTA 28989
2014-FEB-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

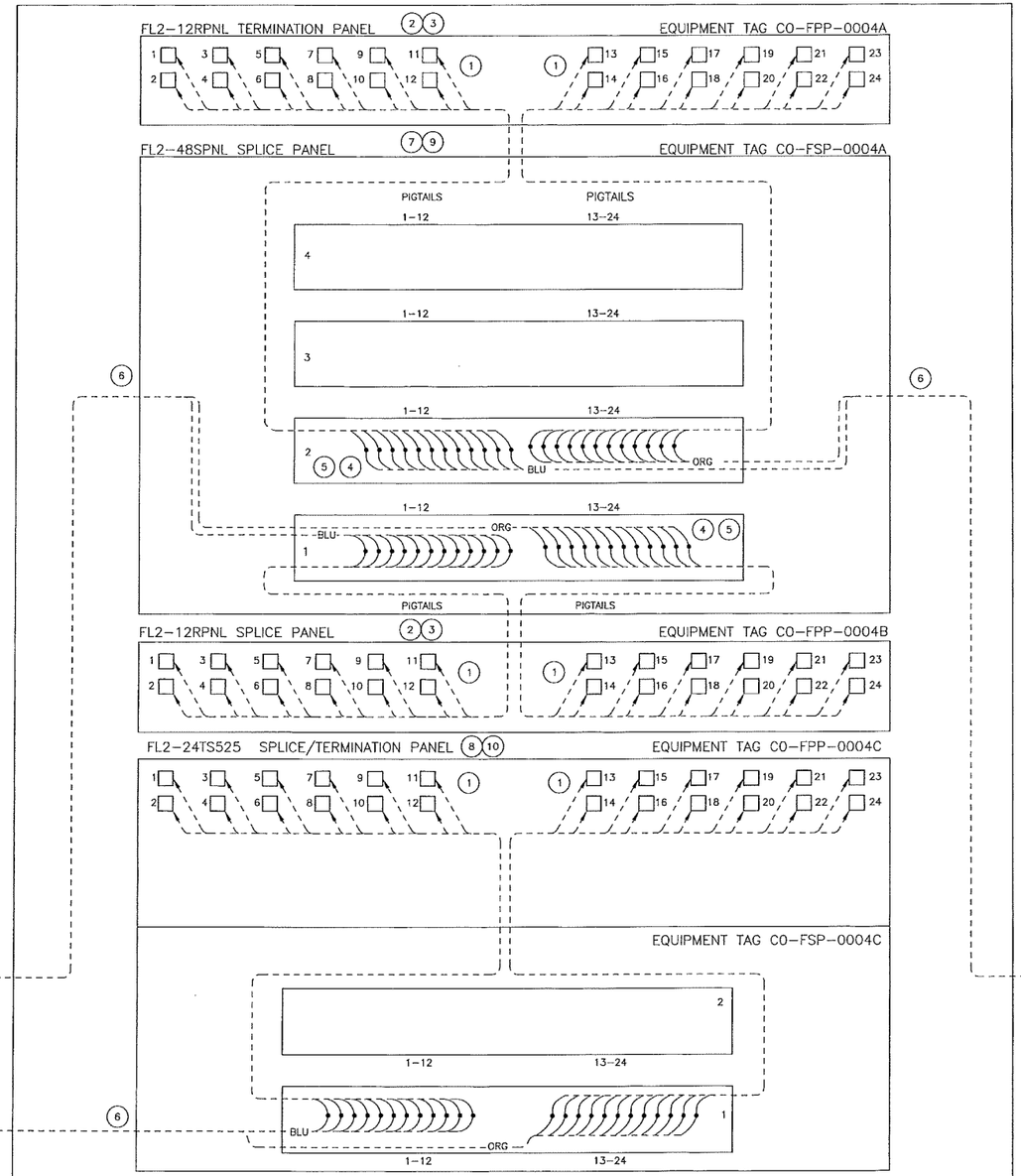
FIA # 4663 | CHAINAGE: | DISCIPLINE # 04

KHTT COMMUNICATION PANEL CO-TCMP-04 (CO-EES-22) POWER DISTRIBUTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-04-03-WD-301 | REV 02

TMC DESIGNFILE

C0-TCMP-04 REFER TO DWG. 4663-04-03-PA-301



EQUIPMENT IDENTIFICATION LIST

ITEM	MFR	PART #	DESCRIPTION
1	TE	FL2-6P8SC605R	6-PAK PLUG-IN WITH LC CONNECTORS
2	TE	FL2-12RPNL	12 PORT PATCH PANEL
3	TE	FL2-FLMT175	1RU FLUSH MOUNT KIT
4	TE	FST-DRS24-HS	SPLICE WHEEL 24 FIBER
5	TE	FST-ACC001	SPLICE PROTECTORS
6	TE	FL2-ACC007	CABLE CLAMP KIT
7	TE	FL2-48SPNL2	48 PORTS SPLICE PANEL
8	TE	FL2-FLMT0525	3RU FLUSHMOUNT KIT
9	TE	FL2-FLMT0350	2RU FLUSHMOUNT KIT
10	TE	FL2-24TS525	SPLICE/TERMINATION PANEL

NOTES:

1. MANUFACTURER TYCO ELECTRONICS ABBREVIATED TO "TE".
2. PANEL VENDOR TO SUPPLY ALL MATERIALS, SHIP LOOSE PANEL MATERIALS WHICH REQUIRE SITE INSTALLATION.

LEGEND:

- FIBER OPTIC LC TYPE BULKHEAD CONNECTION
- FIBER OPTIC FUSION SPLICE (MULTIMODE)
- FIBER OPTIC FUSION SPLICE (SINGLEMODE)
- SINGLEMODE FIBER OR CABLE
- MULTIMODE FIBER OR CABLE

FIBER OPTIC CABLE COLOUR CODE

ACR	STRAND/TUBE COLOR	TUBE/STRAND #
BLU	BLUE	1
ORG	ORANGE	2
GRN	GREEN	3
BRN	BROWN	4
SLT	SLATE	5
WHT	WHITE	6
RED	RED	7
BLK	BLACK	8
YLW	YELLOW	9
VLT	VIOLET	10
PNK	PINK (ROSE)	11
AQU	AQUA	12

SDN# 25472-130-T70-0000-P0310
UEL# 2012016-1EF-EWD-000-0310-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2014-02-12	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	JIM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOOLEY
2014-FEB-12

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		04

HARDISTY KHTT TERMINAL
C0-FPP-0004A/B/C (C0-EES-22)
FIBER OPTIC CONNECTION DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663-04-03-WD-310	00

TIME-DESIGNFILE

TC_A1_BR.DWG 594X841

ELECTRICAL EQUIPMENT SHELTER (CO-EES-XX)

TERMINAL CONTROL PANEL (CO-HTCP-01)

CO-XXXX-XX
TB-XXX

DISCRETE INPUT MODULE RACK X GE FANUC IC694MDL660			
1	2	TBXXXX-2/RX-SX-1	1	INPUT-1	
3	4	TBXXXX-4/RX-SX-2	2	INPUT-2	
5	6	TBXXXX-6/RX-SX-3	3	INPUT-3	
7	8	TBXXXX-8/RX-SX-4	4	INPUT-4	
9	10	TBXXXX-10/RX-SX-5	5	INPUT-5	
11	12	TBXXXX-12/RX-SX-6	6	INPUT-6	
13	14	TBXXXX-14/RX-SX-7	7	INPUT-7	
15	16	TBXXXX-16/RX-SX-8	8	INPUT-8	
17		TBXXXX-17/RX-SX-9	9	COM	COMMON (INPUT 1-8)
18	19	TBXXXX-19/RX-SX-10	10	INPUT-9	
20	21	TBXXXX-21/RX-SX-11	11	INPUT-10	
22	23	TBXXXX-23/RX-SX-12	12	INPUT-11	
24	25	TBXXXX-25/RX-SX-13	13	INPUT-12	
26	27	TBXXXX-27/RX-SX-14	14	INPUT-13	
28	29	TBXXXX-29/RX-SX-15	15	INPUT-14	
30	31	TBXXXX-31/RX-SX-16	16	INPUT-15	
32	33	TBXXXX-33/RX-SX-17	17	INPUT-16	
34		TBXXXX-34/RX-SX-18	18	COM	COMMON (INPUT 9-16)

0VDC +24VDC

CONTINUES ON DWG. 4663-05-00-SC-030

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

NOT FOR CONSTRUCTION

SDN# 25472-130-JC-0000-P0029
UEL# 2012016-1EF-EWD-000-0029-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
0A	2013-03-28	ISSUED FOR REVIEW (UEL PROJ. #2012016)	2197104	FAH	BAB	SRL	JED	DCB	UPSIDE
0B	2013-05-16	RE-ISSUED FOR REVIEW (UEL PROJ. #2012016)	2197104	JIM	BAB	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

REV. NO.	DATE	PERMIT NUMBER:

TransCanada — An business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

PLC-XX/XX SLOT XX
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 1 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-00-SC-029 | REV 0B

TIME-DESCRIPTIC

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

16/May/2013 2:32:3 \\rzaagha, 2012016

ELECTRICAL EQUIPMENT SHELTER (C0-EES-XX)

TERMINAL CONTROL PANEL (C0-HTCP-01)

CONTINUES ON DWG. 4663-05-00-SC-029

0VDC +24VDC

C0-XXXX-XX
TB-XXX

DISCRETE INPUT MODULE RACK X
GE FANUC IC694MDL660

35/36	TBXXX-36/RX-SX-19	19	INPUT-17	
37/38	TBXXX-38/RX-SX-20	20	INPUT-18	
39/40	TBXXX-40/RX-SX-21	21	INPUT-19	
41/42	TBXXX-42/RX-SX-22	22	INPUT-20	
43/44	TBXXX-44/RX-SX-23	23	INPUT-21	
45/46	TBXXX-46/RX-SX-24	24	INPUT-22	
47/48	TBXXX-48/RX-SX-25	25	INPUT-23	
49/50	TBXXX-50/RX-SX-26	26	INPUT-24	
51	TBXXX-51/RX-SX-27	27	COM	COMMON (INPUT 17-24)
52/53	TBXXX-53/RX-SX-28	28	INPUT-25	
54/55	TBXXX-55/RX-SX-29	29	INPUT-26	
56/57	TBXXX-57/RX-SX-30	30	INPUT-27	
58/59	TBXXX-59/RX-SX-31	31	INPUT-28	
60/61	TBXXX-61/RX-SX-32	32	INPUT-29	
62/63	TBXXX-63/RX-SX-33	33	INPUT-30	
64/65	TBXXX-65/RX-SX-34	34	INPUT-31	
66/67	TBXXX-67/RX-SX-35	35	INPUT-32	
68	TBXXX-68/RX-SX-36	36	COM	COMMON (INPUT 25-32)

TO TBDC
4663-05-00-SC-028
POWER SUPPLY

0VDC TBDC(-)-XX/TBXXX-68
+24VDC TBDC(+)-XX/TBXXX-66

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

- FUSED TERMINAL WITH 250mA FUSE.
- DISCONNECT TEST TERMINAL
- 4663-05-XX-XX-XXX — TO/FROM ARROW

NOT FOR CONSTRUCTION

SDN# 25472-130-JC-0000-P0030
UEL# 2012016-1EF-EWD-000-0030-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
0A	2013-03-28	ISSUED FOR REVIEW (UEL PROJ. #2012016)
0B	2013-05-16	RE-ISSUED FOR REVIEW (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	FAH	BAB	SRL	JED	DCB	UPSIDE
2197104	JSH	BAB	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHARAGE: | DISCIPLINE # 05

PLC-XX/XX SLOT XX
DISCRETE INPUT
I/O WIRING DIAGRAM (SHEET 2 OF 2)

SCALE N.T.S. | DRAWING No 4663-05-00-SC-030 | REV 0B

TC_A1_BR.DWG 594X841

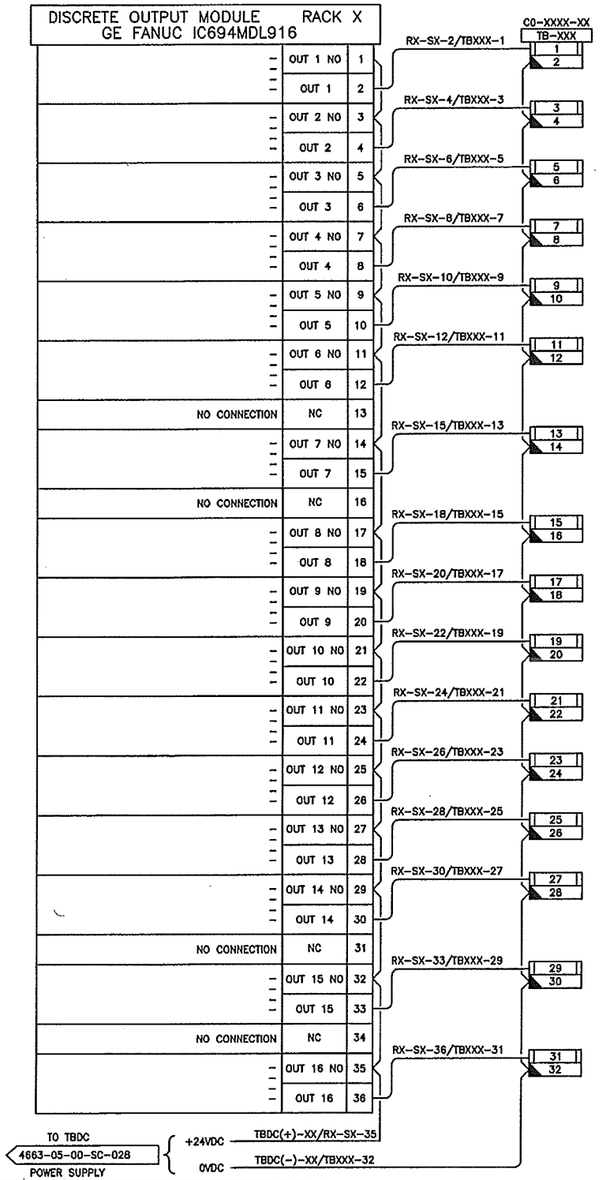
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

17/May/2013 9:06:0... nirzagha, 2012016 KHTT Detailed Design

-TIME- -DESIGNFILE-

ELECTRICAL EQUIPMENT SHELTER (CO-EES-XX)

TERMINAL CONTROL PANEL (CO-HTCP-01)



NOT FOR CONSTRUCTION

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL, SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

XXXX-XX-XX-XX-XXX FROM/TO ARROW

SDN# 25472-130-JC-0000-P0031
UEL# 2012016-1EF-EWD-000-0031-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
0A	2013-03-28	ISSUED FOR REVIEW (UEL PROJ. #2012016)
0B	2013-05-16	RE-ISSUED FOR REVIEW (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	JJM	BAB	SRL	JED	DCB	UPSIDE
2197104	JJM	BAB	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL DATE

REV. NO. DATE PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 CHAINAGE: DISCIPLINE # 05

PLC-XX/XX SLOT XX
DISCRETE OUTPUT - RELAY
I/O WIRING DIAGRAM

SCALE N.T.S. DRAWING No 4663-05-00-SC-031 REV 0B

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ELECTRICAL EQUIPMENT SHELTER (CO-EES-XX)

TERMINAL CONTROL PANEL (CO-HTCP-01)

CO-XXXX-XX
TB-XXX

ANALOG INPUT MODULE RACK X
GE FANUC IC695ALG616

TB-XXX				
1			1	CH-1 IN+
2	TBXXXX-2/RX-SX-1		2	CH-1 IN-
3	TBXXXX-3/RX-SX-2		19	IRTN-1
4			20	NC
5			3	CH-2 IN+
6	TBXXXX-6/RX-SX-3		4	CH-2 IN-
7	TBXXXX-7/RX-SX-4		21	IRTN-2
8			22	NC
9	TBXXXX-9/RX-SX-5		5	COM
		COMMON	23	COM
10			6	CH-3 IN+
11	TBXXXX-11/RX-SX-6		7	CH-3 IN-
12	TBXXXX-12/RX-SX-7		24	IRTN-3
13			25	NC
14			8	CH-4 IN+
15	TBXXXX-15/RX-SX-8		9	CH-4 IN-
16	TBXXXX-16/RX-SX-9		26	IRTN-4
17			27	NC
18			10	CH-5 IN+
19	TBXXXX-19/RX-SX-10		11	CH-5 IN-
20	TBXXXX-20/RX-SX-11		28	IRTN-5
21			29	NC
22			12	CH-6 IN+
23	TBXXXX-23/RX-SX-12		13	CH-6 IN-
24	TBXXXX-24/RX-SX-13		30	IRTN-6
25			31	NC
26			14	COM
		COMMON	32	COM
27	TBXXXX-27/RX-SX-15		15	CH-7 IN+
28	TBXXXX-28/RX-SX-16		16	CH-7 IN-
29			33	IRTN-7
30			34	NC
31	TBXXXX-31/RX-SX-17		17	CH-8 IN+
32	TBXXXX-32/RX-SX-18		18	CH-8 IN-
33	ISOLATED GROUND		35	IRTN-8
			36	NC

TO TBDC
4663-05-00-SC-028
POWER SUPPLY

0VDC — TBDC(-)-XX/TBXXX-32
+24VDC — TBDC(+)-XX/TBXXX-30

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED, MARKED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

- FUSED TERMINAL WITH 250mA FUSE.
- DISCONNECT TEST TERMINAL
- XXXX-XX-XX-XX-XXX — FROM/TO ARROW

SDN# 25472-130-JC-0000-P0032
UEL# 2012016-1EF-EWD-000-0032-01

NOT FOR CONSTRUCTION

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
0A	2013-03-28	ISSUED FOR REVIEW (UEL PROJ. #2012016)	21971014	FAH	BAB	SRL	JED	DCB	UPSIDE
0B	2013-05-16	RE-ISSUED FOR REVIEW (UEL PROJ. #2012016)	21971014	JM	BAB	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — in business to deliver
upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

PLC-XX/XX SLOT XX
ANALOG INPUT - DIFFERENTIAL
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-00-SC-032 | REV 0B

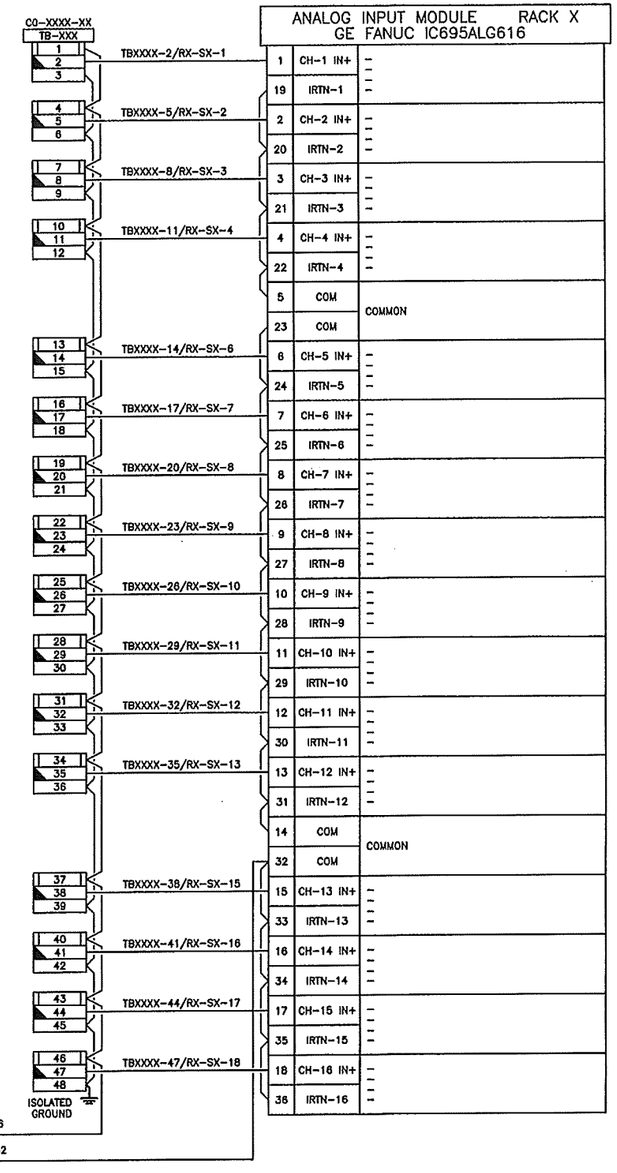
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

16/May/2013 2:10:50 ombardi, 2012016

ELECTRICAL EQUIPMENT SHELTER (CO-EES-XX)

TERMINAL CONTROL PANEL (CO-HTCP-01)



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

XXXX-XX-XX-XX-XXX FROM/TO ARROW

NOT FOR CONSTRUCTION

SDN# 25472-130-JC-0000-P0033
UEL# 2012016-1EF-EWD-000-0033-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REVISION

REV No	DATE	DESCRIPTION
0A	2013-03-28	ISSUED FOR REVIEW (UEL PROJ. #2012016)
0B	2013-05-16	RE-ISSUED FOR REVIEW (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	FAH	BAB	SRL	JED	DCB	UPSIDE
2197104	JM	BAB	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

REV. NO.	DATE	PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

PLC-XX/XX SLOT XX
ANALOG INPUT - SINGLE END
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-00-SC-033 | REV 0B

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

16/May/2013 2:10:29 ombardi, 2012016 —TIME— —DESIGNFILE—

ELECTRICAL EQUIPMENT SHELTER (CO-EES-XX)

TERMINAL CONTROL PANEL (CO-HTCP-01)

ANALOG OUTPUT MODULE RACK X
GE FANUC IC694ALG392

					CO-XXXX-XX TB-XXX
	24VDC INPUT	+24VDC	1	RX-SX-1/TBXXX-1	1
OUTPUT-1		CH-1	3	RX-SX-3/TBXXX-2	2, 3, 4
OUTPUT-2		CH-2	5	RX-SX-5/TBXXX-5	5, 6, 7
OUTPUT-3		CH-3	7	RX-SX-7/TBXXX-8	8, 9, 10
OUTPUT-4		CH-4	9	RX-SX-9/TBXXX-11	11, 12, 13
OUTPUT-5		CH-5	11	RX-SX-11/TBXXX-14	14, 15, 16
OUTPUT-6		CH-6	13	RX-SX-13/TBXXX-17	17, 18, 19
OUTPUT-7		CH-7	15	RX-SX-15/TBXXX-20	20, 21, 22
OUTPUT-8		CH-8	17	RX-SX-17/TBXXX-23	23, 24, 25
	COMMON	COM	19	RX-SX-19/TBXXX-26	26, 27
	GROUND	GND	20		

ISOLATED GROUND

TO TBDC 4663-05-00-SC-028 POWER SUPPLY

+24VDC — TBDC(+)/TBXXX-1

0VDC — TBDC(-)/TBXXX-26

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED AND TAPED.
3. WIRES MUST BE PREPAREO TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

XXXX-XX-XX-XX-XXX FROM/TO ARROW

SDN# 25472-130-JC-0000-P0034
UEL# 2012016-1EF-EWD-000-0034-01

NOT FOR CONSTRUCTION

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No.	DATE	DESCRIPTION
0A	2013-03-28	ISSUED FOR REVIEW (UEL PROJ. #2012016)
0B	2013-05-16	RE-ISSUED FOR REVIEW (UEL PROJ. #2012016)

APPROVAL	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	2197104	JIM	BAB	SRL	JED	DCB	UPSIDE
	2197104	JIM	BAB	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

REV. NO. — DATE — PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

PLC-XX/XX SLOT XX
ANALOG OUTPUT
I/O WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-00-SC-034 | REV 0B

TC_A1_BR.DWG 594X841

16/May/2013 2:10:07 ombardi, 2012016

ELECTRICAL EQUIPMENT SHELTER (CO-EES-XX)

TERMINAL CONTROL PANEL (CO-HTCP-01)

DISCRETE OUTPUT MODULE RACK X
GE FANUC IC694MDL740

+24VDC INPUT	DC+	1	RX-SX-1/TBXXX-1	CO-XXXX-XX TB-XXX 1
	OUTPUT-1	2	RX-SX-2/TBXXX-2	2, 3 → TB-RLY-1 A1/A2 RL01 11/14
	OUTPUT-2	3	RX-SX-3/TBXXX-4	4, 5 → A1/A2 RL02 11/14
	OUTPUT-3	4	RX-SX-4/TBXXX-6	6, 7 → A1/A2 RL03 11/14
	OUTPUT-4	5	RX-SX-5/TBXXX-8	8, 9 → A1/A2 RL04 11/14
	OUTPUT-5	6	RX-SX-6/TBXXX-10	10, 11 → A1/A2 RL05 11/14
	OUTPUT-6	7	RX-SX-6/TBXXX-12	12, 13 → A1/A2 RL06 11/14
	OUTPUT-7	8	RX-SX-8/TBXXX-14	14, 15 → A1/A2 RL07 11/14
	OUTPUT-8	9	RX-SX-9/TBXXX-16	16, 17 → A1/A2 RL08 11/14
COMMON (INPUT 1-8)	COM	10	RX-SX-10/TBXXX-18	18, 19
+24VDC INPUT	DC+	11	RX-SX-11/TBXXX-20	20
	OUTPUT-9	12	RX-SX-12/TBXXX-21	21, 22 → A1/A2 RL09 11/14
	OUTPUT-10	13	RX-SX-13/TBXXX-23	23, 24 → A1/A2 RL10 11/14
	OUTPUT-11	14	RX-SX-14/TBXXX-25	25, 26 → A1/A2 RL11 11/14
	OUTPUT-12	15	RX-SX-15/TBXXX-27	27, 28 → A1/A2 RL12 11/14
	OUTPUT-13	16	RX-SX-16/TBXXX-29	29, 30 → A1/A2 RL13 11/14
	OUTPUT-14	17	RX-SX-17/TBXXX-31	31, 32 → A1/A2 RL14 11/14
	OUTPUT-15	18	RX-SX-18/TBXXX-33	33, 34 → A1/A2 RL15 11/14
	OUTPUT-16	19	RX-SX-19/TBXXX-35	35, 36 → A1/A2 RL16 11/14
COMMON (INPUT 9-16)	1-COM	20	RX-SX-20/TBXXX-37	37

TO TBDC 4663-05-00-SC-028 POWER SUPPLY

0VDC — TBDC(-)XX/TBXXX-37

+24VDC — TBDC(+)XX/TBXXX-20

NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN IN THIS DRAWING SHALL BE PREFIXED BY "130-KSHTT".
2. SPARE WIRES SHALL BE COILED AND TAPED.
3. WIRES MUST BE PREPARED TO ALLOW WIRE NUMBER SLEEVES TO BE APPLIED AT BOTH TERMINATION ENDS.
4. PANEL VENDOR SHALL SUPPLY, INSTALL AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

FUSED TERMINAL WITH 250mA FUSE.

DISCONNECT TEST TERMINAL

XXXX-XX-XX-XX-XXX FROM/TO ARROW

NOT FOR CONSTRUCTION

SDN# 25472-130-JC-0000-P0035
UEL# 2012016-1EF-EWD-000-0035-01

REFERENCE DRAWINGS

DRAWING No	TITLE
-	

REV No.	DATE	DESCRIPTION
0A	2013-03-28	ISSUED FOR REVIEW (UEL PROJ. #2012016)
0B	2013-05-16	RE-ISSUED FOR REVIEW (UEL PROJ. #2012016)

APPROVAL	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	2197104	FAH	BAB	SRL	JED	DCB	UPSIDE
	2197104	JJM	BAB	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

PLC-XX/XX SLOT XX
DISCRETE OUTPUT - STATIC
I/O WIRING DIAGRAM

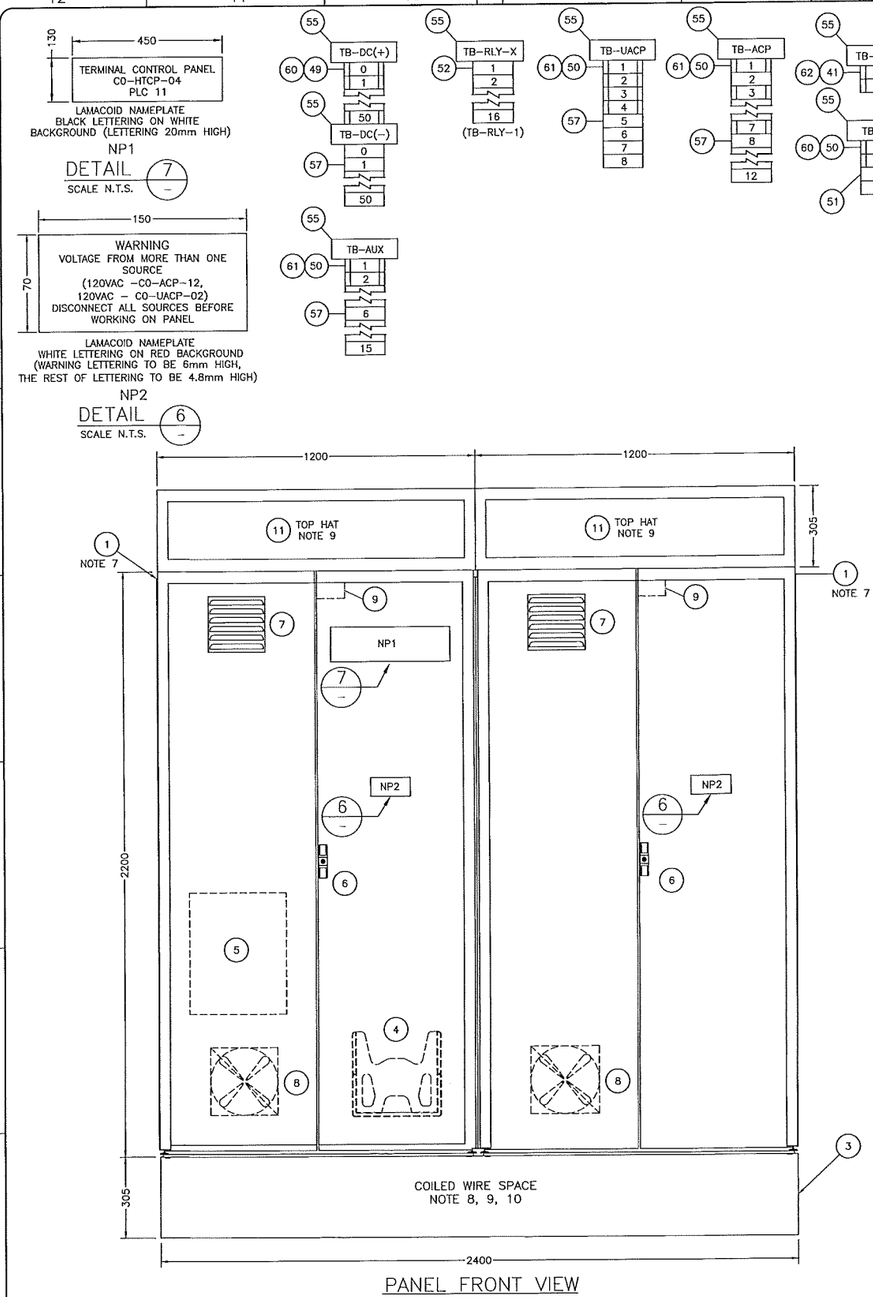
SCALE N.T.S. | DRAWING No 4663-05-00-SC-035 | REV 0B

TIME — DESIGNFILE

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

16/May/2013 2:09:41 ombardi, 2012016



PANEL FRONT VIEW

NOTES:

1. FOR BILL OF MATERIALS SEE DRAWING 4663-05-03-PA-303
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
3. TERMINAL BLOCKS TO BE MOUNTED ON STANDOFFS TO MAKE FLUSH WITH PANDUITS.
4. NAMEPLATES SHALL BE FASTENED WITH SELF TAPPING SCREWS.
5. A REMOVABLE PLEXI-GLASS COVER IS TO BE INSTALLED OVER THE POWER DISTRIBUTION TERMINALS.
6. VENDOR TO INSTALL END COVER AND END BRACKET WHEREVER REQUIRED.
7. PANEL IS ASSEMBLED WITH 2 STANDARD 1200 WIDE CABINETS TO ACHIEVE ONE CABINET OF THE REQUIRED WIDTH. CABINET IS MADE UP OF ONE LEFT SIDE WALL, ONE RIGHT SIDE WALL, AND ONE CONTINUOUS BACK PANEL.
8. PROVIDE PANEL TO SEPARATE COILED WIRE SPACE AND PANEL INTERIOR.
9. PROVIDE GROMMETTED CUTOUTS BETWEEN TOP HAT/WIRESPACE AND FIELD WIREWAYS.
10. PROVIDE REASONABLY SIZED ACCESS PANELS BETWEEN BOTTOM WIRESPACE AND PANEL.

NAMEPLATE SCHEDULE

ITEM	LABEL	TYPE	NAMEPLATE SIZE WxH	LETTER SIZE	COLOR BACKGROUND/LETTER
NP1	PANEL NAMEPLATE (DETAIL 7)	LAMICOID	450mm X 130mm (18" X 5")	20.0mm (0.79")	WHITE/BLACK
NP2	WARNING PLATE (DETAIL 6)	LAMICOID	150mm X 70mm (6" X 2.75")	6.0mm (0.24")/4.8 (0.19")	RED/WHITE
NP3					
NP4					
NP5	PS-1	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP6	PS-2	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP7	PLC-11/09	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP8	PLC-11/10	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP9	PLC-11/11	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP10					
NP11					
NP12					
NP13	DIODE MODULE	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP14					
NP15					
NP16					
NP17	ETHERNET CONNECTORS (TB-ETM)	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP18					
NP19					
NP20	EQUIPMENT GROUND BUS	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP21	INSTRUMENT GROUND BUS	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK

SDN# 25472-130-JC-0000-P0069
UEL# 2012016-1EF-CAB-000-0014-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER PROVINCE OF ALBERTA
2013-OCT-03

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

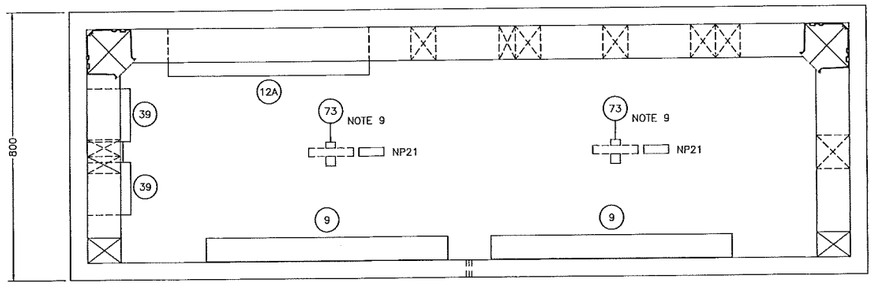
KHTT CONTROL PANEL
(CO-HTCP-04), PLC-11, (CO-EES-22)
PANEL LAYOUT SHEET 1 OF 2

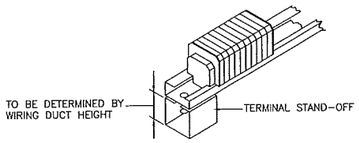
SCALE N.T.S. | DRAWING No 4663-05-03-PA-301 | REV 00

TC_A1_BR.DWG 594X841

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TIME---DESIGNFILE





TYPICAL TERMINAL MOUNTING DETAIL
SCALE N.T.S.

NOTES:

1. FOR BILL OF MATERIALS SEE DRAWING 4663-05-03-PA-303. FOR LABEL DETAILS AND SCHEDULE SEE DRAWING 4663-05-03-PA-301.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
3. TERMINAL BLOCKS TO BE MOUNTED ON STANDOFFS TO MAKE FLUSH WITH PANDUITS.
4. NAMEPLATES SHALL BE FASTENED WITH SELF TAPPING SCREWS.
5. PROVIDE A WIRE PARTITION FOR DUCTS WITH BOTH 120VAC AND 24VDC CONTROL CABLES.
6. REDUNDANT 24VDC POWER SUPPLY UNITS (PS-1 & PS-2) SHALL BE INSTALLED C/W REDUNDANCY DIODE.
7. A REMOVABLE PLEXI-GLASS COVER IS TO BE INSTALLED OVER THE POWER DISTRIBUTION TERMINALS.
8. 120 VAC WIRING CHANNELS SHOWN HATCHED. WIRING CHANNELS FOR 24 VDC ARE SHOWN WITHOUT HATCHING.
9. MOUNT GROUND BAR ON UNDERSIDE OF PANEL ROOF.
10. PROVIDE LABELS ON CARD FRONTS WITH : PLC 11/XX/YY, WHERE XX-RACK YY-SLOT

LEGEND:

120VAC WIRING CHANNEL

DC WIRING CHANNEL

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PS	NIU		ETM	SP	DI	DI	DI	SP	SP	DO	DO	DO	DO	PS	PS
13	16		17		21	21	21			22	22	22	22	13	13
IC695PSD140	IC695NIU001		IC695ETM001	SPARE	IC694MDL660	IC694MDL660	IC694MDL660	SPARE	SPARE	IC694MDL916	IC694MDL916	IC694MDL916	IC694MDL916	IC695PSD140	IC695PSD140

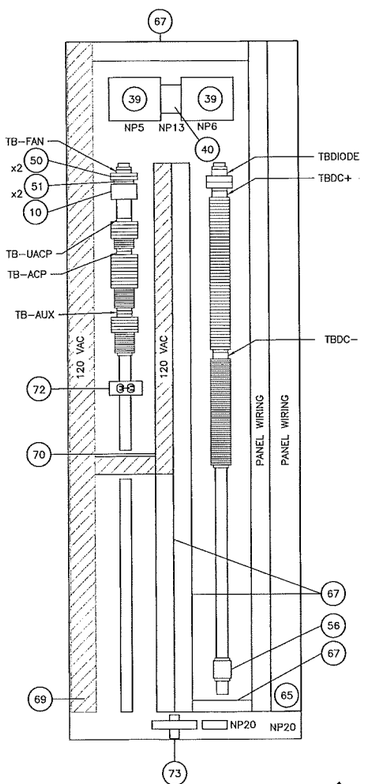
12A PLC-11/09
SCALE N.T.S.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PS	NIU		ETM	SP	DI	DI	DI	SP	SP	DO	DO	DO	DO	PS	PS
13	16		17		21	21	21			22	22	22	22	13	13
IC695PSD140	IC695NIU001		IC695ETM001	SPARE	IC694MDL660	IC694MDL660	IC694MDL660	SPARE	SPARE	IC694MDL916	IC694MDL916	IC694MDL916	IC694MDL916	IC695PSD140	IC695PSD140

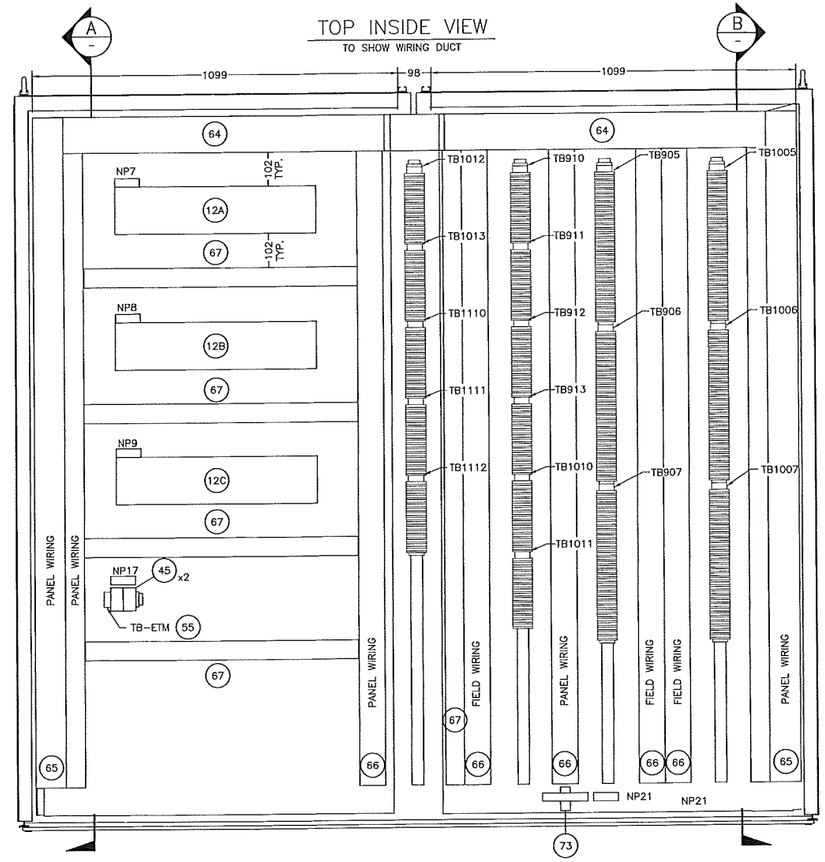
12B PLC-11/10
SCALE N.T.S.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PS	NIU		ETM	SP	DI	DI	DI	SP	SP	DO	DO	DO	SP	PS	PS
13	16		17		21	21	21			22	22	22		13	13
IC695PSD140	IC695NIU001		IC695ETM001	SPARE	IC694MDL660	IC694MDL660	IC694MDL660	SPARE	SPARE	IC694MDL916	IC694MDL916	IC694MDL916	SPARE	IC695PSD140	IC695PSD140

12C PLC-11/11
SCALE N.T.S.

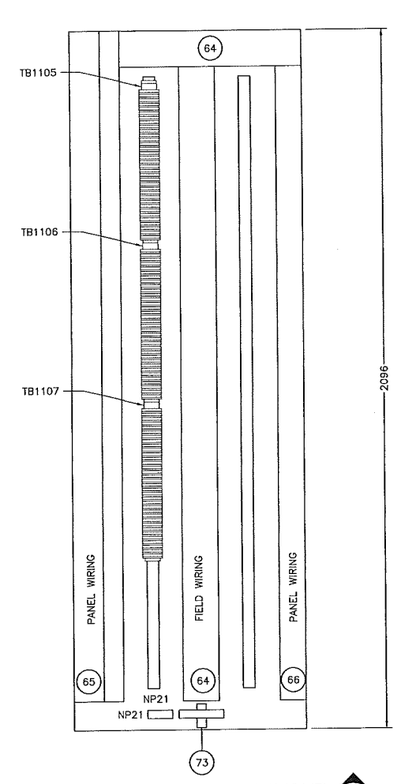


LEFT SIDE PAN LAYOUT A



TOP INSIDE VIEW
TO SHOW WIRING DUCT

FRONT VIEW DOORS REMOVED
BACK PAN LAYOUT



RIGHT SIDE PAN LAYOUT B

SDN# 25472-130-JC-0000-P0070
UEL# 2012016-1EF-CAB-000-0015-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
	SKC	DMC	SRL	JED	DCB	

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER JAMES DOUGLAS BRADY ALBERTA
2013-OCT-03

REV. NO. | DATE

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

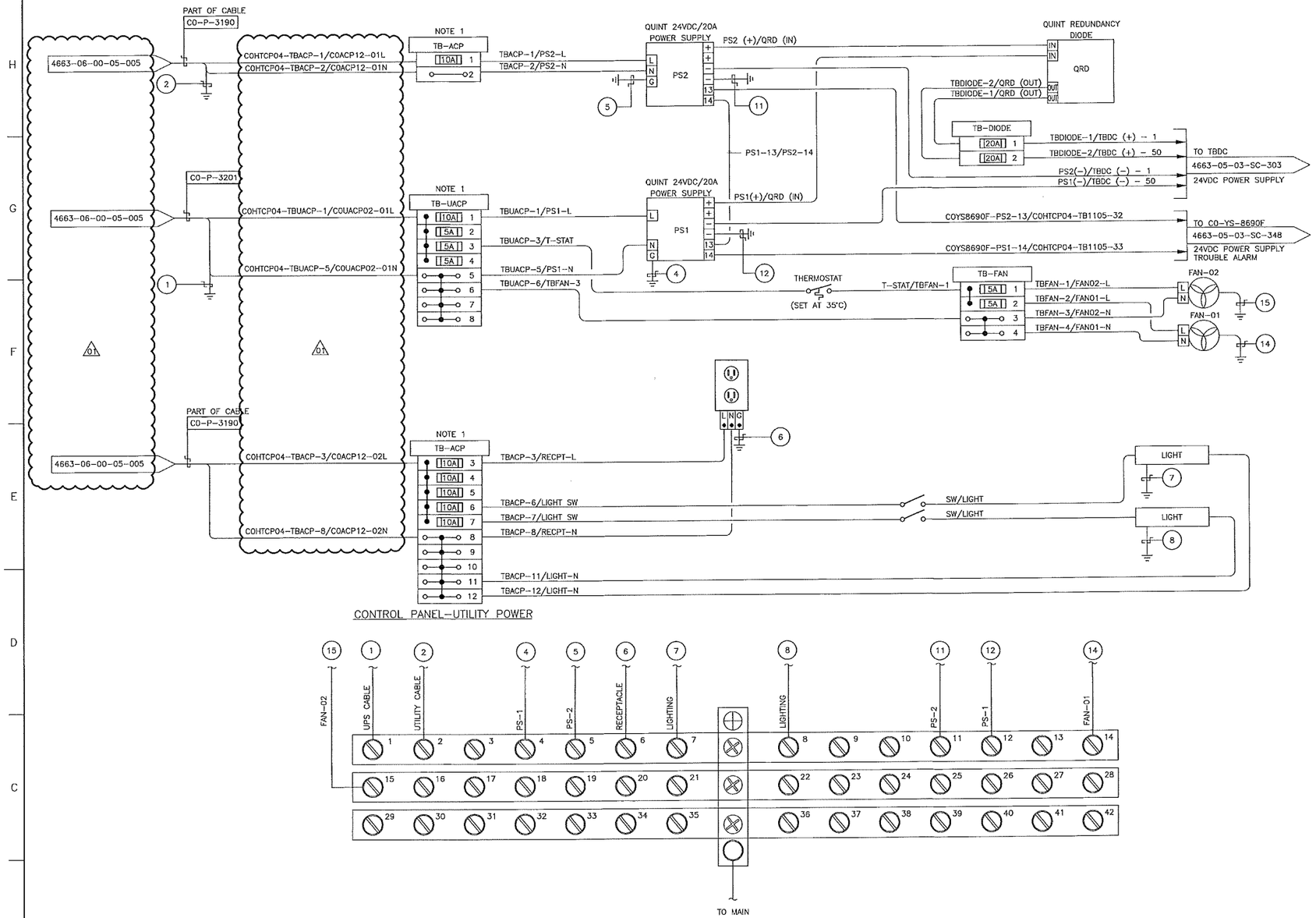
FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

KHTT CONTROL PANEL
(CO-HTCP-04), PLC-11, (CO-EES-22)
PANEL LAYOUT SHEET 2 OF 2

SCALE 1 : 8 | DRAWING No 4663-05-03-PA-302 | REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS



CONTROL PANEL-UTILITY POWER

NOTES:

1. TERMINAL BLOCK SHALL BE CAPABLE OF TERMINATING WIRE SIZE AWG #12.
2. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

20A 4	FUSED TERMINAL
o—o 5	THRU TERMINAL
(X)	GROUND BAR CONNECTION DESIGNATOR (FOR THIS DRAWING ONLY)
4663-05-XX-XX-XXX	TO/FROM ARROW

ABBREVIATIONS:

PS	– POWER SUPPLY
ACP	– AC POWER
UACP	– UPS AC POWER
YS	– EVENT STATUS

SDN# 25472-130-JC-0000-P0072
UEL# 2012016-1EF-EWD-000-0061-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)
01	2014-03-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA JAMES DOORLY
2014-MAR-7

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

KHTT CONTROL PANEL
CO-HTCP-04 (CO-EES-22)
AC POWER DISTRIBUTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-301 | REV 01

TC_A1_BR.DWG 594X841

TIME DESIGNFILE

TERMINAL CONTROL PANEL — DC POWER DISTRIBUTION

TB–DC (+)			TB–DC (–)		
		4663–05–03–SC–301 TBDIODE–1/TBDC(+)–1 (R)			
		4663–05–03–SC–301 TBDIODE–2/TBDC(+)–50 (R)			
[5A]	1	TBDC(+)–1/R9–BACKPLANE–(7) → RACK 9 BACKPLANE POWER SUPPLY	1	TBDC(–)–1/R9–BACKPLANE–(8)	RACK 9 BACKPLANE POWER SUPPLY
[5A]	2	TBDC(+)–2/R9–S0–(+) → RACK 9 SLOT 0 POWER SUPPLY	2	TBDC(–)–2/R9–S0–(–)	RACK 9 SLOT 0 POWER SUPPLY
[5A]	3	TBDC(+)–3/R9–S14–(+) → RACK 9 SLOT 14 POWER SUPPLY	3	TBDC(–)–3/R9–S14–(–)	RACK 9 SLOT 14 POWER SUPPLY
[5A]	4	TBDC(+)–4/R9–S15–(+) → RACK 9 SLOT 15 POWER SUPPLY	4	TBDC(–)–4/R9–S15–(–)	RACK 9 SLOT 15 POWER SUPPLY
[5A]	5	TBDC(+)–5/TB905–66 → RACK 9 SLOT 05 DI CARD	5	TBDC(–)–5/TB905–68	RACK 9 SLOT 05 DI CARD
[5A]	6	TBDC(+)–6/TB906–66 → RACK 9 SLOT 06 DI CARD	6	TBDC(–)–6/TB906–68	RACK 9 SLOT 06 DI CARD
[5A]	7	TBDC(+)–7/TB907–66 → RACK 9 SLOT 07 DI CARD	7	TBDC(–)–7/TB907–68	RACK 9 SLOT 07 DI CARD
[5A]	8	TBDC(+)–8/R9–S10–35 → RACK 9 SLOT 10 DO CARD (RELAY)	8	TBDC(–)–8/TB910–32	RACK 9 SLOT 10 DO CARD (RELAY)
[5A]	9	TBDC(+)–9/R9–S11–35 → RACK 9 SLOT 11 DO CARD (RELAY)	9	TBDC(–)–9/TB911–32	RACK 9 SLOT 11 DO CARD (RELAY)
[5A]	10	TBDC(+)–10/R9–S12–35 → RACK 9 SLOT 12 DO CARD (RELAY)	10	TBDC(–)–10/TB912–32	RACK 9 SLOT 12 DO CARD (RELAY)
[5A]	11	TBDC(+)–11/R9–S13–35 → RACK 9 SLOT 13 DO CARD (RELAY)	11	TBDC(–)–11/TB913–32	RACK 9 SLOT 13 DO CARD (RELAY)
[5A]	12	TBDC(+)–12/R10–BACKPLANE–(7) → RACK 10 BACKPLANE POWER SUPPLY	12	TBDC(–)–12/R10–BACKPLANE–(8)	RACK 10 BACKPLANE POWER SUPPLY
[5A]	13	TBDC(+)–13/R10–S0–(+) → RACK 10 SLOT 0 POWER SUPPLY	13	TBDC(–)–13/R10–S0–(–)	RACK 10 SLOT 0 POWER SUPPLY
[5A]	14	TBDC(+)–14/R10–S14–(+) → RACK 10 SLOT 14 POWER SUPPLY	14	TBDC(–)–14/R10–S14–(–)	RACK 10 SLOT 14 POWER SUPPLY
[5A]	15	TBDC(+)–15/R10–S15–(+) → RACK 10 SLOT 15 POWER SUPPLY	15	TBDC(–)–15/R10–S15–(–)	RACK 10 SLOT 15 POWER SUPPLY
[5A]	16	TBDC(+)–16/TB1005–66 → RACK 10 SLOT 05 DI CARD	16	TBDC(–)–16/TB1005–68	RACK 10 SLOT 05 DI CARD
[5A]	17	TBDC(+)–17/TB1006–66 → RACK 10 SLOT 06 DI CARD	17	TBDC(–)–17/TB1006–68	RACK 10 SLOT 06 DI CARD
[5A]	18	TBDC(+)–18/TB1007–66 → RACK 10 SLOT 07 DI CARD	18	TBDC(–)–18/TB1007–68	RACK 10 SLOT 07 DI CARD
[5A]	19	TBDC(+)–19/R10–S10–35 → RACK 10 SLOT 10 DO CARD (RELAY)	19	TBDC(–)–19/TB1010–32	RACK 10 SLOT 10 DO CARD (RELAY)
[5A]	20	TBDC(+)–20/R10–S11–35 → RACK 10 SLOT 11 DO CARD (RELAY)	20	TBDC(–)–20/TB1011–32	RACK 10 SLOT 11 DO CARD (RELAY)
[5A]	21	TBDC(+)–21/R10–S12–35 → RACK 10 SLOT 12 DO CARD (RELAY)	21	TBDC(–)–21/TB1012–32	RACK 10 SLOT 12 DO CARD (RELAY)
[5A]	22	TBDC(+)–22/R10–S13–35 → RACK 10 SLOT 13 DO CARD (RELAY)	22	TBDC(–)–22/TB1013–32	RACK 10 SLOT 13 DO CARD (RELAY)
[5A]	23	TBDC(+)–23/R11–BACKPLANE–(7) → RACK 11 BACKPLANE POWER SUPPLY	23	TBDC(–)–23/R11–BACKPLANE–(8)	RACK 11 BACKPLANE POWER SUPPLY
[5A]	24	TBDC(+)–24/R11–S0–(+) → RACK 11 SLOT 0 POWER SUPPLY	24	TBDC(–)–24/R11–S0–(–)	RACK 11 SLOT 0 POWER SUPPLY
[5A]	25	TBDC(+)–25/R11–S14–(+) → RACK 11 SLOT 14 POWER SUPPLY	25	TBDC(–)–25/R11–S14–(–)	RACK 11 SLOT 14 POWER SUPPLY
[5A]	26	TBDC(+)–26/R11–S15–(+) → RACK 11 SLOT 15 POWER SUPPLY	26	TBDC(–)–26/R11–S15–(–)	RACK 11 SLOT 15 POWER SUPPLY
[5A]	27	TBDC(+)–27/TB1105–66 → RACK 11 SLOT 05 DI CARD	27	TBDC(–)–27/TB1105–68	RACK 11 SLOT 05 DI CARD
[5A]	28	TBDC(+)–28/TB1106–66 → RACK 11 SLOT 06 DI CARD	28	TBDC(–)–28/TB1106–68	RACK 11 SLOT 06 DI CARD
[5A]	29	TBDC(+)–29/TB1107–66 → RACK 11 SLOT 07 DI CARD	29	TBDC(–)–29/TB1107–68	RACK 11 SLOT 07 DI CARD
[5A]	30	TBDC(+)–30/R11–S10–35 → RACK 11 SLOT 10 DO CARD (RELAY)	30	TBDC(–)–30/TB1110–32	RACK 11 SLOT 10 DO CARD (RELAY)
[5A]	31	TBDC(+)–31/R11–S11–35 → RACK 11 SLOT 11 DO CARD (RELAY)	31	TBDC(–)–31/TB1111–32	RACK 11 SLOT 11 DO CARD (RELAY)
[5A]	32	TBDC(+)–32/R11–S12–35 → RACK 11 SLOT 12 DO CARD (RELAY)	32	TBDC(–)–32/TB1112–32	RACK 11 SLOT 12 DO CARD (RELAY)
[5A]	33	SPARE → SPARE	33	SPARE	SPARE
[5A]	34	SPARE → SPARE	34	SPARE	SPARE
[5A]	35	SPARE → SPARE	35	SPARE	SPARE
[5A]	36	SPARE → SPARE	36	SPARE	SPARE
[5A]	37	SPARE → SPARE	37	SPARE	SPARE
[5A]	38	SPARE → SPARE	38	SPARE	SPARE
[5A]	39	SPARE → SPARE	39	SPARE	SPARE
[5A]	40	SPARE → SPARE	40	SPARE	SPARE
[5A]	41	SPARE → SPARE	41	SPARE	SPARE
[5A]	42	SPARE → SPARE	42	SPARE	SPARE
[5A]	43	SPARE → SPARE	43	SPARE	SPARE
[5A]	44	SPARE → SPARE	44	SPARE	SPARE
[5A]	45	SPARE → SPARE	45	SPARE	SPARE
[5A]	46	SPARE → SPARE	46	SPARE	SPARE
[5A]	47	SPARE → SPARE	47	SPARE	SPARE
[5A]	48	SPARE → SPARE	48	SPARE	SPARE
[5A]	49	SPARE → SPARE	49	SPARE	SPARE
[5A]	50	SPARE → SPARE	50	SPARE	SPARE
		4663–05–03–SC–301 PS2(–)/TBDC(–)–1 (BK/W)			
		4663–05–03–SC–301 PS1(–)/TBDC(–)–50 (BK/W)			

NOTES:

1. TERMINAL BLOCK SHALL BE CAPABLE OF TERMINATING WIRE SIZE #12.
2. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

- [5A] 4 — FUSED TERMINAL
- o—o 5 — THRU TERMINAL
- 4663–05–00–SC–028 — FROM/TO ARROW

SDN# 25472–130–JC–0000–P0073
UEL# 2012016–1EF–EWD–000–0062–01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013–10–03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER PROVINCE OF ALBERTA 2013-OCT-03

PERMIT/ ENG. APPROVAL — DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

TransCanada — In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663	CHAINAGE:	DISCIPLINE # 05

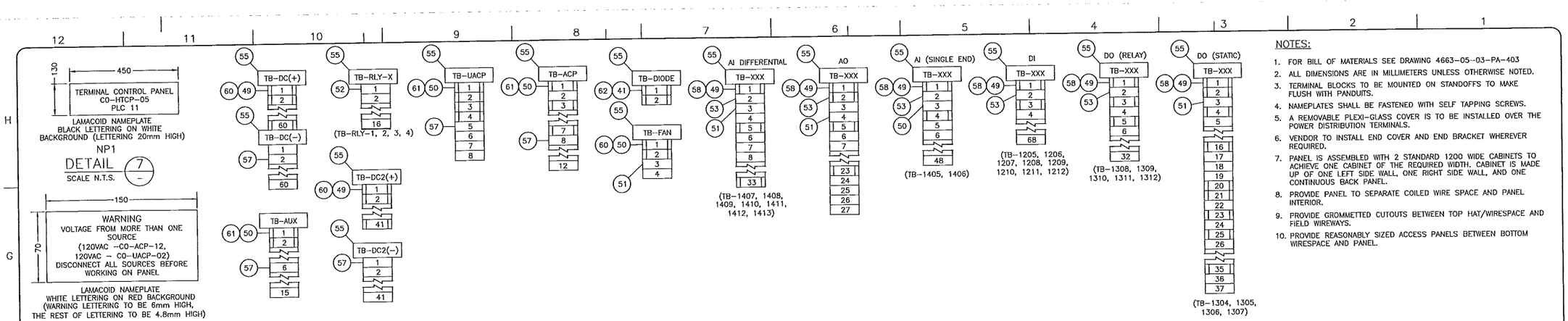
KHTT CONTROL PANEL
CO–HTCP–04 (CO–EES–22)
DC POWER DISTRIBUTION WIRING DIAGRAM

SCALE N.T.S.	DRAWING No 4663–05–03–SC–303	REV 00

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TIME——DESIGNFILE



NAMEPLATE SCHEDULE

ITEM	LABEL	TYPE	NAMEPLATE SIZE WxH	LETTER SIZE	COLOR BACKGROUND/LETTER
NP1	PANEL NAMEPLATE (DETAIL 7)	LAMICOID	450mm X 130mm (18" X 5")	20.0mm (0.79")	WHITE/BLACK
NP2	WARNING PLATE (DETAIL 6)	LAMICOID	150mm X 70mm (6" X 2.75")	6.0mm (0.24")/4.8 (0.19")	RED/WHITE
NP3					
NP4					
NP5	PS-1	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP6	PS-2	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP7	PLC-11/12	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP8	PLC-11/13	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP9	PLC-11/14	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP10					
NP11					
NP12					
NP13	DIODE MODULE	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP14					
NP15					
NP16					
NP17	ETHERNET CONNECTORS (TB-ETM)	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP18	MODBUS CONNECTORS (TB-COM)	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP19					
NP20	EQUIPMENT GROUND BUS	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK
NP21	INSTRUMENT GROUND BUS	LAMICOID	75mm X 25mm (2.95" X 0.98")	4.8mm (0.19")	WHITE/BLACK

SDN# 25472-130-JC-0000-P0074
UEL# 2012016-1EF-CAB-000-0017-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
	SKC	DMC	SRL	JED	DCB	

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER HUGO DOOLEY ALBERTA
2013-OCT-03

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

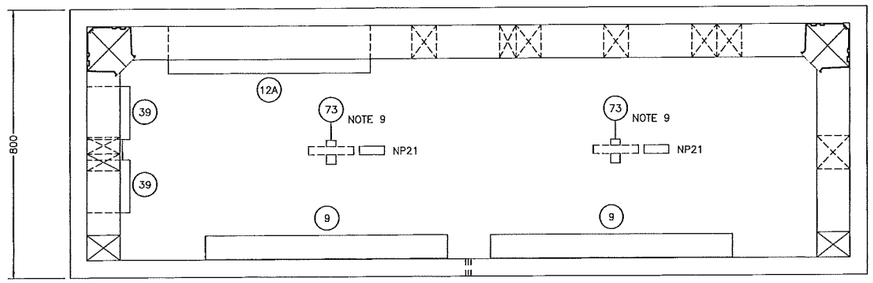
KHTT CONTROL PANEL
(CO-HTCP-05), PLC-11, (CO-EES-22)
PANEL LAYOUT SHEET 1 OF 2

SCALE N.T.S. | DRAWING No 4663-05-03-PA-401 | REV 00

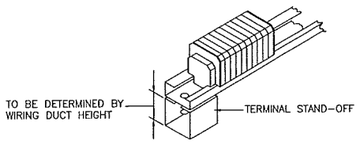
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TC_A1_BR.DWG 594X841

TIME ---------- DESIGNFILE



TOP INSIDE VIEW
TO SHOW WIRING DUCT



TYPICAL TERMINAL MOUNTING DETAIL
SCALE N.T.S.

NOTES:

1. FOR BILL OF MATERIALS SEE DRAWING 4663-05-03-PA-403. FOR LABEL DETAILS AND SCHEDULE SEE DRAWING 4663-05-03-PA-401.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
3. TERMINAL BLOCKS TO BE MOUNTED ON STANDOFFS TO MAKE FLUSH WITH PANDUITS.
4. NAMEPLATES SHALL BE FASTENED WITH SELF TAPPING SCREWS.
5. PROVIDE A WIRE PARTITION FOR DUCTS WITH BOTH 120VAC AND 24VDC CONTROL CABLES.
6. REDUNDANT 24VDC POWER SUPPLY UNITS (PS-1 & PS-2) SHALL BE INSTALLED C/W REDUNDANCY DIODE.
7. A REMOVABLE PLEXI-GLASS COVER IS TO BE INSTALLED OVER THE POWER DISTRIBUTION TERMINALS.
8. 120 VAC WIRING CHANNELS SHOWN HATCHED. WIRING CHANNELS FOR 24 VDC ARE SHOWN WITHOUT HATCHING.
9. MOUNT GROUND BAR ON UNDERSIDE OF PANEL ROOF.
10. PROVIDE LABELS ON CARD FRONTS WITH : PLC 11/XX/YY, WHERE XX-RACK YY-SLOT

LEGEND:

120VAC WIRING CHANNEL

DC WIRING CHANNEL

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PS	NIU		ETM	CMM	DI	DI	DI	DI	DI	DI	DI	DI	SP	PS	PS
13	16		17	18	21	21	21	21	21	21	21	21		13	13
IC695PSD140	IC695NIU001		IC695ETM001	IC695CMM024	IC694MDL660	IC694MDL660	IC694MDL660	IC694MDL660	IC694MDL660	IC694MDL660	IC694MDL660	IC694MDL660	SPARE	IC695PSD140	IC695PSD140

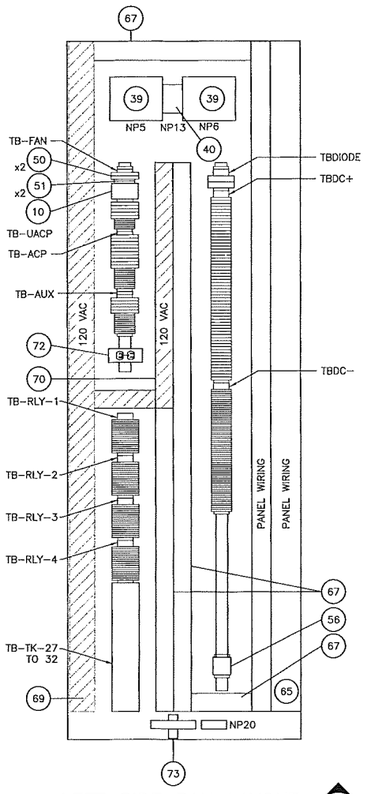
12A PLC-11/12
SCALE N.T.S.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PS	NIU		ETM	DO	DO	DO	DO	DO	DO	DO	DO	DO	SP	PS	PS
13	16		17	23	23	23	23	22	22	22	22	22		13	13
IC695PSD140	IC695NIU001		IC695ETM001	IC694MDL740	IC694MDL740	IC694MDL740	IC694MDL740	IC694MDL916	IC694MDL916	IC694MDL916	IC694MDL916	IC694MDL916	SPARE	IC695PSD140	IC695PSD140

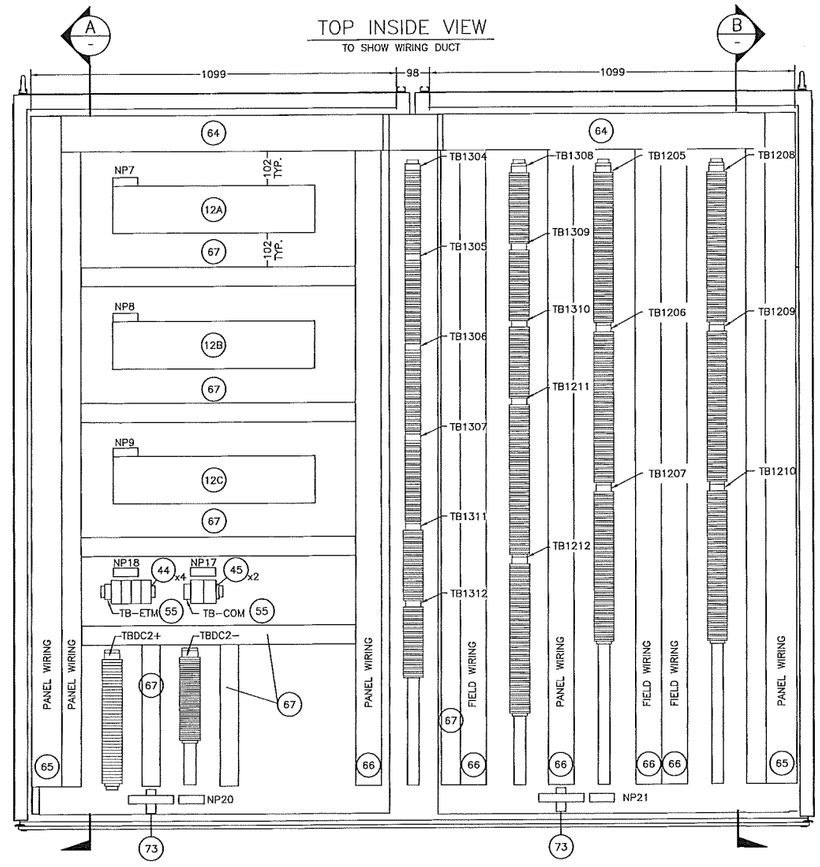
12B PLC-11/13
SCALE N.T.S.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PS	NIU		ETM	SP	AI	AI	AI	AI	AI	AI	AI	AI	AI	PS	PS
13	16		17		19	19	19	19	19	19	19	19	19	13	13
IC695PSD140	IC695NIU001		IC695ETM001	SPARE	IC695ALG616	IC695ALG616	IC695ALG616	IC695ALG616	IC695ALG616	IC695ALG616	IC695ALG616	IC695ALG616	IC695ALG616	IC695PSD140	IC695PSD140

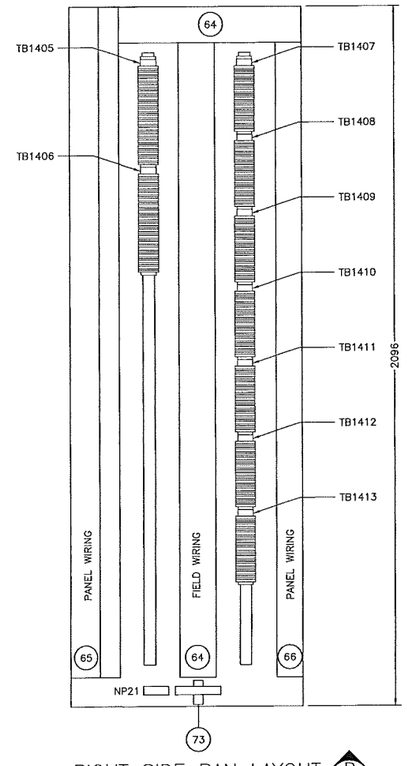
12C PLC-11/14
SCALE N.T.S.



LEFT SIDE PAN LAYOUT A



FRONT VIEW DOORS REMOVED
BACK PAN LAYOUT



RIGHT SIDE PAN LAYOUT B

SDN# 25472-130-JC-0000-P0075
UEL# 2012016-1EF-CAB-000-0018-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
	SKC	DMC	SRL	JED	DCB	

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PROFESSIONAL ENGINEER JAMES DOUGLAS BERRY 2013-OCT-03

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada
In business to deliver

upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

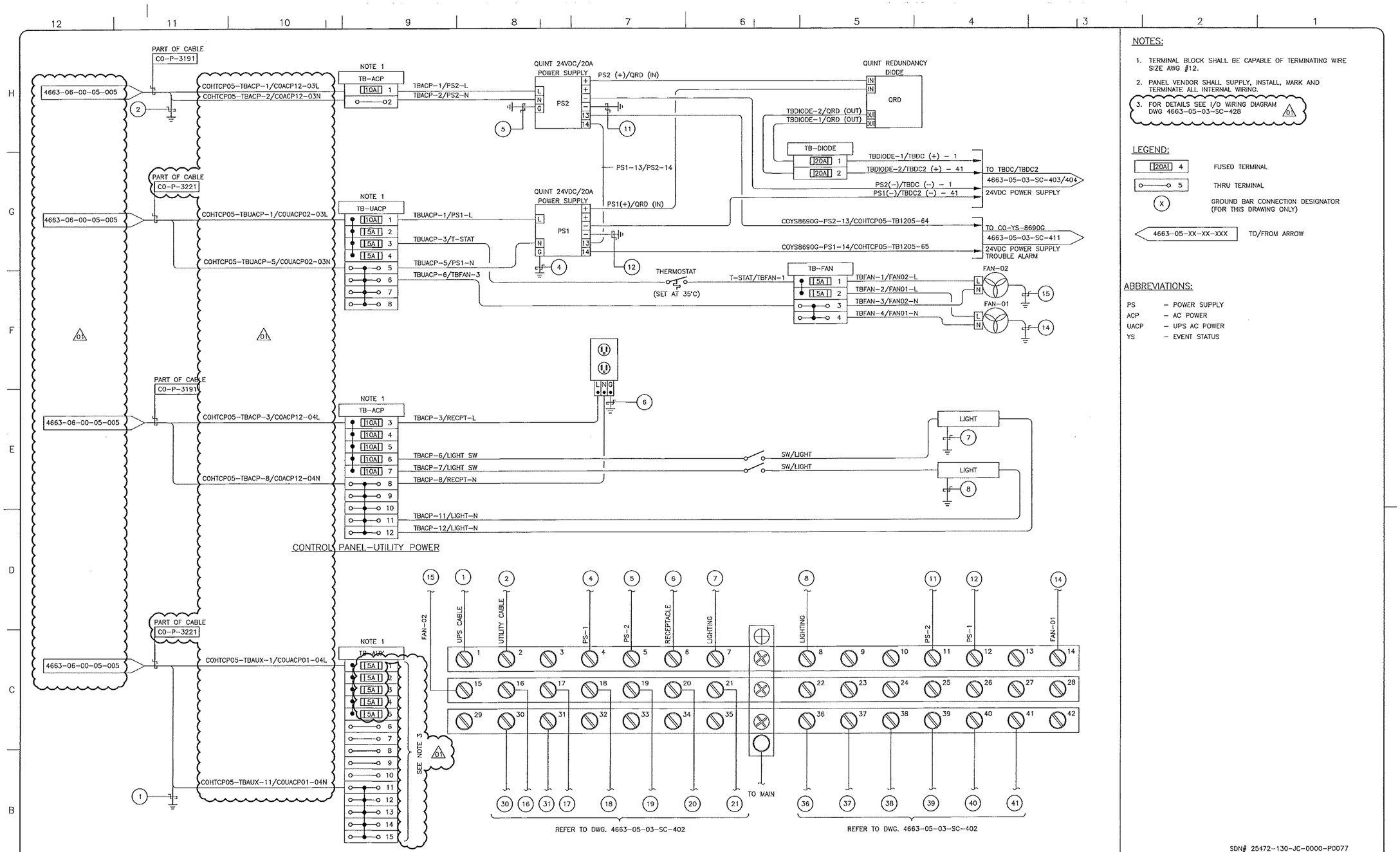
KHTT CONTROL PANEL
(CO-HTCP-05), PLC-11, (CO-EES-22)
PANEL LAYOUT SHEET 2 OF 2

SCALE 1 : 8 | DRAWING No 4663-05-03-PA-402 | REV 00

TMC DESIGNFILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS



NOTES:

1. TERMINAL BLOCK SHALL BE CAPABLE OF TERMINATING WIRE SIZE AWG #12.
2. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
3. FOR DETAILS SEE I/O WIRING DIAGRAM DWG 4663-05-03-SC-428 (01)

LEGEND:

- 20A 4 — FUSED TERMINAL
- 5 — THRU TERMINAL
- (X) — GROUND BAR CONNECTION DESIGNATOR (FOR THIS DRAWING ONLY)
- 4663-05-XX-XX-XXX — TO/FROM ARROW

ABBREVIATIONS:

PS	– POWER SUPPLY
ACP	– AC POWER
UACP	– UPS AC POWER
YS	– EVENT STATUS

SDN# 25472-130-JC-0000-P0077
UEL# 2012016-1EF-EWD-000-0063-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)
01	2014-03-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
2197104	JHP	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PROFESSIONAL ENGINEER ALBERTA — JAMES DOOLEY — 2014-MAR-12

PERMIT TO PRACTICE UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — In business to deliver
upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

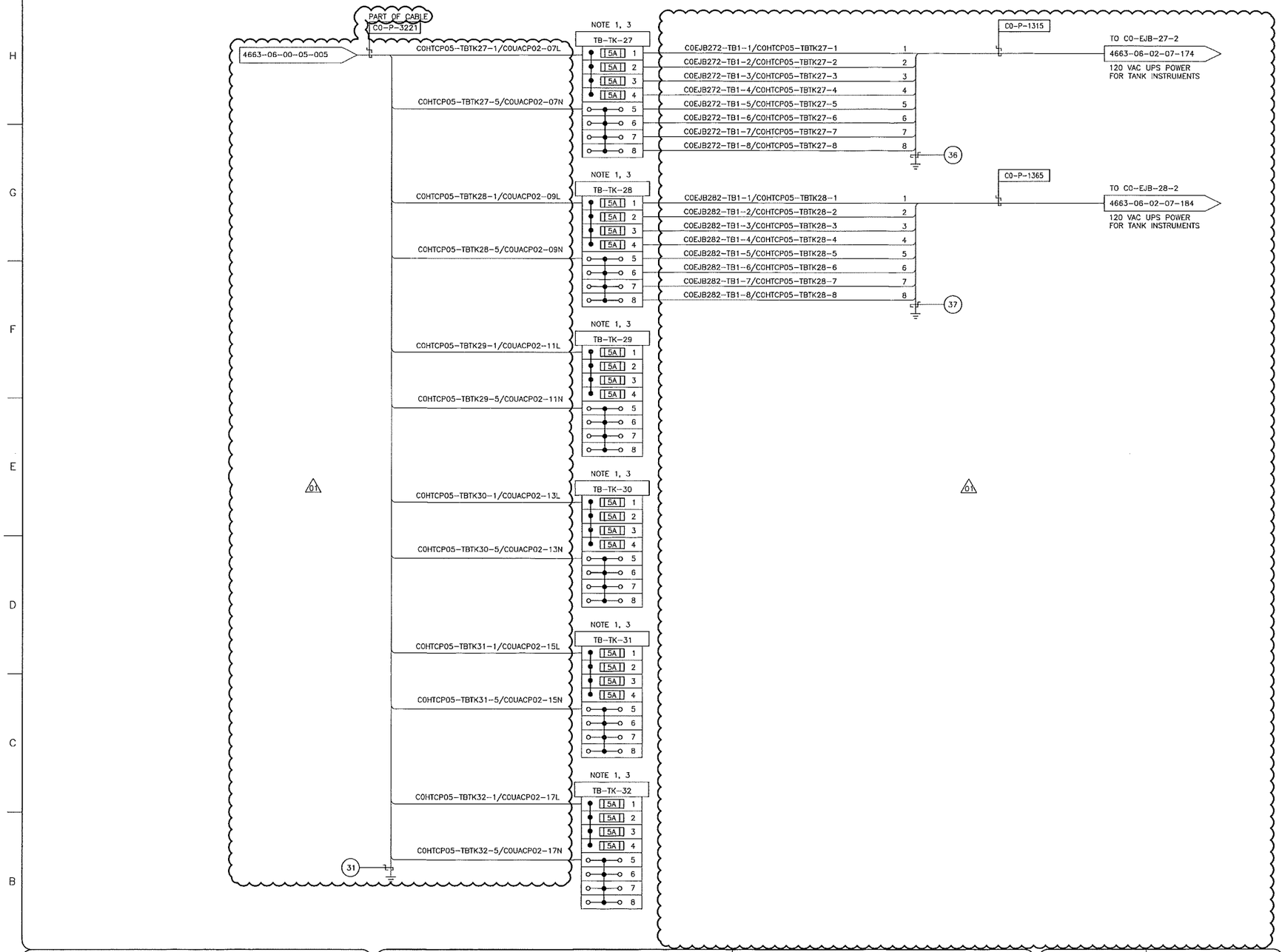
KHTT CONTROL PANEL C0-HTCP-05 (C0-EES-22) AC POWER DISTRIBUTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-401 | REV 01

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

ID — TIME — DESIGNFILE



NOTES:

1. TERMINAL BLOCK SHALL BE CAPABLE OF TERMINATING WIRE SIZE AWG #12.
2. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.
3. FINAL FUSE SIZE TO BE COORDINATED WITH VENDOR.

LEGEND:

20A 4	FUSED TERMINAL
5	THRU TERMINAL
X	GROUND BAR CONNECTION DESIGNATOR REFER TO 4663-05-03-SC-401
4663-05-XX-XX-XXX	TO/FROM ARROW

ABBREVIATIONS:

PS	– POWER SUPPLY
ACP	– AC POWER
UACP	– UPS AC POWER
YS	– EVENT STATUS

SDN# 25472-130-JC-0000-P0078
UEL# 2012016-1EF-EWD-000-0064-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)
01	2014-03-07	RE-ISSUED FOR CONSTRUCTION (UEL PROJ. # 2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE
2197104	BEM	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL

DATE

PROFESSIONAL ENGINEER ALBERTA — JAMES DODD — 2014-MAR-12

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

TransCanada — in business to deliver
upside Engineering Ltd.

KEYSTONE HARDISTY TANK TERMINAL

FA # 4663 | CHAINAGE: | DISCIPLINE # 05

KHTT CONTROL PANEL
C0-HTCP-05 (C0-EES-22)
AC POWER DISTRIBUTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-402 | REV 01

TIME — DESIGNTILE

TC_A1_BR.DWG 594X841

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TERMINAL CONTROL PANEL – DC POWER DISTRIBUTION

4663-05-03-SC-401

PS2(–)/TBDC(–)-1 (BK/W)

TBDIODE-1/TBDC(+)-1 (R)

TB-DC (+)		TB-DC (–)	
5A 1	TBDC(+)–1/R12–BACKPLANE–(7) → RACK 12 BACKPLANE POWER SUPPLY	1	TBDC(–)–1/R12–BACKPLANE–(8) → RACK 12 BACKPLANE POWER SUPPLY
5A 2	TBDC(+)–2/R12–S0–(+) → RACK 12 SLOT 0 POWER SUPPLY	2	TBDC(–)–2/R12–S0–(–) → RACK 12 SLOT 0 POWER SUPPLY
5A 3	TBDC(+)–3/R12–S14–(+) → RACK 12 SLOT 14 POWER SUPPLY	3	TBDC(–)–3/R12–S14–(–) → RACK 12 SLOT 14 POWER SUPPLY
5A 4	TBDC(+)–4/R12–S15–(+) → RACK 12 SLOT 15 POWER SUPPLY	4	TBDC(–)–4/R12–S15–(–) → RACK 12 SLOT 15 POWER SUPPLY
5A 5	TBDC(+)–5/TB1205–66 → RACK 12 SLOT 05 DI CARD	5	TBDC(–)–5/TB1205–68 → RACK 12 SLOT 05 DI CARD
5A 6	TBDC(+)–6/TB1206–66 → RACK 12 SLOT 06 DI CARD	6	TBDC(–)–6/TB1206–68 → RACK 12 SLOT 06 DI CARD
5A 7	TBDC(+)–7/TB1207–66 → RACK 12 SLOT 07 DI CARD	7	TBDC(–)–7/TB1207–68 → RACK 12 SLOT 07 DI CARD
5A 8	TBDC(+)–8/TB1208–66 → RACK 12 SLOT 08 DI CARD	8	TBDC(–)–8/TB1208–68 → RACK 12 SLOT 08 DI CARD
5A 9	TBDC(+)–9/TB1209–66 → RACK 12 SLOT 09 DI CARD	9	TBDC(–)–9/TB1209–68 → RACK 12 SLOT 09 DI CARD
5A 10	TBDC(+)–10/TB1210–66 → RACK 12 SLOT 10 DI CARD	10	TBDC(–)–10/TB1210–68 → RACK 12 SLOT 10 DI CARD
5A 11	TBDC(+)–11/R13–BACKPLANE–(7) → RACK 13 BACKPLANE POWER SUPPLY	11	TBDC(–)–11/R13–BACKPLANE–(8) → RACK 13 BACKPLANE POWER SUPPLY
5A 12	TBDC(+)–12/R13–S0–(+) → RACK 13 SLOT 0 POWER SUPPLY	12	TBDC(–)–12/R13–S0–(–) → RACK 13 SLOT 0 POWER SUPPLY
5A 13	TBDC(+)–13/R13–S14–(+) → RACK 13 SLOT 14 POWER SUPPLY	13	TBDC(–)–13/R13–S14–(–) → RACK 13 SLOT 14 POWER SUPPLY
5A 14	TBDC(+)–14/R13–S15–(+) → RACK 13 SLOT 15 POWER SUPPLY	14	TBDC(–)–14/R13–S15–(–) → RACK 13 SLOT 15 POWER SUPPLY
5A 15	TBDC(+)–15/TB1305–20 → RACK 13 SLOT 05 DO CARD (STATIC)	15	TBDC(–)–15/TB1305–37 → RACK 13 SLOT 05 DO CARD (STATIC)
5A 16	TBDC(+)–16/TB1306–20 → RACK 13 SLOT 06 DO CARD (STATIC)	16	TBDC(–)–16/TB1306–37 → RACK 13 SLOT 06 DO CARD (STATIC)
5A 17	TBDC(+)–17/TB1307–20 → RACK 13 SLOT 07 DO CARD (STATIC)	17	TBDC(–)–17/TB1307–37 → RACK 13 SLOT 07 DO CARD (STATIC)
5A 18	TBDC(+)–18/R13–S08–35 → RACK 13 SLOT 08 DO CARD (RELAY)	18	TBDC(–)–18/TB1308–32 → RACK 13 SLOT 08 DO CARD (RELAY)
5A 19	TBDC(+)–19/R13–S09–35 → RACK 13 SLOT 09 DO CARD (RELAY)	19	TBDC(–)–19/TB1309–32 → RACK 13 SLOT 09 DO CARD (RELAY)
5A 20	TBDC(+)–20/R13–S10–35 → RACK 13 SLOT 10 DO CARD (RELAY)	20	TBDC(–)–20/TB1310–32 → RACK 13 SLOT 10 DO CARD (RELAY)
5A 21	TBDC(+)–21/R13–S11–35 → RACK 13 SLOT 11 DO CARD (RELAY)	21	TBDC(–)–21/TB1311–32 → RACK 13 SLOT 11 DO CARD (RELAY)
5A 22	TBDC(+)–22/R13–S12–35 → RACK 13 SLOT 12 DO CARD (RELAY)	22	TBDC(–)–22/TB1312–32 → RACK 13 SLOT 12 DO CARD (RELAY)
5A 23	TBDC(+)–23/R14–BACKPLANE–(7) → RACK 14 BACKPLANE POWER SUPPLY	23	TBDC(–)–23/R14–BACKPLANE–(8) → RACK 14 BACKPLANE POWER SUPPLY
5A 24	TBDC(+)–24/R14–S0–(+) → RACK 14 SLOT 0 POWER SUPPLY	24	TBDC(–)–24/R14–S0–(–) → RACK 14 SLOT 0 POWER SUPPLY
5A 25	TBDC(+)–25/R14–S14–(+) → RACK 14 SLOT 14 POWER SUPPLY	25	TBDC(–)–25/R14–S14–(–) → RACK 14 SLOT 14 POWER SUPPLY
5A 26	TBDC(+)–26/R14–S15–(+) → RACK 14 SLOT 15 POWER SUPPLY	26	TBDC(–)–26/R14–S15–(–) → RACK 14 SLOT 15 POWER SUPPLY
5A 27	TBDC(+)–27/R14–S05–32 → RACK 14 SLOT 05 AI CARD (SE)	27	TBDC(–)–27/TB1405–46 → RACK 14 SLOT 05 AI CARD (SE)
5A 28	TBDC(+)–28/R14–S06–30 → RACK 14 SLOT 06 AI CARD (DIFF)	28	TBDC(–)–28/TB1406–32 → RACK 14 SLOT 06 AI CARD (DIFF)
5A 29	TBDC(+)–29/R14–S07–30 → RACK 14 SLOT 07 AI CARD (DIFF)	29	TBDC(–)–29/TB1407–32 → RACK 14 SLOT 07 AI CARD (DIFF)
5A 30	TBDC(+)–30/R14–S08–30 → RACK 14 SLOT 08 AI CARD (DIFF)	30	TBDC(–)–30/TB1408–32 → RACK 14 SLOT 08 AI CARD (DIFF)
5A 31	TBDC(+)–31/R14–S09–30 → RACK 14 SLOT 09 AI CARD (DIFF)	31	TBDC(–)–31/TB1409–32 → RACK 14 SLOT 09 AI CARD (DIFF)
5A 32	TBDC(+)–32/R14–S10–30 → RACK 14 SLOT 10 AI CARD (DIFF)	32	TBDC(–)–32/TB1410–32 → RACK 14 SLOT 10 AI CARD (DIFF)
5A 33	TBDC(+)–33/TB1211–66 → RACK 12 SLOT 11 DI CARD	33	TBDC(–)–33/TB1211–68 → RACK 12 SLOT 11 DI CARD
5A 34	TBDC(+)–34/TB1212–66 → RACK 12 SLOT 12 DI CARD	34	TBDC(–)–34/TB1212–68 → RACK 12 SLOT 12 DI CARD
5A 35	TBDC(+)–35/TB1304–20 → RACK 13 SLOT 4 DO CARD (STATIC)	35	TBDC(–)–35/TB1304–37 → RACK 13 SLOT 4 DO CARD (STATIC)
5A 36	TBDC(+)–36/R14–S11–30 → RACK 14 SLOT 11 AI CARD (DIFF)	36	TBDC(–)–35/TB1411–32 → RACK 14 SLOT 11 AI CARD (DIFF)
5A 37	TBDC(+)–36/R14–S12–30 → RACK 14 SLOT 12 AI CARD (DIFF)	37	TBDC(–)–35/TB1412–32 → RACK 14 SLOT 12 AI CARD (DIFF)
5A 38	TBDC(+)–36/R14–S13–30 → RACK 14 SLOT 13 AI CARD (DIFF)	38	TBDC(–)–35/TB1413–32 → RACK 14 SLOT 13 AI CARD (DIFF)
5A 39	SPARE → SPARE	39	SPARE → SPARE
5A 40	SPARE → SPARE	40	SPARE → SPARE
5A 41	SPARE → SPARE	41	SPARE → SPARE
5A 42	SPARE → SPARE	42	SPARE → SPARE
5A 43	SPARE → SPARE	43	SPARE → SPARE
5A 44	SPARE → SPARE	44	SPARE → SPARE
5A 45	SPARE → SPARE	45	SPARE → SPARE
5A 46	SPARE → SPARE	46	SPARE → SPARE
5A 47	SPARE → SPARE	47	SPARE → SPARE
5A 48	SPARE → SPARE	48	SPARE → SPARE
5A 49	SPARE → SPARE	49	SPARE → SPARE
5A 50	SPARE → SPARE	50	SPARE → SPARE
5A 51	SPARE → SPARE	51	SPARE → SPARE
5A 52	SPARE → SPARE	52	SPARE → SPARE
5A 53	SPARE → SPARE	53	SPARE → SPARE
5A 54	SPARE → SPARE	54	SPARE → SPARE
5A 55	SPARE → SPARE	55	SPARE → SPARE
5A 56	SPARE → SPARE	56	SPARE → SPARE
5A 57	SPARE → SPARE	57	SPARE → SPARE
5A 58	SPARE → SPARE	58	SPARE → SPARE
5A 59	SPARE → SPARE	59	SPARE → SPARE
5A 60	SPARE → SPARE	60	SPARE → SPARE

TBDC(+)–60/TBDC2(+)–1 (R)

4663-05-03-SC-404

TBDC(+)–60/TBDC2(–)–1 (BK/W)

NOTES:

1. TERMINAL BLOCK SHALL BE CAPABLE OF TERMINATING WIRE SIZE #12.
2. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

5A 4 — FUSED TERMINAL

5 — THRU TERMINAL

4663-05-00-SC-028 — FROM/TO ARROW

SDN# 25472-130-JC-0000-P0079
UEL# 2012016-1EF-EWD-000-0065-01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-10-03	ISSUED FOR CONSTRUCTION (UEL PROJ. #2012016)	2197104	SKC	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEER ALBERTA — JAMES DOODY — 2013-OCT-03

PERMIT/ ENG. APPROVAL — DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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KEYSTONE HARDISTY TANK TERMINAL

FIA # 4663 | CHAINAGE: | DISCIPLINE # 05

KHTT CONTROL PANEL
CO–HTCP–05 (CO–EES–22)
DC POWER DISTRIBUTION WIRING DIAGRAM

SCALE N.T.S. | DRAWING No 4663-05-03-SC-403 | REV 00

TIME——DESIGNFILE

TC_A1_BR.DWG 594X841

TERMINAL CONTROL PANEL – DC POWER DISTRIBUTION

TBDC(–)–60/TBDC2(–)–1 (BK/W)

4663–05–03–SC–403

TBDC(+)–60/TBDC2(+)–1 (R)

TB–DC2 (+)		TB–DC2 (–)	
5A 1	TBDC2(+)–1/C0AT8578A → C0–AT–8578A POWER SUPPLY	1	TBDC2(–)–1/C0AT8578A → C0–AT–8578A POWER SUPPLY
5A 2	TBDC2(+)–2/C0AT8578B → C0–AT–8578B POWER SUPPLY	2	TBDC2(–)–2/C0AT8578B → C0–AT–8578B POWER SUPPLY
5A 3	TBDC2(+)–3/C0AT8578C → C0–AT–8578C POWER SUPPLY	3	TBDC2(–)–3/C0AT8578C → C0–AT–8578C POWER SUPPLY
5A 4	TBDC2(+)–4/C0AT8578D → C0–AT–8578D POWER SUPPLY	4	TBDC2(–)–4/C0AT8578D → C0–AT–8578D POWER SUPPLY
5A 5	TBDC2(+)–5/C0AT8578E → C0–AT–8578E POWER SUPPLY	5	TBDC2(–)–5/C0AT8578E → C0–AT–8578E POWER SUPPLY
5A 6	TBDC2(+)–6/C0AT8578F → C0–AT–8578F POWER SUPPLY	6	TBDC2(–)–6/C0AT8578F → C0–AT–8578F POWER SUPPLY
5A 7	TBDC2(+)–7/C0AT8588A → C0–AT–8588A POWER SUPPLY	7	TBDC2(–)–7/C0AT8588A → C0–AT–8588A POWER SUPPLY
5A 8	TBDC2(+)–8/C0AT8588B → C0–AT–8588B POWER SUPPLY	8	TBDC2(–)–8/C0AT8588B → C0–AT–8588B POWER SUPPLY
5A 9	TBDC2(+)–9/C0AT8588C → C0–AT–8588C POWER SUPPLY	9	TBDC2(–)–9/C0AT8588C → C0–AT–8588C POWER SUPPLY
5A 10	TBDC2(+)–10/C0AT8588D → C0–AT–8588D POWER SUPPLY	10	TBDC2(–)–10/C0AT8588D → C0–AT–8588D POWER SUPPLY
5A 11	TBDC2(+)–11/C0AT8588E → C0–AT–8588E POWER SUPPLY	11	TBDC2(–)–11/C0AT8588E → C0–AT–8588E POWER SUPPLY
5A 12	TBDC2(+)–12/C0AT8588F → C0–AT–8588F POWER SUPPLY	12	TBDC2(–)–12/C0AT8588F → C0–AT–8588F POWER SUPPLY
5A 13	TBDC2(+)–13/C0AT8588G → C0–AT–8588G POWER SUPPLY	13	TBDC2(–)–13/C0AT8588G → C0–AT–8588G POWER SUPPLY
5A 14	SPARE → SPARE	14	SPARE → SPARE
5A 15	SPARE → SPARE	15	SPARE → SPARE
5A 16	SPARE → SPARE	16	SPARE → SPARE
5A 17	SPARE → SPARE	17	SPARE → SPARE
5A 18	SPARE → SPARE	18	SPARE → SPARE
5A 19	SPARE → SPARE	19	SPARE → SPARE
5A 20	SPARE → SPARE	20	SPARE → SPARE
5A 21	SPARE → SPARE	21	SPARE → SPARE
5A 22	SPARE → SPARE	22	SPARE → SPARE
5A 23	SPARE → SPARE	23	SPARE → SPARE
5A 24	SPARE → SPARE	24	SPARE → SPARE
5A 25	SPARE → SPARE	25	SPARE → SPARE
5A 26	SPARE → SPARE	26	SPARE → SPARE
5A 27	SPARE → SPARE	27	SPARE → SPARE
5A 28	SPARE → SPARE	28	SPARE → SPARE
5A 29	SPARE → SPARE	29	SPARE → SPARE
5A 30	SPARE → SPARE	30	SPARE → SPARE
5A 31	SPARE → SPARE	31	SPARE → SPARE
5A 32	SPARE → SPARE	32	SPARE → SPARE
5A 33	SPARE → SPARE	33	SPARE → SPARE
5A 34	SPARE → SPARE	34	SPARE → SPARE
5A 35	SPARE → SPARE	35	SPARE → SPARE
5A 36	SPARE → SPARE	36	SPARE → SPARE
5A 37	SPARE → SPARE	37	SPARE → SPARE
5A 38	SPARE → SPARE	38	SPARE → SPARE
5A 39	SPARE → SPARE	39	SPARE → SPARE
5A 40	SPARE → SPARE	40	SPARE → SPARE
5A 41	SPARE → SPARE	41	SPARE → SPARE

TBDIODE–2/TBDC2(+)–41 (R)

4663–05–03–SC–401

PS1(–)/TBDC2(–)–41 (BK/W)

NOTES:

1. TERMINAL BLOCK SHALL BE CAPABLE OF TERMINATING WIRE SIZE #12.
2. PANEL VENDOR SHALL SUPPLY, INSTALL, MARK AND TERMINATE ALL INTERNAL WIRING.

LEGEND:

- 5A 4 — FUSED TERMINAL
- 5 — THRU TERMINAL
- 4663–05–00–SC–028 — FROM/TO ARROW

SDN# 25472–130–JC–0000–P0080
UEL# 2012016–1EF–EWD–000–0066–01

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
00	2013–10–03	ISSUED FOR CONSTRUICTION (UEL PROJ. #2012016)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2197104	SKC	DMC	SRL	JED	DCB	UPSIDE

PROFESSIONAL ENGINEER/RPT

PROFESSIONAL ENGINEERS AND GEOSCIENTISTS ASSOCIATION
2013-OCT-03

PERMIT/ ENG. APPROVAL

DATE

PERMIT TO PRACTICE
UPSIDE ENGINEERING LTD.
PERMIT NUMBER: P 5508
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV. NO.	DATE	PERMIT NUMBER:

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KEYSTONE HARDISTY TANK TERMINAL

FIA #	CHAINAGE:	DISCIPLINE #
4663		05

KHTT CONTROL PANEL
C0–HTCP–05 (C0–EES–22)
DC POWER DISTRIBUTION WIRING DIAGRAM

SCALE	DRAWING No	REV
N.T.S.	4663–05–03–SC–404	00

TC_A1_BR.DWG 594X841

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