PIPING AND COMPONENTS SYMBOLS

MAIN LINE PROCESS & UTILITY

SECONDARY PROCESS LINE & SERVICE LINE

FUTURE LINE

UNDERGROUND LINE

TRACED LINE

BATTERY LIMIT (XXX=MATCHING AREA CODE NUMBER)

PACKAGE UNIT BOUNDARY

LINES CONNECTED (ARROWS AS REQUIRED)

LINES CROSSING NOT CONNECTED

PNEUMATIC SIGNAL [INSTAIR]

ELECTRICAL SIGNAL [ELECTRICAL]

PROCESS MEASUREMENT OR MECHANICAL LINKAGE [PROCESS]

INSTRUMENT CAPILLARY TUBING (CAPILL)

SOFTWARE LINK (SOFTWARE)

FOUNDATION FIELDBUS SIGNAL (FF)

HYDRAULIC (HYDRA)

ELECTROMAGNECTIC, SONIC OR NUCLEAR SIGNAL (ELECMAG)

ELECTROMAGNECTIC, SONIC SIGNAL (NOT GUIDED)

JACKETED PIPE ((JACKET)

FLOW ARROW (ARRFLW)

INSTRUMENT ARROW (ARRINT)

INSULATED LINE ANNOTATE H-HEAT OR C-COLD CONSERVATION, A-ACOUSTIC, PP-PERSONNEL PROTECTION SYMBOLS CAN BE COMBINED AS REQUIRED (INSUL). SHOW INSULATION THICKNESS

TRACED LINE ANNOTATE ET [ELECTRICAL], GT[GLYCOL] & ST[STEAM] SHOW TRACING MAINTENANCE TEMP. (INSULTRCD)

EXPANSION JOINT (EXJ)

FLEXIBLE HOSE (FH)

END CAP BUTTWELD (ENDCAP)

END FLANGED (ENDFLG)

END CAP SCREWED OR SOCKETWELD (ENDSCR)

LINE BREAK

HOSE CONNECTION (HC)

INITIAL FEED TO THE UNIT (ARROW 3)

CONTINUATION ARROW TO ANOTHER DRAWING (ARROW 1)

LINE CONTINUED ON THE SAME DRAWING (ARROW 2)

CONTINUATION ARROW TO/FROM ANOTHER DRAWING

GATE VALVE (VGA)

GLOBE VALVE (VGL 1)

Y TYPE GLOBE (VGLY)

CONVAL VALVE W/HILTAP COUPLING

NEEDLE VALVE (VND)

POST INDICATOR VALVE

PLUG VALVE (VPLG)

CHECK VALVE (VCHK)

STOP CHECK VALVE (VCHK_STOP)

MIN. FLOW CHECK VALVE (VCHKMIN)

BALL VALVE (VBA)

BALL VALVE HIGH PRESSURE SIDE SHADED

DOUBLE BLOCK & BLEED GAUGE VALVE

MULTI PORT VALVE (VMULTI)

RELIEF VALVE (RV)

VACUUM RELIEF VALVE

PRESSURE / VACUUM (RVPRES)

DIAPHRAGM VALVE (VDIA)

BUTTERFLY VALVE (VBFY)

ANGLE VALVE (VANG)

VALVE WITH BLEED OR PURGE CONNECTION (VBLEED)

3=WAY VALVE F=FAIL POSITION (VA3WY)

4=WAY VALVE (VA4WY)

CONTROL VALVE AND DIAPHRAGM ACTUATOR (CV)

CONTROL VALVE AND DIAPHRAGM ACTUATOR [WITH HANDLEWHEEL] (CV1)

CONTROL VALVE AND MANUAL ACTUATOR (HV)

CONTROL SELF ACTUATED REGULATOR. POINTS TO CONTROLLED PRESSURE SIDE (CVINTER)

MOTOR OPERATED VALVE (MV)

SINGLE ACTION CYLINDER ACTUATOR (AIR (PISTON) OPERATED VALVE) (AIRV)

SOLENOID VALVE MANUAL RESET (SOLEMANR)

SLIDE VALVE [MANUAL] (SLDE)

FIRE ISOLATION VALVE [GREENWOOD TYPE] (FIV)

DRAIN OR VENT WITH PLUG OR BLIND FLANGE (DRORVT)

SILENCER (SIL)

INTERMITTENT PURGE REFER TO COMMODITY DESIGNATIONS FOR XX (PURGEINT)

CONTINUOUS PURGE REFER TO COMMODITY DESIGNATIONS FOR XX (PURGECON)

NOTE NUMBER

DIAPHRAGM SEAL (SEAL)

HUB JOINT

HUB JOINT WITH BLIND

LINE SIZE ORIFICE (ORIF) ANNOTATE RO DIAMETER

GRADE (GRADE)

SEAL LEG (SLEG)

TEMPORARY STRAINER (TS)

REMOVABLE SPOOL

FIRE HYDRANT

FIRE HYDRANT WITH MONITOR

ELEVATED FIRE MONITOR (SELF SUPPORTED)

ELEVATED FIRE MONITOR (SUPPORTED)

T-TYPE PERMANENT STRAINERS (TTP)

Y-TYPE PERMANENT STRAINERS (YTP)

BASKET TYPE STRAINER (BASKET)

DUPLEX TYPE STRAINER (DUPLEX)

SPECTACLE BLIND (CLOSED) (BLDC)

SPECTACLE BLIND (OPEN) (BLDO)

SPADE BLIND (BLD)

SPACER (SPACER)

CONCENTRIC REDUCER (RED)

ECCENTRIC REDUCER (ECCFOT) (ECCFOB)

FLAME ARRESTOR (FLAME)

DETONATION ARRESTOR

TRAP STATION (TRAP)

TIE POINT SYMBOL (TP). SEE NOTES

SPECIALTY TAG (SPTAG)

SEWER DRAIN (SEWEROP) REFER TO SEWER DESIGNATIONS FOR XX

CLOSED SEWER DRAIN (SEWERCL) REFER TO SEWER DESIGNATIONS FOR XX

SAMPLE POINT

MIXING OR INJECTION POINT

UTILITY STATION (USTN)

UTILITY CONNECTION (UTCON). REFER TO COMMODITY DESIGNATION FOR XX

SPEC BREAK (SPECBRK)

CHANGE OF SLOPE (SLOPE)

DISSIMILAR MATERIAL WELDING

FREE DRAINING

LINE DESIGNATION

LINE NUMBER SHALL BE ASSIGNED TO ALL PIPING AND LDT (LINE DESIGNATION TABLES) AS FOLLOWS:

X - GR - ###YYY - ZZZ
X - NOMINAL LINE SIZE
GR - COMMODITY
- PLANT UNIT NUMBER
(V) - VACUUM SERVICE
YYY - LINE NUMBER (1 THRU 999)
ZZZ - PIPE MATERIAL CLASS

FOR EACH SPECIFIC UNIT AND FOR EACH SPECIFIC FLUID DESIGNATION WITHIN THAT UNIT THE LINE NUMBERING WILL BEGIN AT 001.

COMMODITY DESIGNATIONS

P & ID No. GR — UTILITY

FOR GR, USE THESE SYMBOLS

AA - AERATION AIR
AC - COMBUSTION AIR
AI - INSTRUMENT AIR
AP - PROCESS AIR
AR - REGENERATION AIR
AU - UTILITY AIR
BA - BREATHING AIR
BD - BLOWDOWN & RELIEF
BO - BOILER BLOWDOWN
CA - CATALYST
CL - CHLORINE
CT - COMPRESSOR TRIM
CWS - COOLING WATER SUPPLY
CWR - COOLING WATER RETURN
DM - AMINE DRAIN
DO - OILY DRAIN
DT - DUCT TRIM
ET - EXCHANGER TRIM
FL - FLARE HEADER (UNDETERMINED)
GC - CARBON DIOXIDE GAS
GF - FUEL GAS
GH - HYDROGEN GAS
GHH - HIGH PRESSURE H2
GHL - LOW PRESSURE H2
GI - INERT GAS (NITROGEN)
GN - NATURAL GAS
GO - OXYGEN GAS
GP - PURGE GAS
GR - REFORMED GAS
GS - SYNTHESIS GAS
GW - WASTE GAS
GX - HYDROGEN SULPHIDE GAS
HS - SULPHURIC ACID
HT - HEATER TRIM
IN - INHIBITOR
KA - AMMONIA, ANHYDROUS
KC - CAUSTIC
KP - PROCESS CHEMICALS
KS - SULPHUR
KW - AMMONIA, AQUEOUS
OF - FUEL OIL
OH - HOT OIL
OL - LUBE OIL & SEAL OIL
OS - SLOP OIL
OP - PURGE/FLUSHING OIL
OPH - HIGH PRESSURE OIL
OPL - LOW PRESSURE OIL
OM - OIL MIST
P - PROCESS PIPING
PA - PROCESS AMMONIA
PC - PROCESS CONDENSATE
PT - PUMP TRIM
RA - AMMONIA REFRIGERANT
RE - ETHYLENE REFRIGERANT
RP - PROPYLENE REFRIGERANT
SCH - HIGH PRESSURE CONDENSATE
SC - STEAM CONDENSATE
SCL - LOW PRESSURE CONDENSATE
SE - EXHAUST STEAM
SH - HIGH-PRESSURE STEAM (2500 kPa(ga) SAT.)
SI - HIGH-PRESSURE SULPHUR PLANT STEAM (4200 kPa(ga))
SL - LOW - PRESSURE STEAM (350 kPa(ga))
SM - SATURATED STEAM
SS - HIGH-PRESSURE STEAM (4500 kPa(ga) SUPERHEATED)
SN - MEDIUM-PRESSURE STEAM (900kPa(ga) SUPERHEATED)
SO - STEAM OUT
ST - STEAM TRACING
SV - VACUUM STEAM
TT - TANK TRIM
VA - ATMOSPHERIC VENT
VT - VESSEL TRIM
WA - RAW WATER
WB - BOILER FEED WATER
WC - TEMPERED WATER SUPPLY
WD - DOMESTIC WATER
WF - FIRE WATER
WH - HOT WATER SUPPLY
WI - DEMINERALIZED WATER
WK - HOT WATER RETURN
WL - CHILLED WATER SUPPLY
WM - CHILLED WATER RETURN
WP - PROCESS WATER
WR - TEMPERED COOLING WATER RETURN
WS - SOUR WATER
WT - TREATED WATER
WU - UTILITY WATER
WW - WASTE WATER
WX - CIRCULATING WATER
WF - FILTERED WATER
WZ - CLARIFIED WATER
XT - MISCELLANEOUS TRIM, SAMPLE POINTS

OTHER DESIGNATIONS

AE - ANALYZER
NNF - NORMALLY NO FLOW
HV - HAND CONTROL VALVE
FP - FULL PORT

SEWER DESIGNATIONS

FOR XX, USE THESE SYMBOLS

DA - ACID SEWER
DB - BENZENE DRAIN
DC - CAUSTIC SEWER
DF - DRAIN FLUSH (CLOSED HYDROCARBON DRAIN)
DK - CHEMICAL SEWER
DM - AMINE SEWER
DO - OILY WATER SEWER (OPEN)
DP - PROCESS DRAIN
DR - STORM SEWER
DS - SANITARY SEWER
EF - POND EFFLUENT
OS - OILY SEWER (CLOSED - ABOVE GROUND)

1. AUTOCAD BLOCK NAMES ARE SHOWN IN ROUND BRACKETS UNDER THE SYMBOL DESCRIPTION.

VALVE POSITIONS DESIGNATIONS

HAND OPERATED VALVES
NO - NORMALLY OPEN
NC - NORMALLY CLOSED
LO - LOCKED OPEN
LC - LOCKED CLOSED
LN - LOCKED NEUTRAL
CSO - CAR SEALED OPEN
CSC - CAR SEALED CLOSED

CONTROL VALVES
FO - FAIL OPEN
FC - FAIL CLOSED
FL - FAIL LOCK LAST POSITION
FL(O) - FAIL LOCK (ULTIMATE OPEN)
FL(C) - FAIL LOCK (ULTIMATE CLOSE)
FX(C) - FAIL INTERMEDIATE (ULTIMATE CLOSE)
FX(O) - FAIL INTERMEDIATE (ULTIMATE OPEN)
TSO - TIGHT SHUTOFF

TIE-IN POINTS SHALL BE DESIGNATED AS FOLLOWS

PLT. UNIT NO.
SEQUENCE NO.

ADDITIONS / MODIFICATIONS

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
LEGENDS AND SYMBOLS

SCALE: NONE

SHELL DWG NO.: 200.0000.000.041.007 REV. A

200.007

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INSTRUMENT IDENTIFICATION LETTERS

	MEASURED VARIABLES																								
	ANALYZER	BURNER FLARE	CONDUCTIVITY	DENSITY	VOLTAGE (EMF)	FLOW	FLOW RATIO	FLOW TOTAL	GAUGING	HAND	CURRENT	POWER	TIME OR TIME SCHEDULE	LEVEL	MOISTURE OR HUMIDITY	PRESSURE	PRESSURE DIFFERENCE QUANTITY OR EVENT	SPEED	TEMPERATURE	TEMPERATURE DIFFERENCE	MULTI VARIABLE	VISCOSITY	WEIGHT	MISCELLANEOUS	POSITION
INSTRUMENT FUNCTION	A	B	C	D	E	F	FF	FQ	G	H	I	J	K	L	M	P	PD	Q	S	T	TD	U	V	W	X	Z
ALARM	AA	BA	CA	DA	EA	FA	FFA	FQA	GA	HA	IA	JA	KA	LA	MA	PA	PDA	QA	SA	TA	TDA	UA	VA	WA	XA	ZA
ALARM LOW (L), MEDIUM (M), HI (H)	AAL	-	CAL	DAL	EAL	FAL	FFAL	FQAL	GAL	HAL	IAL	JAL	KAL	LAL	MAL	PAL	PDAL	QAL	SAL	TAL	TDAL	UAL	VAL	WAL	XAL	ZAL
CONTROL	AC	-C	CC	DC	EC	FC	FFC	FQC	GC	HC	IC	JC	KC	LC	MC	PC	PDC	QC	SC	TC	TDC	UC	VC	WC	XC	ZC
CONTROL VALVE (SELF OPERATING)	-		-	-	-	FCV	-	-	-	-	-	-	-	LCV	-	PCV	PDCV	-	-	TCV	TDCV	UCV	-	WCV	XCV	-
ELEMENT	AE	BE	CE	DE	-	FE	-	-	GE	-	-	-	KE	LE	ME	PE	-	QE	SE	TE	-	-	VE	-	XE	ZE
GAUGE GLASS (TUBE)	-	BG	-	-	-	FG	-	-	-	-	-	-	KG	LG	-	PG	PDG	-	-	TG	-	-	VG	-	XG	-
INDICATOR	AI		CI	DI	EI	FI	FFI	FQI	GI	HI	II	JI	KI	LI	MI	PI	PDI	QI	SI	TI	-	UI	VI	WI	XI	ZI
INDICATING CONTROLLER	AIC		CIC	DIC	EIC	FIC	FFIC	FQIC	GIC	HIC	IIC	JIC	KIC	LIC	MIC	PIC	PDIC	QIC	SIC	TIC	TDIC	UIC	VIC	WIC	XIC	ZIC
INDICATING CONTROL STATION	AIK		CIK	DIK	EIK	FIK	FFIK	FQIK	GIK	HIK	IIK	JIK	KIK	LIK	MIK	PIK	PDIK	QIK	SIK	TIK	TDIK	UIK	VIK	WIK	XIK	ZIK
INDICATING SWITCH	AIS		CIS	DIS	EIS	FIS	FFIS	FQIS	GIS	HIS	IIS	JIS	KIS	LIS	MIS	PIS	PDIS	QIS	SIS	TIS	TDIS	UIS	VIS	WIS	XIS	ZIS
INDICATING TRANSMITTER	AIT		CIT	DIT	EIT	FIT	FFIT	FQIT	GIT	-	IIT	JIT	KIT	LIT	MIT	PIT	PDIT	QIT	SIT	TIT	TDIT	UIT	VIT	WIT	XIT	ZIT
RECORDER	AR		CR	DR	ER	FR	FFR	FQR	GR	HR	IR	JR	KR	LR	MR	PR	PDR	QR	SR	TR	TDR	UR	VR	WR	XR	ZR
RECORDING CONTROLLER	ARC		CRC	DRC	ERC	FRC	FFRC	FQRC	GRC	HRC	IRC	JRC	KRC	LRC	MRC	PRC	PDRC	QRC	SRC	TRC	TDRC	URC	VRC	WRC	XRC	ZRC
RECORDING SWITCH	ARS		CRS	DRS	ERS	FRS	FFRS	FQRS	GRS	HRS	IRS	JRS	KRS	LRS	MRS	PRS	PDRS	QRS	SRS	TRS	TDRS	URS	VRS	WRS	XRS	ZRS
RECORDING TRANSMITTER	ART		CRT	DRT	ERT	FRT	FFRT	FQRT	GRT	-	IRT	JRT	KRT	LRT	MRT	PRT	PDRT	QRT	SRT	TRT	TDRT	URT	VRT	WRT	XRT	ZRT
SWITCH	AS	BS	CS	DS	ES	FS	FFS	FQS	GS	HS	IS	JS	KS	LS	MS	PS	PDS	QS	SS	TS	TDS	US	VS	WS	XS	ZS
SWITCH LOW (L), MEDIUM (M), HI (H)	ASL		CSL	DSL	ESL	FSL	FFSL	FQSL	GSL	HSL	ISL	JSL	KSL	LSL	MSL	PSL	PDSL	QSL	SSL	TSL	TDSL	USL	VSL	WSL	XSL	ZSL
TRANSMITTER	AT	-	CT	DT	ET	FT	FFT	FQT	GT	-	IT	JT	KT	LT	MT	PT	PDT	QT	ST	TT	TDT	UT	VT	WT	XT	ZT
CONTROL VALVE OR DAMPER	AV	BV	CV	DV	EV	FV	FFV	FQV	GV	HV	IV	JV	KV	LV	MV	PV	PDV	QV	SV	TV	TDV	UV	VV	WV	XV	ZV
MISCELLANEOUS	AX	BX	CX	DX	EX	FX	FFX	FQX	GX	HX	IX	JX	KX	LX	MX	PX	PDX	QX	SX	TX	TDX	UX	VX	WX	XX	ZX
RELAY TRANSDUCER ETC	AY	BY	CY	DY	EY	FY	FFY	FQY	GY	HY	IY	JIY	KY	LY	MY	PY	PDY	QY	SY	TY	TDY	UY	VY	WY	XY	ZY
DRIVE OR ACTUATOR	AZ	BZ	CZ	DZ	EZ	FZ	FFZ	FQZ	GZ	HZ	IZ	JZ	KZ	LZ	MZ	PZ	PDZ	QZ	SZ	TZ	TDZ	UZ	VZ	WZ	XZ	ZZ

THE COMBINATION OF LETTERS SHOWN INCLUDE THOSE MOST FREQUENTLY ENCOUNTERED. OTHER COMBINATIONS MAY BE DERIVED FROM TABLE 1 ISA-S-5.1 STANDARD. IF AN INSTRUMENT HAS ADDITIONAL FUNCTIONS, IT SHOULD BE SHOWN BY TWO GROUPS OF LETTERS RATHER THAN EXCEEDING THREE LETTERS (E.G. FQI AND FRC NOT FQIRC).

A- ANALYZERS MAY BE FURTHER IDENTIFIED BY DESCRIPTIVE LETTERS OR WORDS WRITTEN OUTSIDE THE TAGGING BALLOON.

C- IS USED WITH ZSC TO GIVE CLOSED POSITION.

D, F, Q,- ARE MODIFYING LETTERS FOR DIFFERENCE (D), FRACTION OR RATIO (F), AND QUALITY OR TOTAL (Q). THEY MAY BE USED WITH OTHER FIRST LETTERS THAN THOSE SHOWN IN THE TABLE , E.G. KQ-TOTAL TIME, SD-SPEED DIFFERENCE, DF DENSITY RATIO.

J- IS USED FOR SCANNING - I.E.- FOR TEMPERATURE TJI OR TJR.

L- IS USED FOR PILOT LGHT. THE LETTER "L" MAY BE USED ALONE OR IF PART OF A LOOP, IT CAN TAKE THE LOOP LETTERS AS A PREFIX. E.G.F. , ETC.

N- IS USER'S CHOICE - EITHER AS A MEASUREMENT OR OUTPUT FUNCTION.

O- IS USED WITH F TO GIVE FO, FLOW ORIFICE RESTRICTION. IS USED WITH ZSO TO GIVE OPEN POSITION.

R- IS USED AS A MEASURED VARIABLE FOR RADIOACTIVITY MEASUREMENT.

S- IS ALSO USED TO MEAN SAFETY AS IN PSE RUPTURE DISC.

U- IS USED TO SHOW A MULTIFUNCTION INSTRUMENT. - I.E.- COMBINATION RECORDING SCANNING, TOTALIZING, ETC. OR MULTIFUNCTION SYSTEM THAT MAY BE DETAILED SEPARATELY.

W- IS USED WITH T AS TW FOR TEMPERATURE WELL.

X - IS USED TO IDENTIFY COMPUTING TYPE RELAYS, FUNCTION CAN BE SHOWN OUTSIDE BALLOON.

Y - IS USED TO SHOW ON/OFF TYPE NON ADJUSTABLE RELAYS IN A LOOP. - I.E.- SOLENOIDS, PNEUMATIC 3-WAY VALVES ETC.

E - THE SUFFIX LETTER "E" IS TO BE USED TO IDENTIFY COMPONENTS OF A SAFETY SYSTEM - I.E.- SHUTDOWN, DEPRESSURING, LOCK UP, ETC., (PALE - ALARM ON LOW PRESSURE SHUTDOWN).

V - WILL BE USED OUTSIDE BALLOON TO IDENTIFY VENDOR SUPPLIED INSTRUMENTS.

H/L - TWO STAGE VABIABLE ALARMS SHALL BE IDENTIFIED BY H AND HH, OR L AND LL, - I.E.- H- HIGH LEVEL ALARM
- HH- VERY HIGH LEVEL ALARM
NOTE: SAFETY SYSTEM WILL BE GENERALLY BE HE NOT HHE.

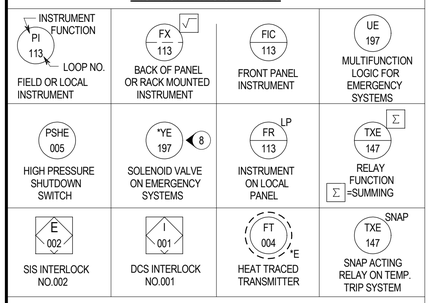
LP - WILL BE USED OUTSIDE BALLOON TO IDENTIFY INSTRUMENTS AT LOCAL PANELS. IF MORE THAN ONE PANEL, THEN IDENTIFY THEM NUMERICALLY AND REFERENCE IN GENERAL NOTES.

N- WILL BE USED FOR DIGITAL INPUT/OUTPUT TO MICROPROCESSOR BASED SYSTEMS. - I.E.- MECHANICAL EQUIPMENT ON/OFF MANUAL CONTROL OR EQUIPMENT STATUS- RUN/STOP.

LC- WILL BE USED OUTSIDE BALLOON TO IDENTIFY INSTRUMENT AT LOCAL CONSOLES.

CB- CUT BACK CONTROL

INSTRUMENTS SYMBOLS



NOTES

* - E SYMBOL USED WHEN TRACING POWER COMES FROM EMERGENCY SYSTEM.

GENERAL INSTRUMENTS SYSTEMS

FUNCTION IN DCS SYSTEM DISPLAY TO OPERATE

FUNCTION IN DCS SYSTEM NOT REQUIRED TO BE DISPLAYED TO OPERATE

HARDWIRED INTERLOCK SYSTEM

HARDWIRED SHUTDOWN INTERLOCK SYSTEM

DUAL FUNCTION (FOR SERVICES) INSTRUMENT

DCS OR PLC INTERLOCK

SIS INTERLOCK

HEXAGON DENOTES COMPUTER OR RTU FUNCTION

MOTOR CONTROL

MOTOR CONTROL DISPLAYS IN THE DCS ARE DESIGNATED AS BELOW:

HIS 401 R/S - SOFT HAND SWITCH OR PUSH BUTTON WITH RUN/STOP ACTION AND RUN STOPPED STATUS DISPLAY

MOTOR CONTROL ITEMS ON LOCAL PANEL OR FIELD MOUNTED ARE DESIGNATED AS BELOW:

HS 402 LP - STOP- ILLUMINATED PUSH BUTTON WITH STOP ACTION LOCAL PANEL MOUNTED

L 403 LP - RUN - INDICATING LIGHT

HS 404 - HOA - LOCAL HAND-OFF-AUTO TO MOTOR (ONE BALLOON CAN REPRESENT MORE THAN ONE FUNCTION)

IDENTIFICATION LETTERS:

HS - HAND SWITCH OR PUSH BUTTON

L - INDICATING LIGHT, IF ASSOCIATED WITH HAND SWITCHES OR PUSH BUTTONS OR ALARM IF USED FOR ALARM AL, ALH

NOTES

1. THE SWITCH/LIGHT FUNCTION SHALL BE SHOWN OUTSIDE OF CIRCLE

2. SOME TYPICAL FUNCTIONS ARE:

START	HAND	MANUAL
STOP	OFF	TRIP
RUN	AUTO	RESET
READY	JOG	ARMED

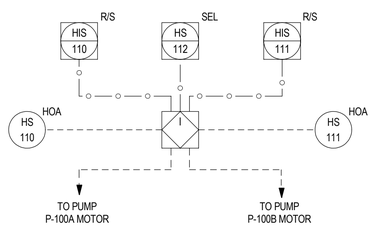
FUNCTIONAL ABBREVIATIONS MAYBE USED:
-S/S - START/STOP
-HOA - HAND-OFF-AUTO

3. NUMBERING SHALL FOLLOW THE SAME PROCEDURE AS INSTRUMENTS.

4. FOR MOTOR CONTROL SWITCHES AND LIGHTS, ONLY PANEL MOUNTED ITEMS ARE SHOWN ON P&ID'S EXCEPT WHERE LOCAL DEVICES ARE OTHER THAN START/STOP. ALL LOCAL DEVICES ARE THE RESPONSIBILITY OF THE ELECTRICAL DEPT.

5. INDICATING LIGHTS SHALL BE COLOR CODED AS FOLLOWS:
RUNNING/OPEN - BLUE
STOPPED/CLOSED - YELLOW

6.



START/STOP AND H-O-A HAND SWITCHES FOR PUMP "A" WILL HAVE A SEQUENTIAL NUMBER. A DIFFERENT SEQUENTIAL NUMBER IS USED FOR PUMP "B". THE DCS SOFT DEVICE BLOCK TAG WILL NOT HAVE A SUFFIX (I.E. HS-110) THE LOCAL HAND SWITCHES FOR H-O-A AND LOCAL START/STOP WILL HAVE SUFFIX STARTING WITH A (I.E. HS-110A). COMMON HAND SWITCH FOR BOTH PUMPS (I.E. SELECTOR SWITCH) WILL HAVE ITS OWN SEQUENTIAL NUMBER.

APPLICATION OF INSTRUMENT IDENTIFICATION TO P.&I.D.'S

1. AS A GENERAL GUIDE, THE EXTENT OF INSTUMENTATION SHOWN ON THE P&ID SHOULD BE SUFFICIENT TO PERMIT THE OBSERVER TO IDENTIFY THE MAIN COMPONENTS AND THE FINAL READOUT CONTROL AND/OR ALARM ACTION AND TO UNDERSTAND THE FULL FUNCTION OF THE INSTRUMENT SYSTEM. IDENTIFICATION OF ALL COMPONENTS AND THE FULL SCHEMATIC RELATIONSHIP ARE SHOWN ON THE INSTRUMENT HARD WIRED LOOP DWGS.

   FOR ELABORATE CONTROL SYSTEMS A SEPARATE DRAWING (EITHER VENDOR OR CONTRACTOR) MAY BE REQUIRED. IN SUCH A CASE, A BLOCK WILL BE DRAWN ON THE P&ID WITH A DRAWING NUMBER IDENTIFICATION AND SHOWING ALL THE INPUT AND OUTPUT SIGNALS.

2. XHS LP O/C — OPEN CLOSED HAND SWITCH MOUNTED ON A LOCAL PANEL FOR ACTUATING A "XV" ON/OFF VALVE.

   XHIS O/C — DCS COMPOSITE POINT SELECTOR SWITCH WITH OPEN/CLOSED INDICATION FROM "XV" LIMIT SWITCHES OR POSITION TRANSMITTER.

3. ALL CONTROLLERS COMING INTO DCS DO NOT NEED TO BE MARKED AS AN IC OR RC AS I AND R ARE IMPLICIT FOR EVERY POINT.
   ALARM PRESENTATION (MINIMIZE NUMBER OF BALLOONS)
   THE OPERATOR HAS THE ABILITY TO SET AN H OR L FOR ANY POINT.
   THESE OPERATOR ALERTS WILL NOT BE SHOWN ON P&ID ALARMS UNDER ENGINEERING CHANGE CONTROL WILL BE SHOWN AS: PI H, FI L

   IF MEASUREMENT POINT HAS A LOGIC INTERLOCK; THE INDICATED VALUE WILL BE AVAILABLE IN THE DCS. THE LL OR HH SIGNIFIES THE TRIP ACTION UNDER ENGINEERING CONTROL, WHICH THE OPERATOR CANNOT ADJUST.

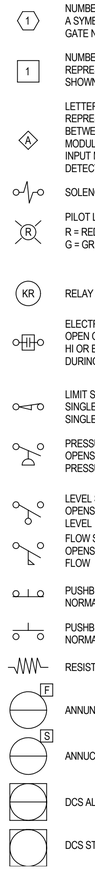
   LTE — E — LL

4. ELECTRICAL ACCESSORIES, COIL RELAYS, AMPLIFIERS AND I/P TRANSDUCERS AT CONTROL VALVES, ARE NORMALLY OMITTED ON THE P&ID. THE LATTER MAY BE SHOWN FOR THE LOOPS, WITH TWO OR MORE VALVES OR SEPARATE DEVICES, OR WITH THE AIR SIGNAL GOING TO AN INSTRUMENT PRIOR TO THE VALVE.
5. THE BALLOONS MAY BE DRAWN TANGENTIALLY TO SHOW A COMMON INSTRUMENT WHERE PRACTICAL.
6. FAILURE ACTION FOR SOLENOID AND PNEUMATIC 3-WAY INSTRUMENT VALVES WILL BE SHOWN WITH AND ARROW AND FO, FC, NOMENCLATURE- SIMILAR TO THAT USED FOR CONTROL VALVES.
7. SOLENOID VALVES ON NON- EMERGENCY SYSTEMS SHOULD BE TAGGED AS UYI- XXX.
8. SOLENOID VALVES ON EMERGENCY SYSTEMS SHOULD BE TAGGED AS *YE-XXX, I.E. XYE-001. SOLENOID VALVES ON NON-EMERGENCY SYSTEMS SHOULD BE TAGGED AS *YI-XXX, I.E. LYI-001.
9. CB 147 B — TYPICAL CUTBACK CONTROL REPRESENTATION SEE APPLICABLE P&ID FOR COMPLETE INTERACTION.

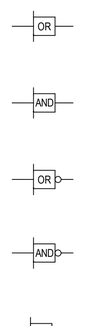
INSTRUMENT ABBREVIATION

A/S - INSTRUMENT AIR SUPPLY
FE - FLOW ELEMENT
FO - FLOW RESTRICTION ORIFICE
SIS - SAFETY INSTRUMENTED SYSTEM
SP - REMOTE SET POINT
RTD - RESISTANCE TEMPERATURE DETECTOR
V - WITH VENDOR SUPPLIED EQUIPMENT

LEGEND FOR FUNCTIONAL LOGIC DIAGRAMS



LEGEND FOR FUNCTIONAL LOGIC DIAGRAMS



GENERAL NOTES FOR FUNCTIONAL LOGIC DIAGRAMS

1. GRAPHICS LOGIC SHOWN ON DWGS. CONFORM TO ISA GRAPHIC SYMBOLS.
2. ALL ELECTRICALLY AND ELECTRONIC CONTROLLED DEVICES ARE SHOWN IN THE DE - ENERGIZED CONDITION PRIOR TO START-UP POSITION, UNLESS OTHERWISE SPECIFICALLY NOTED.
3. LOGIC SYMBOLS REPRESENT FUNCTIONAL AND OPERATIONAL SEQUENCE OF EVENTS AND DO NOT NECESSARILY REFLECT ACTUAL LOGIC GATES.
4. STATE OF LOGIC IS SHOWN AT LOGIC "0" WITH POWER OFF AND ALL INPUTS AND OUTPUTS IN THE FAIL SAFE CONDITION.
5. ALL CONTACTS THAT REQUIRE ANNUNCIATOR POINTS AND/OR VALVE STATUS LIGHTS SHALL BE EITHER DOUBLE-POLE FOR INTERLOCK AND THE OTHER FOR ANNUNCIATOR OR STATUS LIGHT, OR DIRECT INPUT TO PLC WITH REPEATED OUTPUT TO AUXILIARY DEVICE.

INSTRUMENT IDENTIFICATION NUMBERS

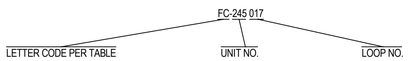
THE IDENTIFICATION NUMBER FOR LOOPS WILL HAVE SIX DIGITS, THE FIRST THREE BEING UPGRADER COMPLEX UNIT NUMBER.

THE FOLLOWING THREE DIGITS WILL PROVIDE A SINGLE SEQUENCE OF LOOP NUMBERS FOR EACH PROCESS VARIABLE IDENTIFICATION OF EACH LOOP.

THE LOOP NUMBERING SEQUENCE WILL BEGIN WITH THE NUMBER 001 FOR EACH PROCESS VARIABLE IDENTIFICATION FOR EACH UNIT, INCLUSIVE OF THE FOLLOWING LOCAL INSTRUMENTS.

PG - PRESSURE GAUGES
TG - DIAL THERMOMETER
TW - TEMPERATURE TEST WELL
LG - LEVEL GAUGES
FI - PURGEMETERS
FG - SIGHT FLOW GLASS
FO - FLOW ORIFICE
PSE - RUPTURE DISC
RV - PRESSURE SAFETY VALVE
FSV - EXCESS FLOW VALVE
RV - RELIEF VALVE (SYMBOL REF. DWG. 245.0000.000.041.001)

EXAMPLE



WITH THE EXCEPTION OF HAND SWITCHES, FOR INSTRUMENTS THAT ARE LOCATED ON IDENTICAL PARALLEL EQUIPMENT, THE IDENTICAL INSTRUMENTS ON EACH PIECE OF EQUIPMENT SHALL BE NUMBERED XXXA, XXXB, XXXC ETC. EXAMPLE: PARALLEL INSTRUMENTS SHALL BE NUMBERED 017A, 017B & 017C.

THE FIRST THREE DIGITS (UNIT NUMBER) WILL BE OMITTED FROM THE BALLOONS FOR IMPROVED READABILITY OF LOOP IDENTIFICATION NUMBERS. A GENERAL NOTE ON THE P&ID WILL REFERENCE THIS AND IDENTIFY THE OMITTED PLANT NUMBER. THE INSTRUMENT LOOP NUMBERS WILL THEN BE THREE DIGITS, I.E. 017.

INTERLOCK NUMBERS ARE SIX DIGITS AND ARE ASSIGNED BY THE INSTRUMENT DEPARTMENT. THE FIRST THREE DIGITS DESIGNATE THE UNIT AND THE LATTER THREE ARE SEQUENTIAL, COMMENCING AT 001 IN EACH UNIT. THE FIRST THREE DIGITS ARE OMITTED ON THE P&ID.

EXAMPLE

1. ALL REDUNDANT TRANSMITTERS HAVE DEVIATION ALARMS IN THE DCS. THE DEVIATION ALARMS ARE NOT SHOWN ON THE P&ID.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
INSTR ID LETTERS SYMBOLS AND LOOP NO

SCALE: NONE

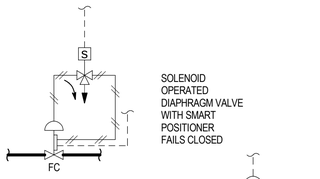
SHELL DWG NO.: 200.0000.000.041.008 REV. A

200.008 FILE:\\F:\1025\DRAWINGS\UTILITIES\200\200.008.pid MODEL DATE:2/1/2011 4:22:31 PM BY:alnn14887

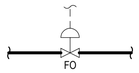
IN LINE AND TANK MOUNTED INSTRUMENTS

PNEUMATIC OR ELECTRONIC PER PROJECT REQUIREMENT

CONTROL VALVE

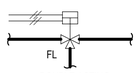


SOLENOID OPERATED DIAPHRAGM VALVE WITH SMART POSITIONER FAILS CLOSED



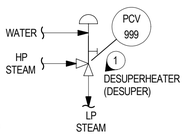
DIAPHRAGM GLOBE WITH SMART POSITIONER WITHOUT HANDWHEEL FAILS OPEN

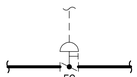
SINGLE ACTING CYLINDER ANGLE VALVE FAILS CLOSED



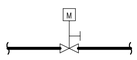
DOUBLE ACTING CYLINDER THREE WAY VALVE FAILS LOCKED IN LAST POSITION

SLIDE VALVE





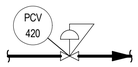
BUTTERFLY VALVE WITH SMART POSITIONER WITH HANDWHEEL FAILS CLOSED



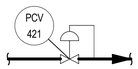
MOTOR OPERATED (MOV) VALVE WITH HANDWHEEL

SELF-ACTUATED REGULATORS

(REFER TO PROJECT DWG. 245.0000.000.041.002)

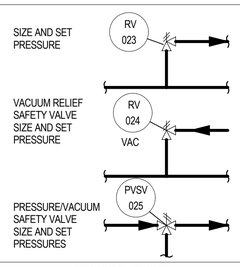


SELF-CONTAINED



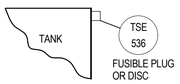
WITH EXTERNAL PRESSURE TAP

PRESSURE RELIEF VALVES



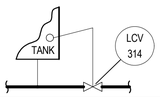
TEMPERATURE

(REFER TO PROJECT DWG. 245.0000.000.041.002)



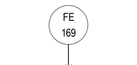
FUSIBLE PLUG OR DISC

LEVEL

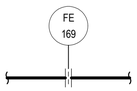


LEVEL REGULATOR WITH MECHANICAL LINKAGE

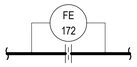
FLOW



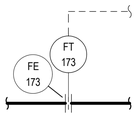
ORIFICE PLATE WITH FLANGE TAPS



ORIFICE PLATE COMPLETE WITH LOCAL FLOW INDICATOR

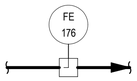


ORIFICE PLATE WITH VENA CONTRACTA RADIUS OR PIPE TAPS

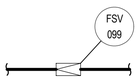


ORIFICE PLATE CONNECTED TO DIFFERENTIAL PRESSURE FLOW TRANSMITTER

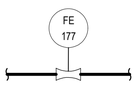
PURGEMETER OR ROTAMETER



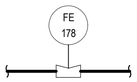
PITOT OR PITOT VENTURI OR ANNUBAR



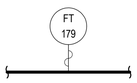
EXCESS FLOW VALVE



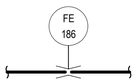
VENTURI TUBE OR FLOW NOZZLE



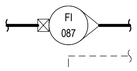
WEDGE



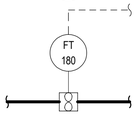
ULTRASONIC FLOW METER



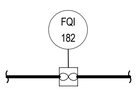
FLUME



ROTAMETER OR PURGEMETER WITH NEEDLE VALVE ON INLET

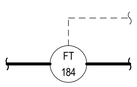


TURBINE OR PROPELLER FLOW METER

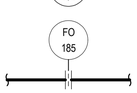


POSITIVE DISPLACEMENT METER

FLOW SIGHT GLASS



INLINE FLOWMETER WITH INTEGRAL TRANSMITTER



FIXED RESTRICTION ORIFICE

POSITIVE DISPLACEMENT (POSDISPL)

WEDGE (WEDGE)

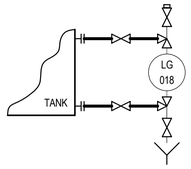
STRAIGHTING VANES (STVANES)

CORIOLIS (CORIO)

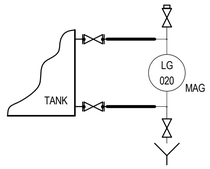
VORTEX

MAGNETIC

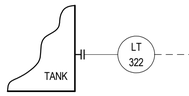
LEVEL



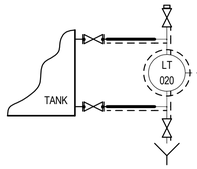
GAUGE GLASS EXTERNALLY CONNECTED



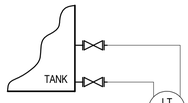
LEVEL INDICATOR MAGNETIC TYPE



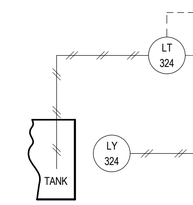
LEVEL TRANSMITTER INTERNAL FLOAT SIDE CONNECTION



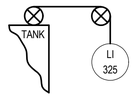
WINTERIZED LEVEL TRANSMITTER EXTERNAL FLOAT



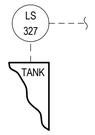
LEVEL TRANSMITTER DP TYPE



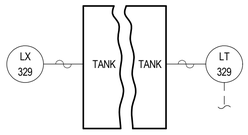
LEVEL TRANSMITTER DP TYPE WITH BUBBLER SYSTEM & DIP TUBE



LEVEL INDICATOR FLOAT WITH WIRE AND PULLEY

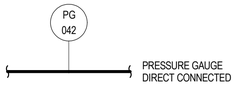


CAPACITANCE, DIELECTRIC OR CONDUCTIVITY TYPE SWITCH



RADIOACTIVE OR SONIC SOURCE

PRESSURE



PRESSURE GAUGE DIRECT CONNECTED

SIZE AND SET PRESSURE

REMOTE PRESSURE GAUGE WITH CAPILLARY & LINE MOUNTED DIAPHRAGM SEAL

PRESSURE GAUGE DIAPHRAGM SEAL LINE MOUNTED

PRESSURE POINT

TEMPERATURE

TEMPERATURE TEST CONNECTION WITH WELL

TEMPERATURE ELEMENT WITH OR WITHOUT WELL (NOT CONNECTED TO SECONDARY INSTRUMENT)

FILLED SYSTEM WITH WELL

THERMOMETER

TEMPERATURE TRANSMITTER WITH TW & TE

P&ID ABBREV.

ACTUAL

TEMPERATURE CONT.

MULTI-ELEMENT THERMOCOUPLE FOR DIFFERENT ELEVATIONS WITH WELL IN TANK

THERMAL RADIATION TYPE TEMPERATURE ELEMENT

TYPICAL LOOPS

MICROPROCESSOR (DCS/PLC) BASED SYSTEM

TYPICAL FLOW LOOP

TYPICAL FLOW LOOP INCLUDING SIS INTERLOCK & SOLENOID VALVE

TYPICAL FLOW LOOP INCLUDING DCS INTERLOCK

TYPICAL LEVEL - FLOW CASCADE LOOP. WINTERIZED

TEMPERATURE AND PRESSURE COMPENSATION

1. INSTRUMENT TAG REQUIRED FOR INTEGRAL DESUPERHEATING VALVE.
2. AUTOCAD BLOCK NAMES ARE SHOWN IN ROUND BRACKETS UNDER THE SYMBOL DESCRIPTION.

ADDITIONS / MODIFICATIONS

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
ID LETTERS SYMBOLS AND LOOP NO.

SCALE: NONE

SHELL DWG NO.: 200.0000.000.041.009 REV. A

200.009

FILE:\\F:\1025\DRAWINGS\UTILITIES\200\200.009.pid MODEL DATE: 2/1/2011 4:21:15 PM BY:ahm14887

PIPING AND INSTRUMENT DIAGRAM (P&ID) SYMBOLS

TXT / NO. — FIELD INSTRUMENT (INSTR1)

TXT / NO. — FRONT PANEL INSTRUMENT (INSTR2)

LP TXT / NO. — INSTRUMENT ON LOCAL PANEL (INSTR3)

TXT / NO. — BACK OF PANEL OR RACK MOUNTED INSTRUMENT (INSTR4)

I — PROGRAMMABLE LOGIC TYPE INTERLOCK SYSTEM (INTLOCK4)

WINTERIZED

I/I — CURRENT TO CURRENT TRANSDUCER (FDR1)

K — PROPORTIONAL (FDR5)

X^n — EXPONENTIAL (FDR6)

A/D — ANALOG TO DIGITAL (FDR7)

E/I — VOLT TO CURRENT TRANSDUCER

d/dt — DERIVATIVE (FDR10)

√ — EXTRACT SQUARE ROOT (FDR11)

f(x) — NONLINEAR OR UNSPECIFIED FUNCTION (FDR12)

f(t) — FUNCTION OF TIME (FDR13)

REV — REVERSE (FOR14)

A/M — AUTO MANUAL (FDR15)

R — RESET FOR LATCH TYPE SOLENOID (FDR16)

Σ — SUMMATION (FDR17)

X — MULTIPLY (FDR18)

1:1 — BOOST (FDR19)

> — HIGH SELECTION (FDR20)

I/P — CURRENT TO PNEUMATIC TRANSDUCER (FDR21)

P/I — PNEUMATIC TO CURRENT TRANSDUCER (FDR22)

< — LOW SELECTION (FDR24)

FUNCTION DESIGNATIONS FOR RELAYS (ISA S5.1)

THE FUNCTION DESIGNATIONS ASSOCIATED WITH RELAYS SHALL BE USED AS FOLLOWS, INDIVIDUALLY OR IN COMBINATION

NO.	SYMBOL	FUNCTION
1.	1-0 or ON - OFF	AUTOMATICALLY CONNECT, DISCONNECT, OR TRANSFER ONE OR MORE CIRCUITS PROVIDED THAT IS NOT THE FIRST SUCH DEVICE IN A LOOP
2.	Σ or ADD	ADD OR TOTALIZE (ADD AND SUBTRACT)
3.	△ or DIFF	SUBTRACT * *
4.	± ±	BIAS *
5.	AVG.	AVERAGE
6.	% or 1:3 or 2:1 [TYPICAL]	GAIN OR ATTENUATE (INPUT : OUTPUT) *
7.	⊠	MULTIPLY * *
8.	÷	DIVIDE * *
9.	√ SQ. RT.	EXTRACT SQUARE ROOT
10.	X^n or $X^{1/n}$	RAISE TO POWER
11.	f(x)	CHARACTERIZE
12.	1:1	BOOST
13.	> or HIGHEST (MEASURED VARIABLE)	HIGH- SELECT. SELECT HIGHEST (HIGHER) MEASURED VARIABLE (NOT SIGNAL, UNLESS SO NOTED).
14.	< or LOWEST (MEASURED VARIABLE)	LOW- SELECT. SELECT LOWEST (LOWER) MEASURED VARIABLE (NOT SIGNAL, UNLESS SO NOTED).
15.	REV.	REVERSE
16.	A/D or D/A	FOR INPUT / OUTPUT SEQUENCES OF THE FOLLOWING: A - ANALOG, D - DIGITAL
17.	∫	INTEGRATED (TIME INTEGRAL)
18.	D or d/dt	DERIVATIVE OR RATE
19.	I/D	INVERSE DERIVATE
20.	AS REQUIRED	UNCLASSIFIED

* USED FOR SINGLE - INPUT RELAY.

* * USED FOR RELAY TWO OR MORE INPUTS.

1. AUTOCAD BLOCK NAMES ARE SHOWN IN ROUND BRACKETS UNDER THE SYMBOL DESCRIPTION.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

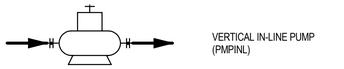
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
FUNCTION DESIGNATIONS

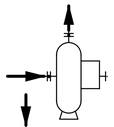
SCALE: NONE

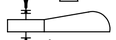
SHELL DWG NO.: 200.0000.000.041.010 REV. A

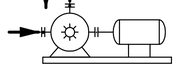
200.010

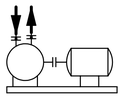
FILE:\\F:\1025\DRAWINGS\UTILITIES\200\200.010.pid MODEL DATE:1/5/2011 10:21:29 AM BY:ahm14887

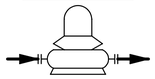

VERTICAL IN-LINE PUMP
(PMPINL)

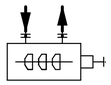

CENTRIFUGAL PUMP
(PMPCENT)

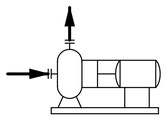

RECIPROCATING PUMP
(PMPRECIP)

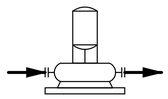

VACUUM PUMP
(PMPVAC)


TOP SUCTION/DISCH. PUMP
(PMPTT)

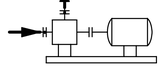

HIGH SPEED
CENTRIFUGAL
PUMP
(PMPHSC)


MULTISTAGE
PUMP
(PMPMULTI)


CENTRIFUGAL CANNED PUMP
(PMPCCAN)

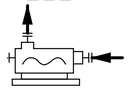

VERTICAL IN-LINE
CANNED PUMP
(PMPICAN)

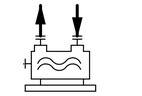

CETRIFUGAL SIDE
IN/OUT BETWEEN
BEARING PUMP

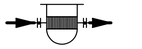

METERING PUMP
(PMPMETER)

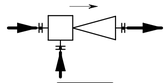

INJECTION PUMP
(PMPINJEC)

VERTICAL SUMP PUMP
(PMPSUMP)


ROTARY SCREW
PUMP (PMPROTS)

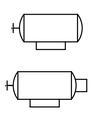

ROTARY SCREW
COMPRESSOR (COMPROTS)


FILTER (FLT)

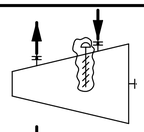

EJECTOR/INJECTOR
EDUCTOR
BASIC SYMBOL
(EJECTOR)

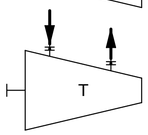

IN-LINE STATIC MIXER
(INMIX)

TANK MIXER
(TKMIX)

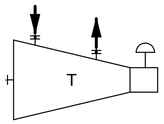

ELECTRIC MOTORS
AC MOTOR
*VFD FOR VARIABLE
FREQUENCY DRIVE
(EM)

SYNCHRONOUS MOTOR
*DC FOR DC MOTORS
(EMDC)

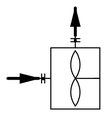

CENTRIFUGAL
COMPRESSOR
WITH GUIDE VANES
(COMPC)

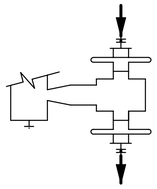


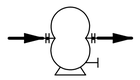
STEAM TURBINE
(STMTUR)

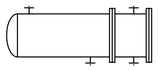


TURBINE WITH
PNEUMATIC
SPEED CONTROL
(STMTURPN)


CENTRIFUGAL FAN
OR BLOWER
(CFB)

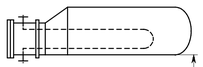

RECIPROCATING
COMPRESSOR
(RCOMP)


ROTARY LOBE
BLOWER (RLB)

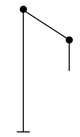

SHELL & TUBE
(HORIZONTAL)
(STHORIZ)


DOUBLE PIPE
(DPIPE)

NON-INTEGAL
GEAR BOX
(GEARBOX)


KETTLE REBOILER
(REBOIL)

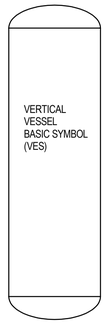

ELEVATION FROM
FINISHED SURFACE
AT GRADE

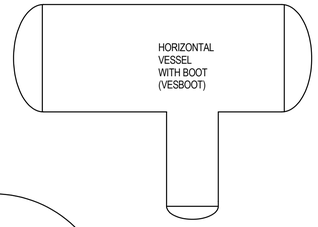

LOADING ARM
(LOADARM)

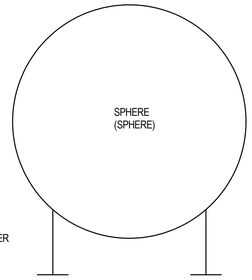

TRUCK LOADING
STATION
(TRKLOAD)


OIL MIST
DISTRIBUTION
BLOCK WITH 2
RECLASSIFIERS.
ADD RECLASSIFIERS
AS REQUIRED.
(OILMIST)

AIR
ELIMINATOR
(AIREL)


VERTICAL
VESSEL
BASIC SYMBOL
(VES)


HORIZONTAL
VESSEL
WITH BOOT
(VESBOOT)


SPHERE
(SPHERE)


VESSEL
SWAGED
(VESSWG)


MANWAY
(MANWAY)


VORTEX BREAKER
(VORTEX)

CONICAL ROOF TANK
(TK)

OPEN TANK
(TKOPEN)

INTERNAL FLGATER
(TKGF)

OPEN TOP FLGATER
(TKOPF)

EXAMPLES:

INDICATION OF
POINT OF CHANGE

CHANGE IN
RESPONSIBILITY

PLATE & FRAME
(PLATEEXCH)

TRAYS

GENERAL
GRID
SIEVE
VALVE
BUBBLE CAP

TRAY WITH
DOWNCOMERS

1) SINGLE PASS

2) TWO PASSES

3) CALMING
SECTION

DEMISTER

SCHOEPENTOETER

DISTRIBUTOR
TROUGH & TRAY

LIQUID SPRAY
(PERFORATED)

LIQUID SPRAY
(NOZZLE)

TOTAL DRAW-OFF

PARTIAL DRAW-OFF

CHIMNEY

HALF PIPE

SWIRL DECK

VANE TYPE INLET
(HORIZONTAL)

VANE TYPE INLET
(VERTICAL)

DIFFUSER

CYCLONE

DOLLAR PLATE

PACKED SECTION

REDISTRIBUTION
(LIQUID/LIQUID)

REDISTRIBUTION
(GAS/LIQUID)

BAFFLE WITH
PARTITION

VORTEX BREAKER

INTERNALS WHEN DRAWN TO BE DASHED

PACKED COLUMN
BASIC SYMBOL

T.L. ELEV. (TYP.)

TRAYED COLUMN
BASIC SYMBOL
TRAY NUMBERS
FROM BOTTOM

ROTATING DISC
CONTACTOR

FIRED HEATER DEPICTION
(HTRFIRE)

VERTICAL CYLINDRICAL NATURAL
DRAFT FURNACE WITH SEPARATE
(HORIZONTAL OR CROSS FLOW)
CONVECTION SECTION

TYPICAL ARRANGEMENT SHOWN
ACTUAL SYMBOL TO CONFIRM TO
CORRECT CONFIGURATION

FORCED DRAFT SINGLE (COOLER)
BAY AIR COOLER

VARIABLE/SINGLE SPEED
MOTOR SHOWN AS REQUIRED
VFD, VARIABLE FREQUENCY
DRIVE

TYPICAL ARRANGEMENT SHOWN
ACTUAL SYMBOL TO CONFIRM TO
CORRECT CONFIGURATION

SHELL & TUBE
VERTICAL
(OVHD_EXCH)

SHELL & TUBE
VERTICAL THERMOSYPHON
(VERT_THER)

NOTES:

IDENTIFICATION OF EQUIPMENT

1. ALL EQUIPMENT SHALL BE REPRESENTED BY A TAG NUMBER. COMPOSED OF A LETTER PLUS A NUMBER. THE FIRST THREE DIGITS OF WHICH ARE THE PLANT NUMBER AND THE FINAL TWO DIGITS ARE A NUMBER RUNNING CONSECUTIVELY FROM 01 FOR EACH GROUP OF EQUIPMENT.
2. WHERE A CHOICE BETWEEN TWO OR MORE LETTERS HAS TO BE MADE THE MORE IMPORTANT FUNCTION SHOULD PREVAIL FOR EXAMPLE, IF A JET IS USED FOR MIXING PUPPOSES, Mx IS USED OVER I.
3. DRIVERS ARE NUMBERED BY THE DRIVER EQUIPMENT AND TYPE OF DRIVER. E.G. EM-MOTOR FOR AIR COOLER, CT-TURBINE MOTOR FOR AIR COOLER, CT -TURBINE FOR COMPRESSOR, PM-PUMP MOTOR, EF-AIR COOLER FAN.

LETTER OF GROUP	DECSRIPTION
B	FIRED BOILERS
C	COMPRESSORS & BLOWERS LIQ RING VAC PUMP
CG	COMPRESSOR GEARS
CT	COMPRESSOR TURBINE
CM	COMPRESSOR MOTOR
E	EXCHANGERS, HEAT TRANSFER EQUIPMENT
EG	EMERGENCY GENERATOR
EM	EXCHANGER MOTOR
ER	EMERGENCY EQUIPMENT.
F	AIR COOLER FANS AND COOLING TOWER FANS
G	GENERATORS
GT	GAS TURBINE GENERATOR
H	FIRED HEATERS, INCINERATORS
I	JETS (INJECTORS & EJECTORS)
M	MOTORS
ME	ELECTRIC MOTORS
MF	FAN MOTOR
MM	MIXER MOTORS
Mx	MIXERS, AGITATORS
P	PUMPS
PG	PUMP GEARS
PM	PUMP MOTORS
PT	PUMP TURBINE
S	SPECIAL (SILENCERS, STACKS, PACKAGE UNITS DETONATION ARRSTOR FLAME ARRSTOR, STATIC MIXER STRAINER, SUMP)
ST	STEAM TURBINE
T	TURBINE
Tk	TANKS (ATMOSPHERIC)
V	VESSELS INCLUDING COLUMNS, PRESSURE STORAGE & FILTERS
X	STATIONARY TRANSPORT EQUIPMENT
XM	STATIONARY TRANSPORT EQUIPMENT MOTOR
XZ	BULK LOADING ARM MOTOR
Z	BULK LOADING ARMS

4. EQUIPMENT NUMBERING ON FLOW DAIGRAMS SHOULD PREFERABLY BE DONE FROM LEFT TO RIGHT.
   EXAMPLE OF EQUIPMENT NUMBERING: V-41101.
   V-EQUIPMENT DESIGNATION (REFER TO PARAGRAPH 1) 41101- VESSEL No. 01 IN PROCESS UNIT 411.
   EQUIPMENT SPARING WILL BE SHOWN AS FOLLOWS:
   EXAMPLE: (PUMP) P-41112A, B, C, ETC.
   ANY EXISTING EQUIPMENT WHICH IS TO BE REPLACED WITH NEW EQUIPMENT IN THE SAME SERVICE WILL RETAIN ITS OLD EQUIPMENT NUMBER WITH THE EXCEPTION THAT A "R" WILL BE ADDED TO THE END. IE) E-42011 WILL BECOME E-42011R.
   ANY EQUIPMENT THAT IS BEING COMPLETELY REMOVED FROM SERVICE WILL HAVE ITS NUMBER RETIRED AND NOT REUSED FOR OTHER EQUIPMENT.
   FOR REUSED EQUIPMENT IN THE SAME UNIT, THE EQUIPMENT NUMBER WILL STAY THE SAME AND THE SERVICE DESCRIPTION WILL CHANGE.
   REUSED EQUIPMENT TO BE USED IN A DIFFERENT UNIT WILL RECEIVE A NEW EQUIPMENT NUMBER AND SERVICE DESCRIPTION, THAT IS CONSISTENT WITH THE UNIT THAT IT IS BEING INSTALLED IN.

1. AUTOCAD BLOCK NAMES ARE SHOWN IN ROUND BRACKETS UNDER THE SYMBOL DESCRIPTION.

ADDITIONS / MODIFICATIONS

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
FLOW DIAGRAM SYMBOLS FOR EQUIPMENT

SCALE: NONE

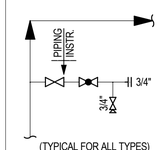
SHELL DWG NO.: 200.0000.000.041.011 REV. A

200.011

FILE:\\F:\1025\DRAWINGS\UTILITIES\200\200.011.pid MODEL DATE:2/12/2011 5:51:43 PM BY:alm14887

SAMPLE POINT
ACTUAL DETAIL ARRANGEMENT
APPLICATION AND DESCRIPTION

P&ID WILL SHOW

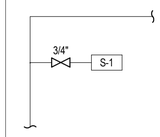


(TYPICAL FOR ALL TYPES)

2
S-1 10

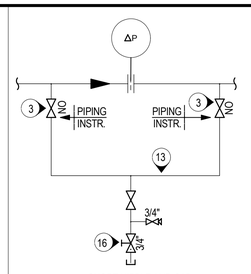
S-1

LIQUID HYDROCARBONS AND WATER
BELOW 45°C



S-1

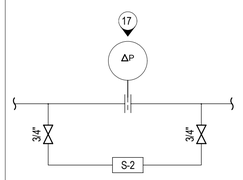
LIQUID HYDROCARBONS AND WATER
BELOW 45°C



SHORT NIPPLE AND CAP

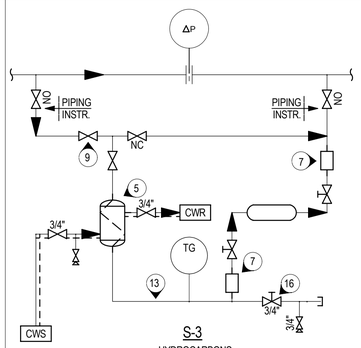
S-2

LIQUID HYDROCARBONS
BELOW 45°C



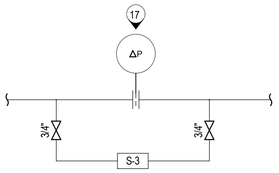
S-2

LIQUID HYDROCARBONS
BELOW 45°C



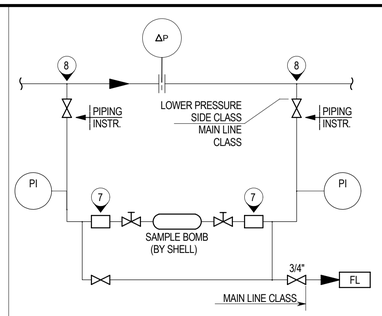
S-3

HYDROCARBONS
45°C AND ABOVE



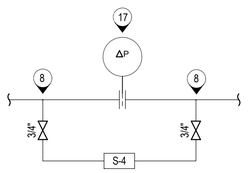
S-3

HYDROCARBONS
45°C AND ABOVE



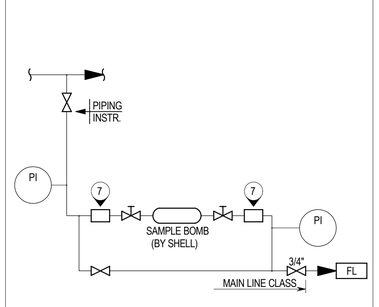
S-4

SWEET/SOUR HYDROCARBON GAS/LIQUID
BELOW 45°C



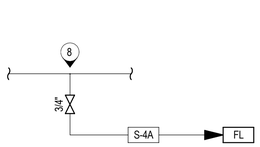
S-4

SWEET/SOUR HYDROCARBON GAS/LIQUID
BELOW 45°C



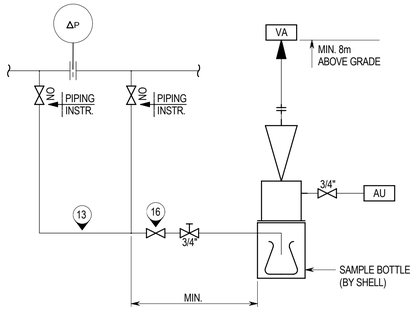
S-4A

SWEET/SOUR HYDROCARBON GAS/LIQUID
BELOW 45°C



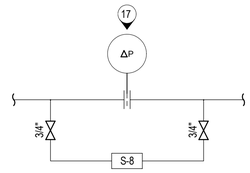
S-4A

SWEET/SOUR HYDROCARBON GAS/LIQUID
BELOW 45°C



S-8

SOUR LIQUIDS (SOUR WATER AMINE)
BELOW 45°C



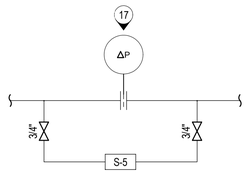
S-8

SOUR LIQUIDS (SOUR WATER AMINE)
BELOW 45°C

1. SEE DRAWING 200.0000.000.041.007, 008, 009, 010, & 011 FOR SYMBOL IDENTIFICATION AND GENERAL NOTES.
2. ARRANGEMENT S-1 TO BE USED ONLY WHERE THE SAMPLING VALVE CAN BE WELDED DIRECTLY TO A NORMALLY FLOWING LINE IN AN ACCESSIBLE LOCATION. TO BE CONFIRMED IN EPC.
3. BRIDGE WELD ALL ROOT VALVES TO THE MAIN LINE EXCEPT IN ARRANGEMENT LOCATION. TO BE CONFIRMED IN EPC.
4. SEWER CHOICE PER AVAILABILITY.
5. SAMPLE COOLER MODEL NO. LATER.
6. ALL SAMPLE POINTS TO BE LOCATED AT GRADE. WHERE POSSIBLE, INCORPORATE SAMPLE POINT WITH ANALYZER CONDITIONING TO REDUCE ADDITIONAL COOLING, ETC. WHERE POSSIBLE, SAMPLES TO BE COOLED BELOW 45°C FOR PERSONNEL PROTECTION.
7. PRESSURE LIMIT FOR SNAP- ON SAMPLE BOMB FITTINGS IS 45 MPa AT 65°C. FOR HIGHER PRESSURES USE DIRECT SCREWED BOMB CONNECTIONS.
8. SAMPLE CONNECTION ON TOP OF HORIZONTAL LINE FOR GAS. SAMPLE CONNECTION ON SIDE OF HORIZONTAL LINE FOR LIQUID SAMPLE.
9. DELETE SECOND VALVE WHEN ROOT VALVE IS ACCESSIBLE FROM THE SAMPLE VALVE.
10. THE TYPE OF FITTING (SOCKOLET OR WELDOLET WITH FLANGE) AND THE FIRST VALVE OR VALVES AT THE MAIN LINE SHALL BE AS PER VENT (OR DRAIN) REQUIREMENTS FOR THE MAIN LINE PIPING CLASS. SEE SPECIFICATION 245.0311.035.005.
11. THE STEEL CABINET IS TO BE COMPLETE WITH AN INTEGRALLY MOUNTED AIR EJECTOR. THE FRONT WALL TO BE A CLEAR PLASTIC DOOR. PROVIDE SLOTS IN THE FLOOR FOR VENTILATION. SEVERAL SAMPLING CONNECTIONS CAN BE BROUGHT INTO THE SAME CABINET. HOWEVER EACH CONNECTION MUST HAVE ITS OWN SPIGOT TO PREVENT CONTAMINATION.
12. ISOKINETIC SAMPLE PROBE (JONAS) REQUIRED FOR STEAM SAMPLE.
13. SAMPLE LINE PIPING CLASS SHALL CORRESPOND TO THE PIPING CLASS OF THE MAIN LINE.
14. DO NOT MANIFOLD MORE THAN ONE SAMPLE LINE TO ONE COOLER TO PREVENT CONTAMINATION.
15. ADD APPROPRIATE WINTERIZATION AND PERSONNEL PROTECTION.
16. SAMPLING VALVES MUST BE CLOSE CONNECTED TO FAST LOOP (SAMPLING BYPASS).
17. ΔP — ANY DEVICE OR INSTRUMENT THAT CREATES A PRESSURE DROP TO ASSURE OF SUFFICIENT FLOW THROUGH THE FAST LOOP. P&ID SYMBOL MAY VARY ACCORDING TO DEVICE BEING USED.

S-5 12

STEAM AND CONDENSATE AND HOT WATER
ABOVE 45°C

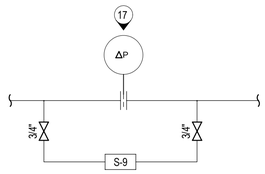


S-5

STEAM AND CONDENSATE
ABOVE 45°C

S-9

SOUR LIQUIDS (SOUR WATER AMINE)
45°C AND ABOVE

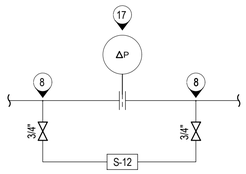


S-9

SOUR LIQUIDS (SOUR WATER AMINE)
45°C AND ABOVE

S-12

SWEET/SOUR HYDROCARBON GAS/LIQUID
45°C AND ABOVE



S-12

SWEET/SOUR HYDROCARBON GAS/LIQUID
45°C AND ABOVE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
STANDARD DETAIL - SAMPLING SYSTEMS

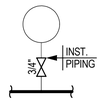
SCALE: NONE

SHELL DWG NO.: 200.0000.000.041.012

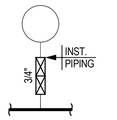
REV. A

200.012
FILE:\\F:\1020\SDRAWINGS\UTILITIES\200\200.012.pid MODEL DATE:2/1/2011 4:15:06 PM BY:ahm1488

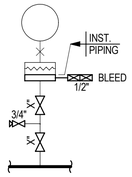
FIELD MOUNTED PRESSURE INSTRUMENT (PG, PT, PS, PP)
EACH PRESSURE DIFFERENTIAL TAP IS AS SHOWN.



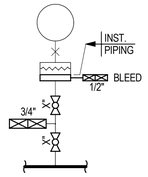
PIPING SPECS
(UAB, UAZ, UAY, UJB, ULB)



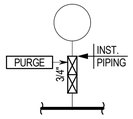
ALL PIPING CLASSES ◀ 3



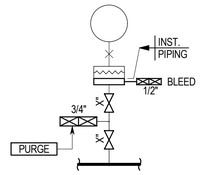
PIPING CLASSES
(150#, 300#, 600#)



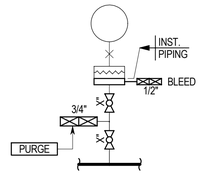
PIPING CLASSES
(900#, 1500#, 2500#)



ALL PIPING CLASSES



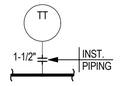
PIPING CLASSES
(150#, 300#, 600#)



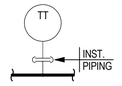
PIPING CLASSES
(900#, 1500#, 2500#)

FIELD MOUNTED TEMPERATURE INSTRUMENT (TG, TT)

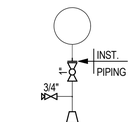
PIPING SPECS WITH
THREADED CONNECTION



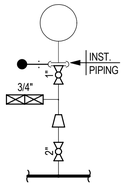
PIPING SPECS
(150#, 300#, 600#, 1500#)



PIPING SPECS
(1500#, 2500#)

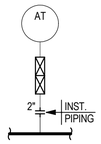


PIPING CLASSES
(150#, 300#, 600#)

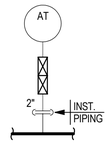


PIPING CLASSES
(900#, 1500#, 2500#)

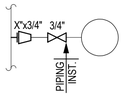
ANALYZER CONNECTIONS



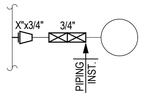
PIPING SPECS
(150# TO 2500#)



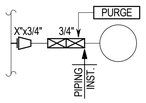
PIPING SPECS
(900# TO 2500#)



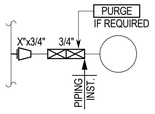
PIPING SPECS
(UAB, UAZ, UAY, UJB, ULB)
(FOR VESSEL CONNECTION)



PIPING CLASSES ◀ 3
(150#, 300#, 600#, 900#, 1500#)
(FOR VESSEL CONNECTION)



PIPING CLASSES
(150#, 300#, 600#, 900#, 1500#)
(FOR VESSEL CONNECTION)



PIPING CLASSES
(1500#, 2500#)
(FOR VESSEL CONNECTION)

1. FOR GENERAL NOTES AND DETAILS SEE DWGS. 245.0311.000.053.005, 006, 007, 008, 009, 010, 011, 012, 013, 018 AND 019.
2. LEGEND:
   3/4" - 3/4" 'PHOENIX' DOUBLE BLOCK & BLEED GAUGE VALVE.
   1/2" - 1/2" 'SWAGELOK' DOUBLE BLOCK & BLEED GAUGE VALVE.
3. EXCEPT PIPING SPECS, UAB, UAZ, UAY, UJB, ULB.
4. PIPING/INSTRUMENTATION SCOPE BREAKS ARE NOT TO BE SHOWN ON THE P&ID'S. DETAILS ON THESE CONNECTIONS SHOW IMPLIED BREAKS.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

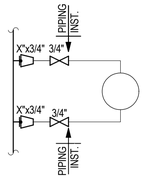
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
PRESSURE INSTRUMENT CONNECTION DETAILS

SCALE: NONE

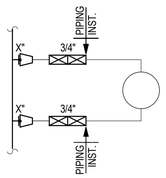
SHELL DWG NO.: 200.0000.000.041.013 REV. A

200.013 FILE:\\F-\1025\DRAWINGS\UTILITIES\200\200.013.pid MODEL DATE: 2/1/2011 4:13:45 PM BY:ahm14887

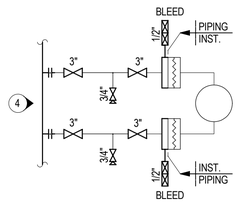
LEVEL OR D/P INSTRUMENT ON VESSEL (PDT, LT,LTE)



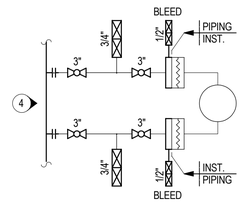
PIPING SPECS
(UAB, UAZ, UAY, UJB, ULB)



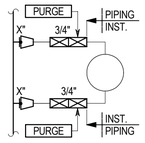
ALL PIPING CLASSES
(150#, 300#, 600#, 900#, 1500#) ◄ 3



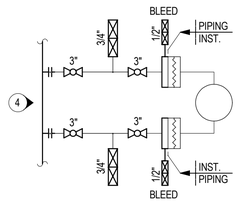
PIPING CLASSES
(150#, 300#, 600#)



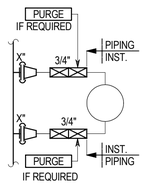
PIPING CLASSES
(600# H2 SERVICE, 900#, 1500#)



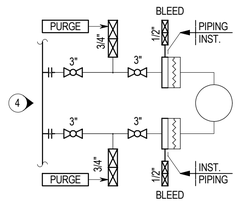
PIPING CLASSES
(150#, 300#, 600#, 900#, 1500#)



PIPING CLASSES
(1500# , 2500#)

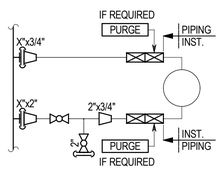


PIPING CLASSES
(1500#, 2500#)

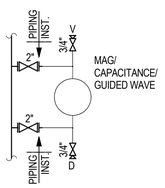


PIPING CLASSES
(1500#, 2500#)

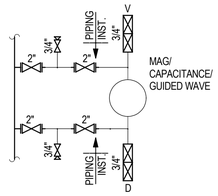
LEVEL INSTRUMENT (LG/LT, LS)



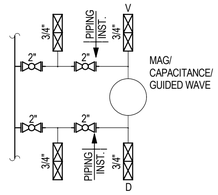
(1500#, 2500#)
WITH UTILITY CONNECTION



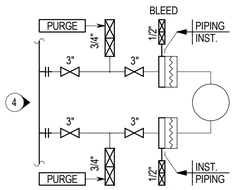
PIPING SPECS
(UAB, UAZ, UAY, UJB, ULB)



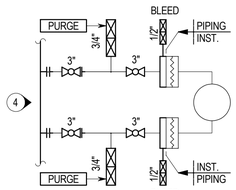
PIPING CLASSES
(150#, 300#, 600#) ◄ 3



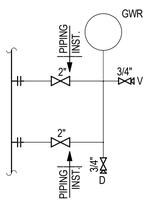
PIPING CLASSES
(600# H2 SERVICE, 900#, 1500#)



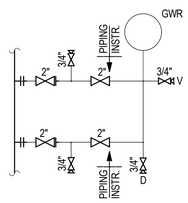
PIPING CLASSES
(150#, 300#, 600#)



PIPING CLASSES
(600# H2 SERVICE, 900#, 1500#)



PIPING SPECS
(UAB, UAZ, UAY, UJB, ULB)



PIPING CLASSES
(150#, 300#, 600#) ◄ 3

1. FOR GENERAL NOTES AND DETAILS SEE DWGS 245.0311.000.053.005, 006, 007, 008, 009, 010, 011, 012, 013, 018 AND 019.
2. LEGEND:
   3/4" ⋈ - 3/4" "PHOENIX" DOUBLE BLOCK & BLEED GAUGE VALVE.
   1/2" ⋈ - 1/2" "SWAGELOK" DOUBLE BLOCK & BLEED GAUGE VALVE.
3. EXCEPT PIPING SPECS, UAB, UAZ, UAY, UJB, ULB.
4. PIPING/INSTRUMENTATION SCOPE BREAKS ARE NOT TO BE SHOWN ON THE P&ID'S. DETAILS ON THESE CONNECTIONS SHOW IMPLIED BREAKS.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
LEVEL INSTRUMENT CONNECTION DETAILS

SCALE: NONE

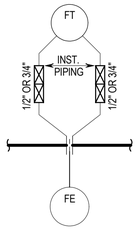
SHELL DWG NO.: 200.0000.000.041.014

REV. A

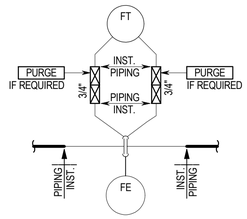
200.014

FILE:\\F:\1025\DRAWINGS\UTILITIES\200\200.014.pid MODEL DATE:2/1/2011 4:13:08 PM BY:ahm14887

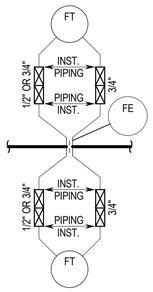
ORIFICE FLANGE - MOUNTED FLOW MEASUREMENT (FT)



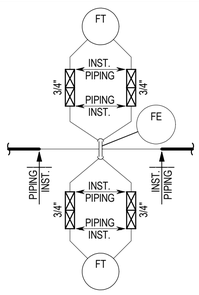
PIPING CLASSES
(150#, 300#, 600#, 900#)



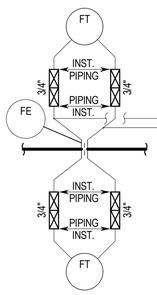
PIPING CLASSES
(1500#, 2500#)



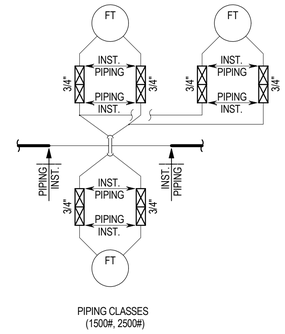
PIPING CLASSES
(150#, 300#, 600#, 900#, 1500#)



PIPING CLASSES
(1500#, 2500#)

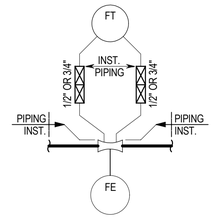


PIPING CLASSES
(150#, 300#, 600#, 900#, 1500#)



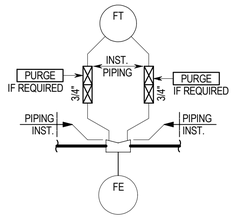
PIPING CLASSES
(1500#, 2500#)

VENTURI - MOUNTED FLOW MEASUREMENT (FT)

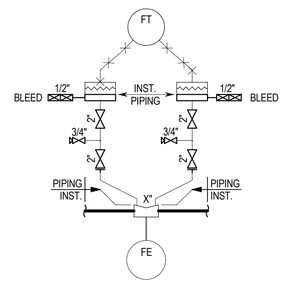


PIPING CLASSES

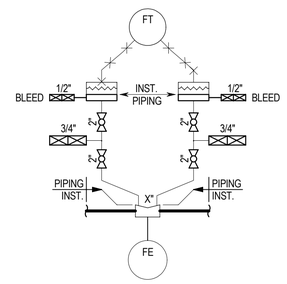
WEDGE - MOUNTED FLOW MEASUREMENT (FT)



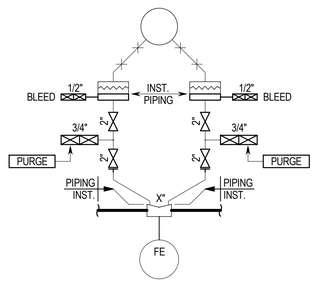
PIPING CLASSES



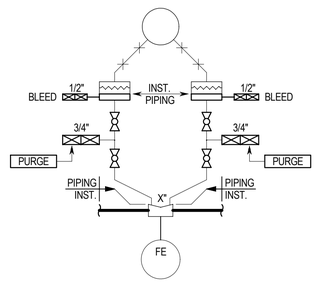
PIPING CLASSES
(150#, 300#, 600#)



PIPING CLASSES
(900#, 1500#)



PIPING CLASSES
(150#, 300#, 600#)



PIPING CLASSES
(900#, 1500#)

1. FOR GENERAL NOTES AND DETAILS SEE DWGS. 245.0311.000.053.005, 006, 007 008, 009, 010, 011, 012, 013, 018 AND 019.
2. LEGEND:
   3/4" - 3/4" "PHOENIX" DOUBLE BLOCK & BLEED GAUGE VALVE.
   1/2" - 1/2" "SWAGELOK" DOUBLE BLOCK & BLEED GAUGE VALVE.
3. PIPING/INSTRUMENTATION SCOPE BREAKS ARE NOT TO BE SHOWN ON THE P&ID'S. DETAILS ON THESE CONNECTIONS SHOW IMPLIED BREAKS.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
FLOW ELEMENT CONNECTION DETAILS

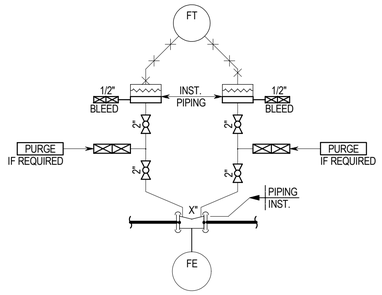
SCALE: NONE

SHELL DWG NO.: 200.0000.000.041.015 REV. A

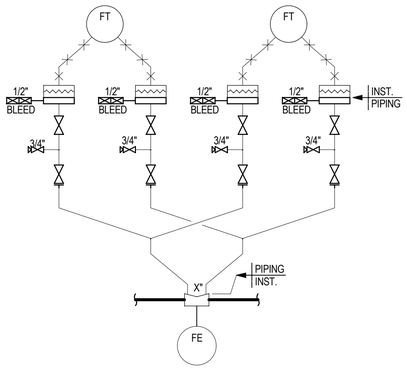
200.015

FILE:\\1025\DRAWINGS\UTILITIES\200\200.015.pid MODEL DATE:2/1/2011 4:12:18 PM BY:ahm14987

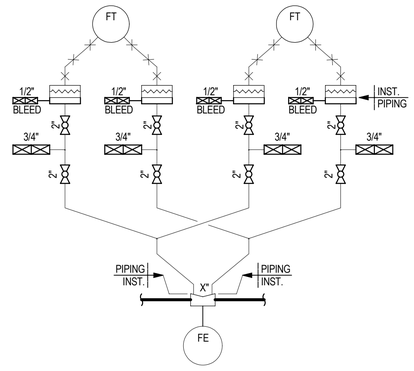
WEDGE - MOUNTED FLOW MEASUREMENT (FT)



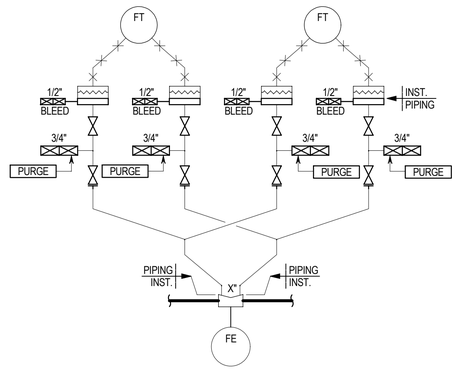
PIPING CLASSES
(1500#, 2500#)



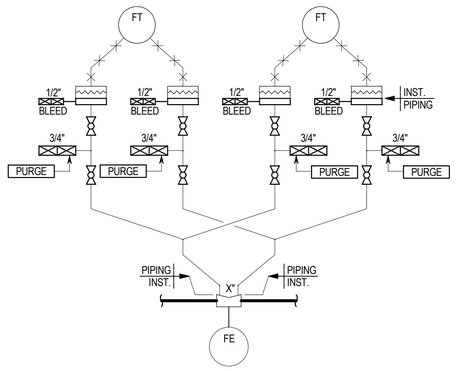
PIPING CLASSES
(150#, 300#, 600#)



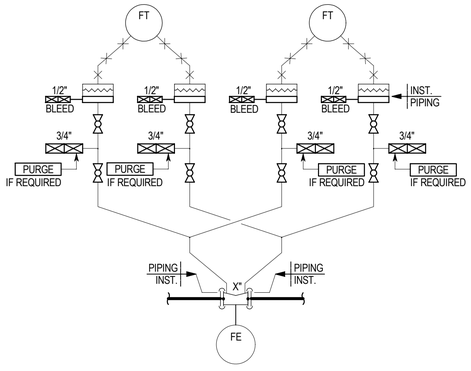
PIPING CLASSES
(900#, 1500#)



PIPING CLASSES
(150#, 300#, 600#)



PIPING CLASSES
(900#, 1500#)



PIPING CLASSES
(1500#, 2500#)

1. FOR GENERAL NOTES AND DETAILS SEE DWGS 245.0311.000.053.005, 006, 007, 008, 009, 010, 011, 012, 013, 018 AND 019.
2. LEGEND:
   3/4" - 3/4" "PHOENIX" DOUBLE BLOCK & BLEED GAUGE VALVE.
   1/2" - 1/2" "SWAGELOK" DOUBLE BLOCK & BLEED GAUGE VALVE.
3. PIPING/INSTRUMENTATION SCOPE BREAKS ARE NOT TO BE SHOWN ON THE P&ID'S. DETAILS ON THESE CONNECTIONS SHOW IMPLIED BREAKS.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
A	05/08/10	ISSUED FOR REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

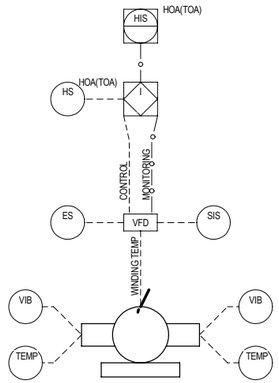
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON
FLOW ELEMENT CONNECTION DETAILS

SCALE: NONE

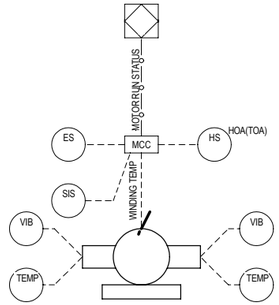
SHELL DWG NO.: 200.0000.000.041.016 REV. A

200.016

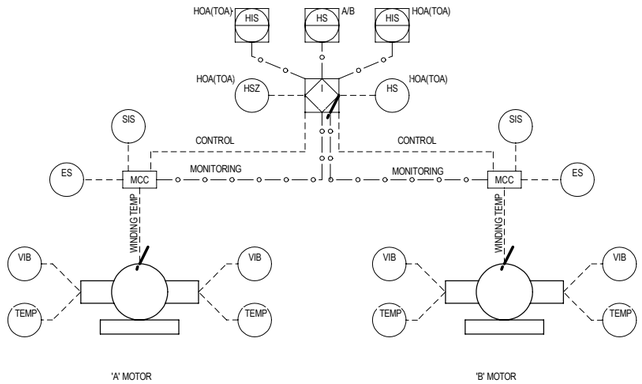
FILE:\\F:\1025\DRAWINGS\UTILITIES\200\200.016.pid MODEL DATE:2/1/2011 4:06:58 PM BY:ahm14867



DCS VFD CONTROL



NON DCS STARTER CONTROL



DCS STARTER CONTROL

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
C	12/02/10	ISSUED FOR CLIENT REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 200 - COMMON

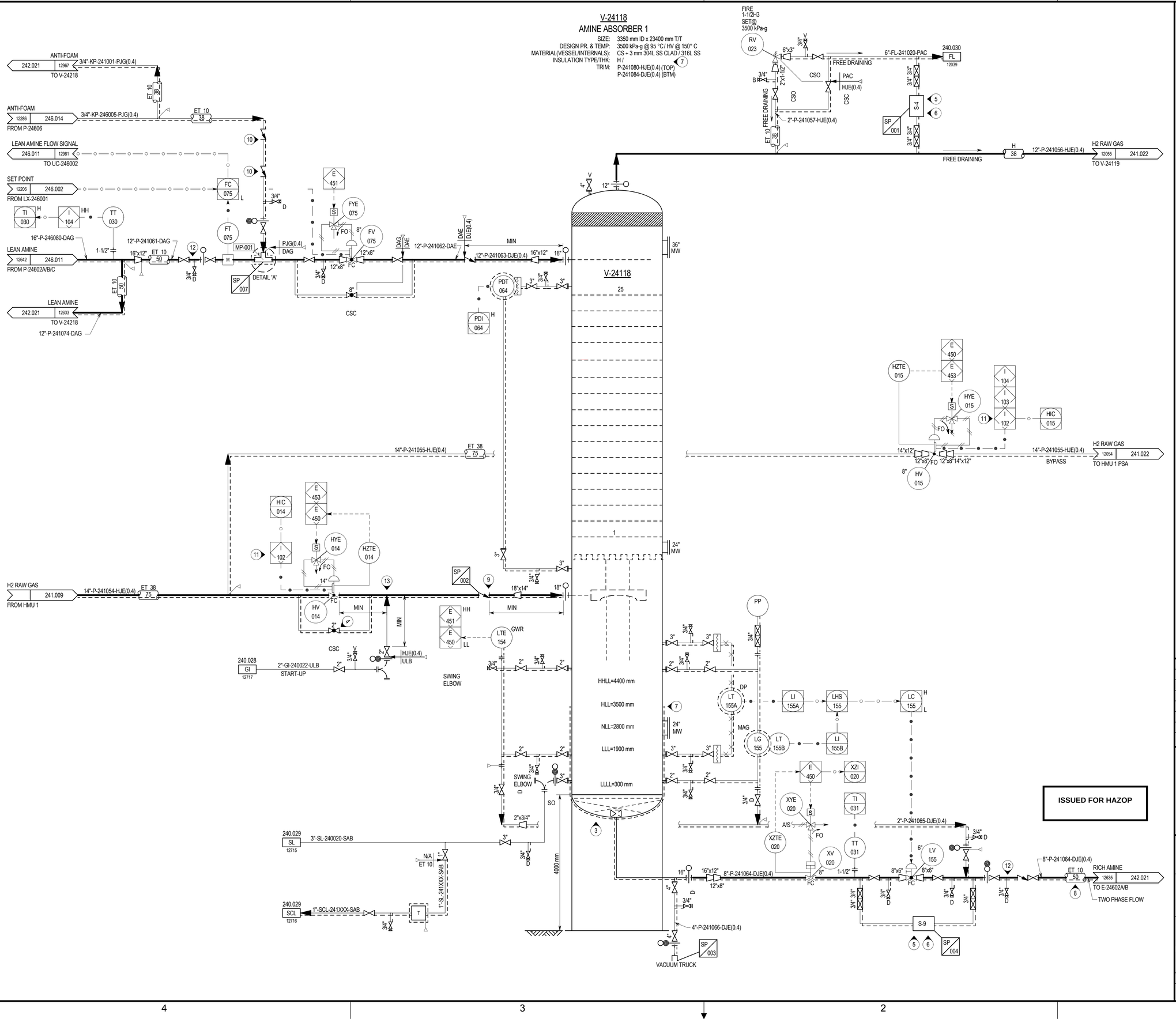
SCALE: NONE

SHELL DWG NO.: 200.0000.000.041.XX1

REV.

200.XX1

FILE:\\F1025\DRAWINGS\UTILITIES\200\200.XX1.pid MODEL DATE:2/2/2011 2:35:55 AM BY:tes29451



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES AND CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "241" UNLESS OTHERWISE STATED.

3 . BOTTOM OF COLUMN IS PACKED WITH 600 mm OF #2 RASCHIG RINGS.

4 . H2 RAW GAS BYPASS REQUIRED FOR SYSTEM PURGE AND PRESSURIZATION AT START-UP.

5 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.

6 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.

7 . ELECTRIC TRACE TO HLL (ET 10).

8 . LOCALIZED DEGASSING OF CO2 MAY OCCUR AT RESTRICTIONS, BENDS, TEES, ETC. RESULTING IN LOCALIZED TWO-PHASE FLOW AND VIBRATION.

9 . 316 SS HARDFACED TRIM MATERIAL IS REQUIRED FOR THIS CHECK VALVE.

10 . TWO CHECK VALVES IN SERIES, ONE IN THE HORIZONTAL AND ONE IN THE VERTICAL POSITION, SEPARATED BY AT LEAST 500 mm.

11 . INADVERTANT SIMULTANEOUS CLOSING OF BOTH HV-014 AND HV-015 PREVENTED BY INTERLOCK I-102

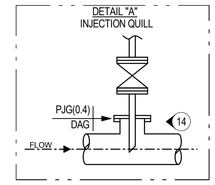
12 . VALVES ARE FOR BATTERY LIMIT ISOLATION OF UNIT.

13 . TOP CONNECTION.

14 . 316 STAINLESS STEEL INJECTION QUILL. OUTLET OF INJECTION QUILL TO BE CENTERED IN PROCESS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- DETAILS FOR INJECTION QUILL TO BE FINALIZED.
- SAMPLE STATION SPECIALITY ITEM NUMBERS.
- CONFIRM AVAILABILITY OF DCS AND SIS INTERLOCK SEQUENCE NUMBERS ADDED FOR QUEST.



REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 241 - HYDROGEN MANUFACTURING UNIT TRAIN 1
AMINE ABSORBER 1

SCALE: NONE

SHELL DWG NO.: 241.0000.000.041.021 REV. G

241.021

FILE:\\F:\1025\DRAWINGS\HMU\241\241-021.pid MODEL DATE:6/14/2011 1:17:48 PM BY:bes29451

V-24119
ABSORBER 1 WASH WATER VESSEL

SIZE: 1800 mm ID x 10900 mm T/T
DESIGN PR. & TEMP: 3500 kPa-g @ 60 °C / HV @ 150 °C
MATERIAL(VESSEL/INTERNALS): CS + 3 mm 304L SS CLAD / 316L SS
INSULATION TYPE/THK: H /
TRIM: P-241081-HJE(0.4) (5)

H2 RAW GAS 12054 241.021 FROM HMU 1
14"-P-241055-HJE(0.4) ET 38 75 BYPASS
SET POINT TO PSA LOGIC
FHS 074 (7)
FI 074A
FX 074B (3)
FC SIGNAL 241.009 FROM FC-377
FI 074B
FX 074A f(x)
AI 016 CO2
I 101 CO2 LEAN CO2 RICH HOLD
AIT 016
TI 032 H
PC 067 H
PV 067
10"x6"
HJE(0.4) PAC
10"-FL-241021-PAC ET 10 50
240.030 FL 12061
FC TSO
3/4" 3/4"
AE 016
AP 016C
240.030 FL 13045
PI 065
PT 065
AP 016B
AP 016A
TT 032
FT 074
E 450
E 453
XYE 019
S
A/S
FO
XZTE 019
XV 019
12"
FC
14"x12"
ET 38 53
6"-P-241059-HJE(0.4) FREE DRAINING
PT 067
FREE DRAINING
INST PIPING
1-1/2"
ET 38 75 14"-P-241058-HJE(0.4)
H2 RAW GAS 241.009 TO HMU 1 PSA
DETAIL "B"
CSC
2"
FLOW SIGNAL 246.022 13030 TO FX-246076
WASH WATER 242.022 12969 2"-SCH-242XXX-SAG TO V-24219
2"-SCH-241XXX-SAG
WASH WATER 12968 246.022 2"-SCH-246003-SAG FROM P-24609A/B
FC 076 L
FT 076
FYE 076
FV 076
2"x1" ET 10 38 3/4" D
SAD HJE(0.4)
MIN
3"x2"
CSC SAG SAD
2"-SCH-241XXX-SAD
V-24119
24" MW
4"x3"
3"-P-241XXX-HJE(0.4)
HJE(0.4) PJE(0.4)
ET 10 38 3"-P-241073-PJE(0.4)
CIRCULATING WATER 241.023 12408 FROM E-24129
PDT 066
PDI 066 H
PP
GWR
LTE 156
H2 RAW GAS 12055 241.021 FROM V-24118
12"-P-241056-HJE(0.4)
H 38 FREE DRAINING
14"x12"
HHLL=2450 mm
HLL=2300 mm
NLL=1050 mm
LLL=870 mm
LLLL=300 mm
LI 156 H L
LI 159 H L
E 453 E 452 HH LL
LTE 159 DP
MAG
LG 157
LT 157A
LT 157B DP
LI 157A
LI 157B
LHS 157A
LC SIGNAL 12409 241.023 TO LC-157
SO
7860 mm
6"
ET 10 50 6"-P-241067-PJE(0.4)
CIRCULATING WATER 12407 241.023 TO P-24108A/B

ISSUED FOR HAZOP

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "241" UNLESS OTHERWISE STATED.
3. CALCULATE AMOUNT OF CO2 REMOVED FROM RAW H2 GAS.
4. H2 RAW GAS BYPASS REQUIRED FOR SYSTEM PURGE AND PRESSURIZATION AT START-UP.
5. ELECTRIC TRACE TO HLL (ET 10).
6. EITHER LTE-241156 OR LTE-241159 SHALL BE SELECTABLE AS THE INPUT TO SAFETY INTERLOCKS E-452 AND E-453. A DEVIATION ALARM TO MONITOR THE TWO INSTRUMENTS SHALL BE PROVIDED AT THE DCS.
7. HAND SWITCH TO SEND FLOW SETPOINT FROM FC-377 TO PSA WHEN QUEST IS ISOLATED.
8. TWO CHECK VALVES IN SERIES, ONE IN THE HORIZONTAL AND ONE IN THE VERTICAL POSITION, SEPARATED BY AT LEAST 500 mm.
9. VALVES ARE FOR BATTERY LIMIT ISOLATION OF UN IT.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INTERLOCK I-101 ACTIONS, IF ANY, TO BE CONFIRMED.
- CONFIRM AVAILABILITY OF DCS AND SIS INTERLOCK SEQUENCE NUMBERS ADDED FOR QUEST.

DETAIL "B"
SAMPLE QUILL
FLOW
INST PIPING

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT
FLUOR®

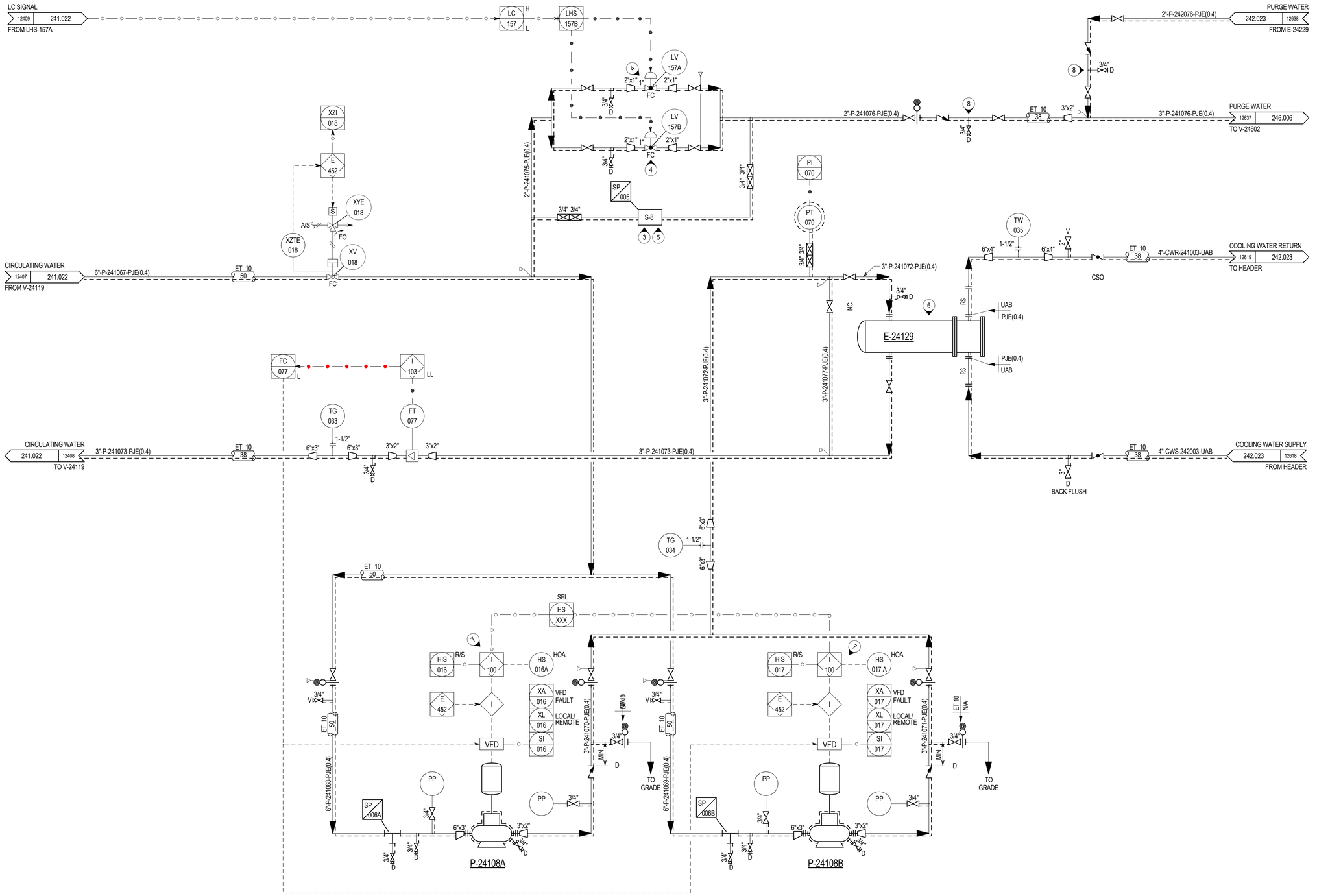
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 241 - HYDROGEN MANUFACTURING UNIT TRAIN 1
ABSORBER 1 WASH WATER VESSEL

SCALE: NONE
SHELL DWG NO.: 241.0000.000.041.022 REV. G

241.022
FILE:\\F:\1025\DRAWINGS\HMU\241\241.022.pid MODEL DATE:6/14/2011 1:17:50 PM BY:bes29451

E-24129
ABSORBER 1 CIRCULATING WATER COOLER

	SHELL	TUBE
RATED DUTY:	0.2 MW	
SURFACE AREA:	37.9 m^2	
TEMA TYPE:	BEU	
DESIGN PRESS:	3900 kPa-g / HV	3010 kPa-g /
DESIGN TEMP:	60 °C / 150 °C	58 °C /
MATERIAL:	CS + 3 mm 304L SS CLAD	SUPER DUPLEX 2507 + 0.38 mm CA
INSULATION TYPE/THK:	/	/
TRIM:	P-241082-PJE(0.4) (6)	CWR-241004-PJE(0.4) (6)



P-24108A/B (7)

ABSORBER 1 CIRCULATING WATER WASH PUMPS

	CASING	INTERNALS
RATED FLOW:	39.1 m^3/hr	
DIFF. PR.:	322 kPa	
DRIVER:	5.6 kW	
MATERIAL:	316 SS	316 SS
INSULATION TYPE/THK:	/ (6)	
TRIM:	P-241083-PJE(0.4)	

ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "242" UNLESS OTHERWISE STATED.
3 . FOR PIPING DETAILS OF SAMPLE STATION SEE DRAWING 200.0000.000.041.012.
4 . CV OF CONTROL VALVE TO BE MINIMUM.
5 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
6 . ELECTRIC TRACE (ET 10).
7 . AUTO-START STAND-BY PUMP ON RUN FAILURE OF PRIMARY PUMP.
8 . VALVES ARE FOR BATTERY LIMIT ISOLATION OF UNIT.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- COMFIRM AVAILABILITY OF DCS AND SIS INTERLOCK SEQUENCE NUMBERS ADDED FOR QUEST.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

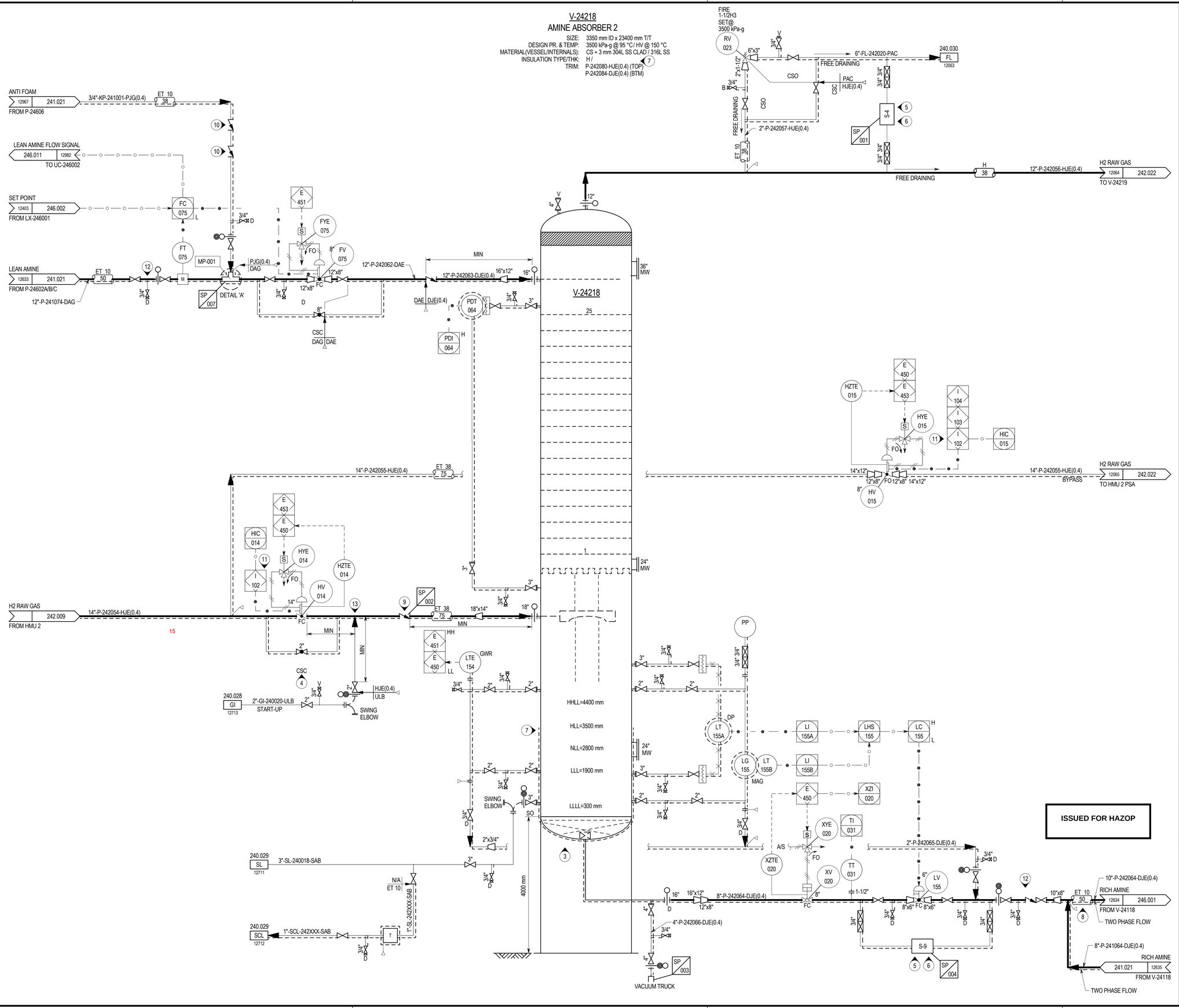
FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 241 - HYDROGEN MANUFACTURING UNIT TRAIN 1
ABSORBER 1 WASH WATER COOLER

SCALE: NONE

SHELL DWG NO.: 241.0000.000.041.023 REV. G

241.023
FILE:\\F:\1025\DRAWINGS\HMU\241\241.023.pid MODEL DATE:6/14/2011 1:17:52 PM BY:bes29451



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES AND CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "242" UNLESS OTHERWISE STATED.
3 . BOTTOM OF COLUMN IS PACKED WITH 600 mm OF #2 RASCHIG RINGS.
4 . H2 RAW GAS BYPASS REQUIRED FOR SYSTEM PURGE AND PRESSURIZATION AT START-UP.
5 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.
6 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
7 . ELECTRIC TRACE TO HLL (ET 10).
8 . LOCALIZED DEGASSING OF CO2 MAY OCCUR AT RESTRICTIONS, BENDS, TEES, ETC. RESULTING IN LOCALIZED TWO-PHASE FLOW AND VIBRATION.
9 . 316 SS HARDFACED TRIM MATERIAL IS REQUIRED FOR THIS CHECK VALVE.
10 . TWO CHECK VALVES IN SERIES, ONE IN THE HORIZONTAL AND ONE IN THE VERTICAL POSITION, SEPARATED BY AT LEAST 500 mm.
11 . INADVERTANT SIMULTANEOUS CLOSING OF BOTH HV-014 AND HV-015 PREVENTED BY INTERLOCK I-102
12 . VALVES ARE FOR BATTERY LIMIT ISOLATION OF UNIT.
13. TOP CONNECTION.
14. 316 STAINLESS STEEL INJECTION QUILL. OUTLET OF INJECTION QUILL TO BE CENTERED IN PROCESS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- DETAILS FOR INJECTION QUILL TO BE FINALIZED.
- CONFIRM AVAILABILITY OF DCS AND SIS INTERLOCK SEQUENCE NUMBERS ADDED FOR QUEST.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

ISSUED FOR HAZOP

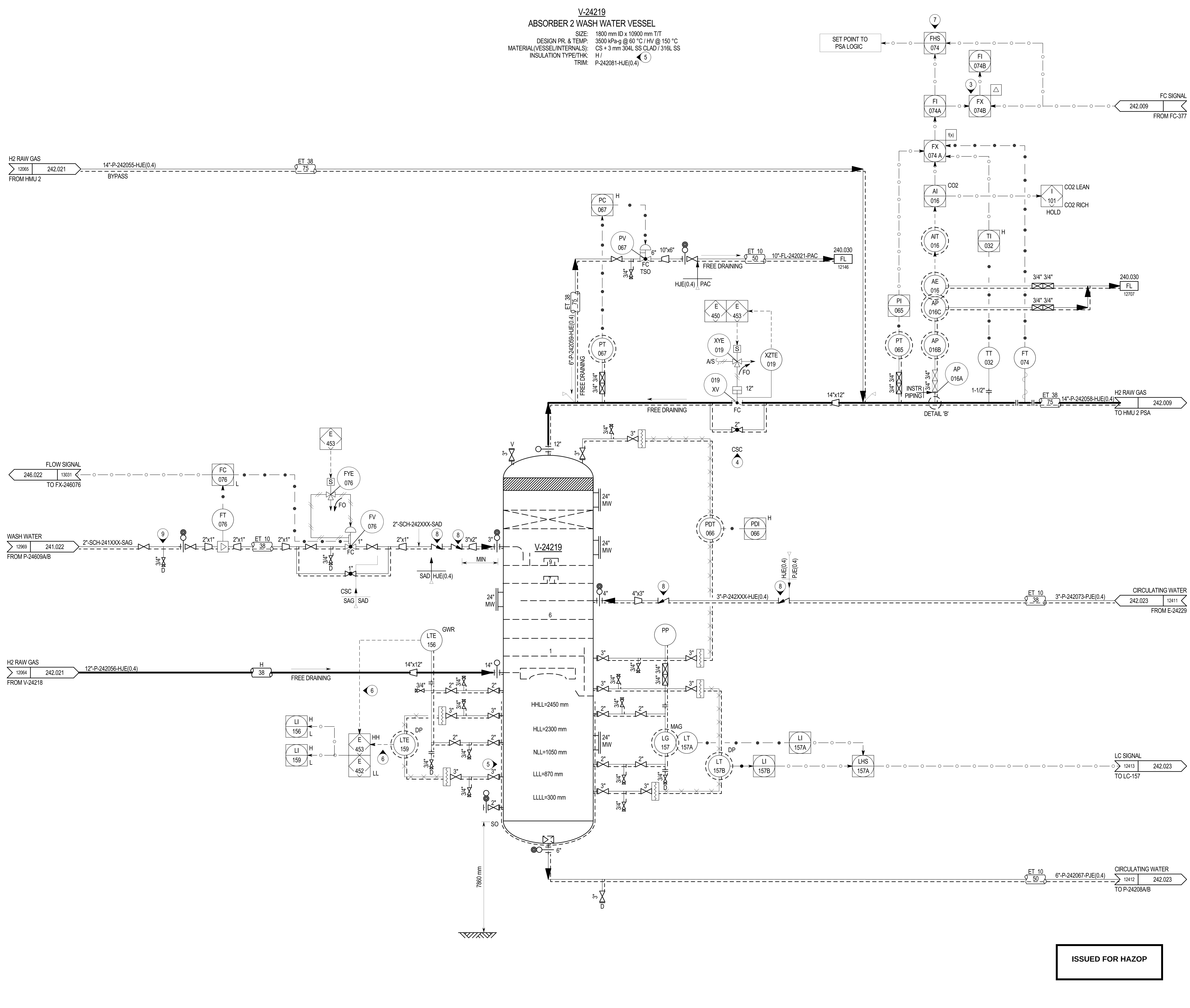
SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 242 - HYDROGEN MANUFACTURING UNIT TRAIN 2
AMINE ABSORBER 2

SCALE: NONE
SHELL DWG NO.: 242.0000.000.041.021 REV. G

242.021 FILE:\\F:\1025\0\RAWINGS\HMU\242\242.021.pid MODEL DATE:6/14/2011 2:02:39 PM BY:tkis29451



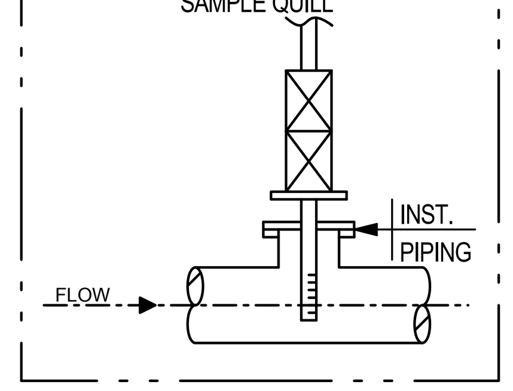
V-24219
ABSORBER 2 WASH WATER VESSEL
SIZE: 1800 mm ID x 10900 mm T/T
DESIGN PR. & TEMP: 3500 kPa-g @ 60 °C / HV @ 150 °C
MATERIAL(VESSEL/INTERNALS): CS + 3 mm 304L SS CLAD / 316L SS
INSULATION TYPE/THK: H /
TRIM: P-242081-HJE(0.4)
H2 RAW GAS
242.021
FROM HMU 2
14"-P-242055-HJE(0.4)
BYPASS
SET POINT TO PSA LOGIC
FC SIGNAL
242.009
FROM FC-377
CO2 LEAN
CO2 RICH
HOLD
240.030
FL
H2 RAW GAS
242.009
TO HMU 2 PSA
14"-P-242058-HJE(0.4)
DETAIL 'B'
FREE DRAINING
10"-FL-242021-PAC
FLOW SIGNAL
246.022
TO FX-246076
WASH WATER
241.022
FROM P-24609A/B
2"-SCH-241XXX-SAG
2"-SCH-242XXX-SAD
CIRCULATING WATER
242.023
FROM E-24229
3"-P-242XXX-HJE(0.4)
3"-P-242073-PJE(0.4)
H2 RAW GAS
242.021
FROM V-24218
12"-P-242056-HJE(0.4)
HHLL=2450 mm
HLL=2300 mm
NLL=1050 mm
LLL=870 mm
LLLL=300 mm
LC SIGNAL
242.023
TO LC-157
CIRCULATING WATER
242.023
TO P-24208A/B
6"-P-242067-PJE(0.4)
7860 mm

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "242" UNLESS OTHERWISE STATED.
3. CALCULATE AMOUNT OF CO2 REMOVED FROM RAW H2 GAS.
4. H2 RAW GAS BYPASS REQUIRED FOR SYSTEM PURGE AND PRESSURIZATION AT START-UP.
5. ELECTRIC TRACE TO HLL (ET 10).
6. EITHER LTE-242156 OR LTE-242159 SHALL BE SELECTABLE AS THE INPUT TO SAFETY INTERLOCKS E-452 AND E-453. A DEVIATION ALARM TO MONITOR THE TWO INSTRUMENTS SHALL BE PROVIDED AT THE DCS.
7. HAND SWITCH TO SEND FLOW SETPOINT FROM FC-377 TO PSA WHEN QUEST IS ISOLATED.
8. TWO CHECK VALVES IN SERIES, ONE IN THE HORIZONTAL AND ONE IN THE VERTICAL POSITION, SEPARATED BY AT LEAST 500 mm.
9. VALVES ARE FOR BATTERY LIMIT ISOLATION OF UNIT.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INTERLOCK I-101 ACTIONS, IF ANY, TO BE CONFIRMED.
- CONFIRM AVAILABILITY OF DCS AND SIS INTERLOCK SEQUENCE NUMBERS ADDED FOR QUEST.

DETAIL 'B'
SAMPLE QUILL



REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 242 - HYDROGEN MANUFACTURING UNIT TRAIN 2
ABSORBER 2 WASH WATER VESSEL

SCALE: NONE
SHELL DWG NO.: 242.0000.000.041.022
REV. G

ISSUED FOR HAZOP

242.022
FILE:\\F:\1025\DRAWINGS\HMU\242\242.022.pid MODEL DATE:8/14/2011 1:50:47 PM BY:bes29451

E-24229
ABSORBER 2 CIRCULATING WATER COOLER

	SHELL	TUBE
RATED DUTY:	0.2 MW	
SURFACE AREA:	37.9 m^2	
TEMA TYPE:	BEU	
DESIGN PRESS:	3900 kPa-g / HV	3010 kPa-g /
DESIGN TEMP:	60 °C / 150 °C	58 °C /
MATERIAL:	CS + 3 mm 304L SS CLAD	SUPER DUPLEX 2507 + 0.38 mm CA
INSULATION TYPE/THK:	/	/
TRIM:	P-242082-PJE(0.4) (6)	WR-242004-PJE(0.4) (6)

LC SIGNAL
12413 242.022
FROM LHS-157A

LC 157 H L
LHS 157B
LV 157A
LV 157B
1" FC 2"x1"
3/4" D
2"-P-242075-PJE(0.4)
3/4" 3/4"
S-8
SP 005
3 5
4

ET 10 38
2"-P-242076-PJE(0.4)
PURGE WATER
12638 241.023
TO V-24602

XZI 018
E 452
S
XYE 018
A/S
FO
XZTE 018
XV 018
FC

CIRCULATING WATER
12412 242.022
FROM V-24219
6"-P-242067-PJE(0.4)
ET 10 50

PI 070
PT 070
3/4" 3/4"
3"-P-242072-PJE(0.4)
3/4" D
NC
3"-P-242077-PJE(0.4)

4"-CWR-242XXX-UAB
TW 035
1-1/2"
6"x4"
V
ET 10 50
6"-CWR-242003-UAB
COOLING WATER RETURN
240.003
TO HEADER
4"-CWR-241003-UAB
COOLING WATER RETURN
241.023 12619
FROM E-24129
CSO

6
RS
UAB
PJE(0.4)
E-24229
PJE(0.4)
UAB
RS

4"-CWS-240XXX-UAB
ET 10 38
V
D
BACK FLUSH
ET 10 50
6"-CWS-240015-UAB
COOLING WATER SUPPLY
240.003
FROM HEADER
4"-CWS-242003-UAB
COOLING WATER SUPPLY
12618 241.023
TO E-24129

FC 077
I 103 LL
TG 033
FT 077
1-1/2"
6"x3" 6"x3" 3"x2" 3"x2"
3/4" D
3"-P-242073-PJE(0.4)
ET 10 38
CIRCULATING WATER
242.022 12411
TO V-24219

TG 034
1-1/2"
6"x3"
ET 10 50

HS SEL
7
HIS 016 R/S
I 100
HS 016A HOA
E 452
XA 016 VFD FAULT
XL 016 LOCAL/ REMOTE
SI 016
VFD
3/4" V
ET 10 50
3"-P-242070-PJE(0.4)
ET 10 N/A
3/4"
MIN
D
TO GRADE
6"-P-242068-PJE(0.4)
PP
SP 006A
3/4"
6"x3" 3"x2"
P-24208A

HIS 017 R/S
I 100
HS 017A HOA
E 452
XA 017 VFD FAULT
XL 017 LOCAL/ REMOTE
SI 017
VFD
3"-P-242071-PJE(0.4)
ET 10 N/A
TO GRADE
6"-P-242069-PJE(0.4)
PP
SP 006B
P-24208B

P-24208A/B (7)
ABSORBER 2 CIRCULATING WATER WASH PUMPS

RATED FLOW:	39.1 m^3/hr
DIFF. PR.:	322 kPa
DRIVER:	5.6 kW
	CASING / INTERNALS
MATERIAL:	316 SS / 316 SS
INSULATION TYPE/THK:	/
TRIM:	P-242083-PJE(0.4) (6)

ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "242" UNLESS OTHERWISE STATED.
3 . FOR PIPING DETAILS OF SAMPLE STATION SEE DRAWING 200.0000.000.041.012.
4 . CV OF CONTROL VALVE TO BE MINIMUM.
5 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
6 . ELECTRIC TRACE (ET 10).
7 . AUTO-START STAND-BY PUMP ON RUN FAILURE OF PRIMARY PUMP.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- CONFIRM AVAILABILITY OF DCS AND SIS INTERLOCK SEQUENCE NUMBERS ADDED FOR QUEST.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
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D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 242 - HYDROGEN MANUFACTURING UNIT TRAIN 2
ABSORBER 2 WASH WATER COOLER

SCALE: NONE
SHELL DWG NO.: 242.0000.000.041.023
REV. G

242.023
FILE:\\F:\1025DRAWINGS\HMU\242\242.023.pid MODEL DATE:6/14/2011 1:52:05 PM BY:bea29451

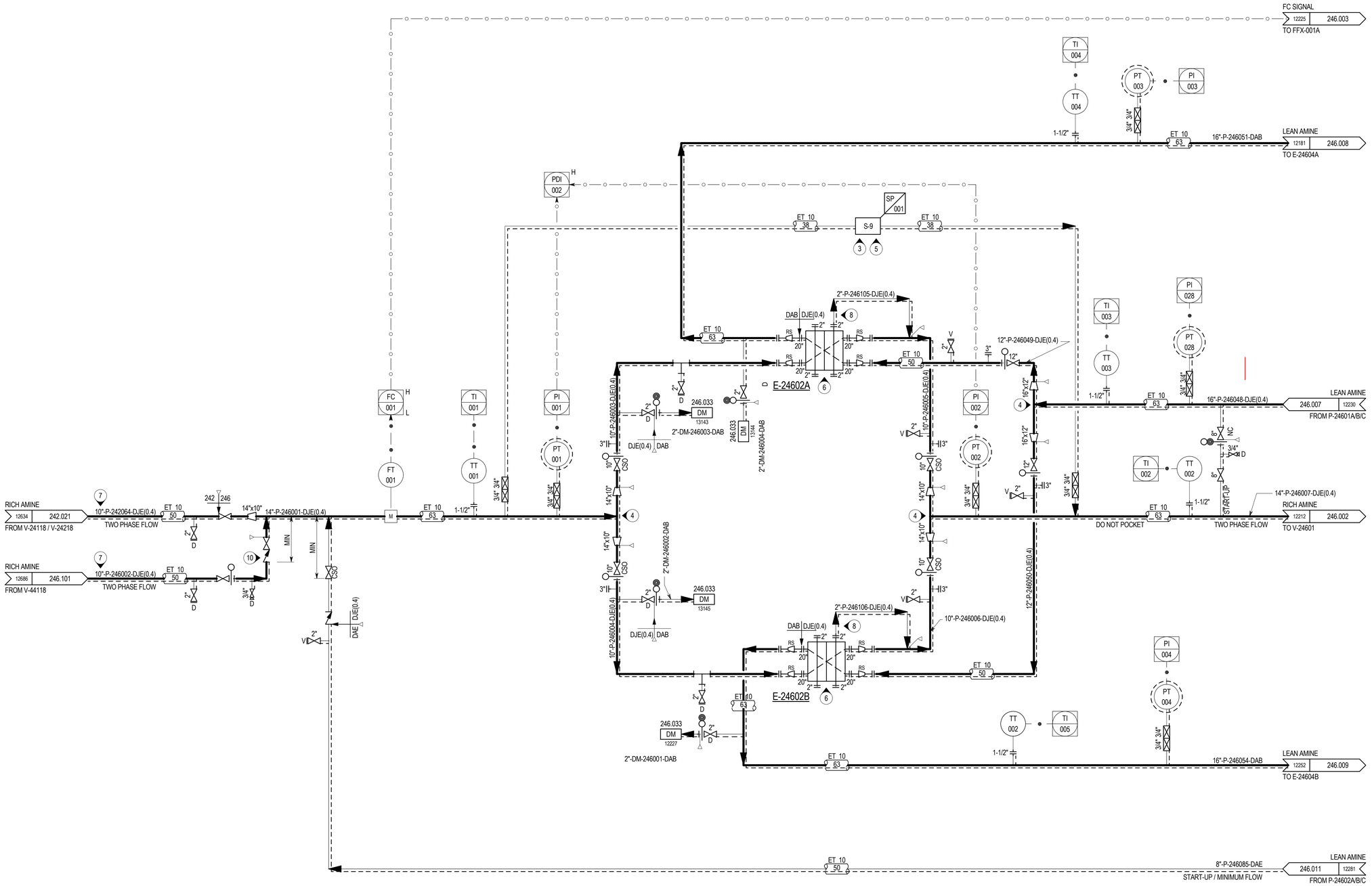
E-24602A/B
LEAN / RICH AMINE EXCHANGER

RATED DUTY:	64.5 MW (TOTAL)	
SURFACE AREA:	1521.0 m^2	
	HOT	COLD
DESIGN PRESS:	2700 kPa-g / HV	3500 kPa-g / HV
DESIGN TEMP:	130 °C / 150 °C	120 °C / 150 °C
MATERIAL:	PLATES: 316L SS / GRAPHITE FRAME: CS	
INSULATION TYPE/THK:	/	9 / 9
TRIM:	P-246121-DJE(0.4) P-246122-DJE(0.4)	
TEMA TYPE:	COMPABLOC	

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
4 . SYMMETRICAL PIPING.
5 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.
6 . EXCHANGER TO BE DRAINED IF ISOLATED FOR MAINTENANCE.
7 . LOCALIZED DEGASSING OF C02 MAY OCCUR AT RESTRICTIONS, BENDS, TEES, ETC. RESULTING IN LOCALIZED TWO-PHASE FLOW AND VIBRATION.
8 . A PERMANENT SELF VENTING CONNECTION IS REQUIRED TO PREVENT ACCUMULATION AND TRAPPING OF GASES.
9 . ELECTRIC TRACE (ET 10).
10. VALVES ARE FOR BATTERY LIMIT ISOLATION.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.



ISSUED FOR HAZOP

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

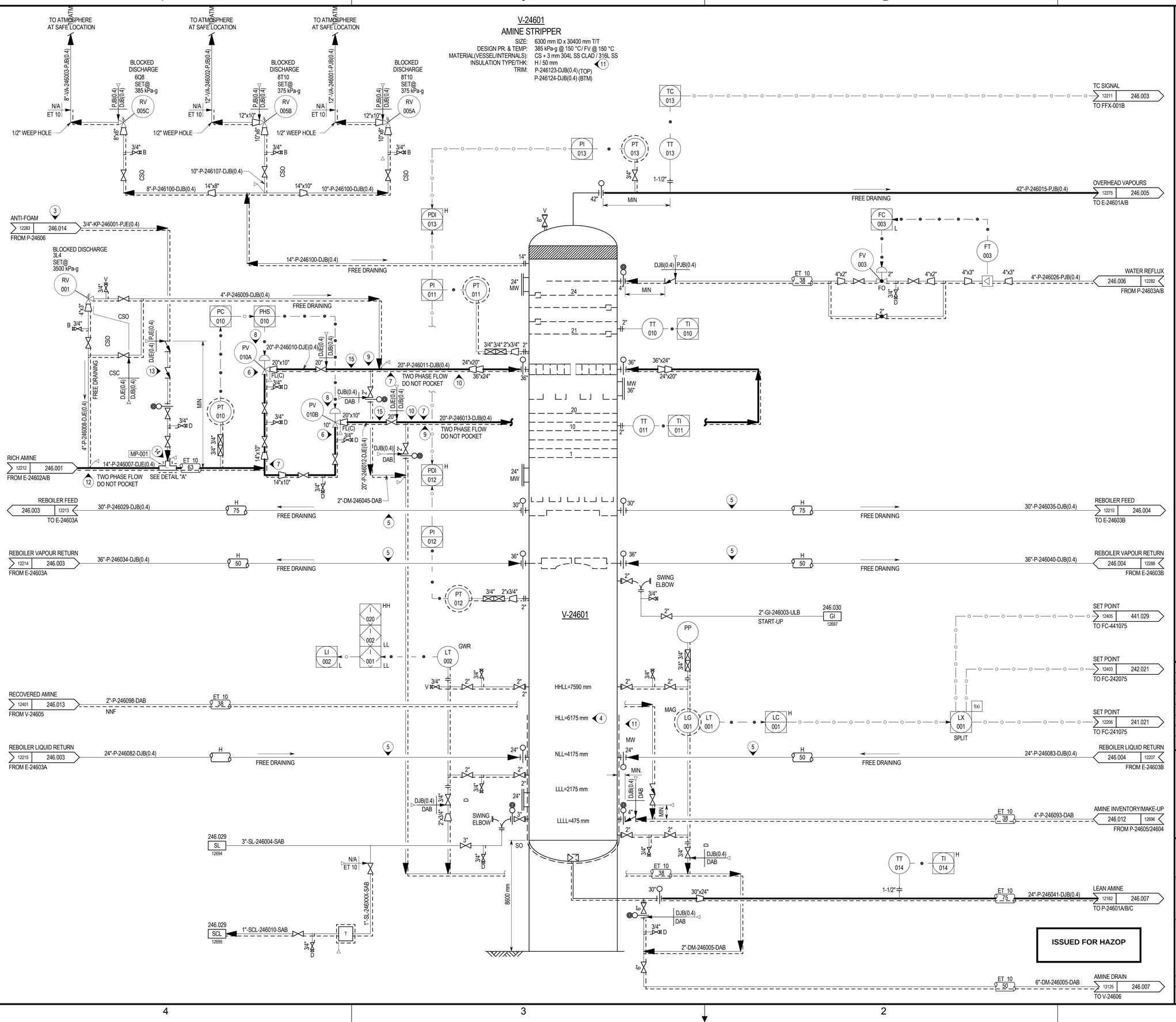
FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
LEAN / RICH AMINE EXCHANGER

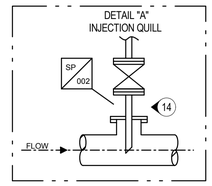
SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.001 REV. G

246.001
FILE:\\IF\1025\DRAWINGS\CO2\246\246.001.pid MODEL DATE:6/14/2011 10:40:12 AM BY:bed29451



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . ANTI-FOAM IS ADDED INTERMITTENTLY BY THE OPERATOR BASED ON HIGH DP ACROSS THE TRAYED SECTION OF THE AMINE STRIPPER.
4 . TOP OF WEIR IN REBOILERS E-24603A/B TO BE AT SAME ELEVATION AS HLL IN AMINE STRIPPER.
5 . SYMMETRICAL PIPING TO/FROM E-24603A AND E-24603B.
6 . CV OF CONTROL VALVES PV-010A/B TO BE MINIMUM. CV AFFECTS RV-005 SIZING FOR VAPOUR BLOWTHROUGH CASE.
7 . SYMMETRICAL PIPING ON INLET AND OUTLET OF CONTROL VALVE.
8 . PV-010A/B ARE 2x50% VALVES. SPARE VALVE TO BE MAINTAINED ON SITE.
9 . PIPING FROM CONTROL VALVE TO VESSEL NOZZLE TO HAVE 1.5 mm CORROSION ALLOWANCE.
10. SLUG FLOW DURING TURNDOWN.
11. ELECTRIC TRACE TO HLL (ET 10).
12. LOCATE RV-001 MINIMUM DISTANCE FROM PV-010A/B INLET.
13. TWO CHECK VALVES IN SERIES, ONE IN THE HORIZONTAL AND ONE IN THE VERTICAL POSITION, SEPARATED BY AT LEAST 500 mm.
14. 316 STAINLESS STEEL INJECTION QUILL. OUTLET OF INJECTION QUILL TO BE CENTERED IN PROCESS PIPE.
15. 304SS PIPING FROM CONTROL VALVE TO V-24601 TO HAVE 1.5 mm CORROSION ALLOWANCE.



HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- DETAILS FOR CHEMICAL INJECTION QUILL TO BE FINALIZED.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
AMINE STRIPPER

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.002 REV. G

246.002

FILE:\\F:\1025\DRAWINGS\CO2\246\246.002.pid MODEL DATE:6/14/2011 10:40:14 AM BY:bes29451

E-24603A
STRIPPER REBOILER

	SHELL	TUBE
RATED DUTY:	50.4 MW (PER SHELL)	
SURFACE AREA:	1755.5 m^2 (PER SHELL)	
TEMA TYPE:	BKU	
DESIGN PRESS:	385 kPa-g / FV	500 kPa-g / FV
DESIGN TEMP:	150 °C / 150 °C	250 °C / 250 °C
MATERIAL:	CS + 3 mm 304L SS CLAD	316L SS + 0.6 mm CA
INSULATION TYPE/THK:	H /	NONE /
TRIM:	P-246125-DJB(0.4)	

V-24603A
STRIPPER REBOILER CONDENSATE POT

SIZE: 1500 mm ID x 4200 mm T/T
DESIGN PR. & TEMP: 500 kPa-g @ 250 °C / FV @ 250 °C
MATERIAL(VESSEL/INTERNALS): CS + 3 mm CA
INSULATION TYPE/THK: H / (8)
TRIM: SL-246030-SAB

FC SIGNAL 12225 246.001 FROM FC-001
TC SIGNAL 12211 246.002 FROM TC-013
REBOILER FEED 12213 246.002 FROM V-24601
REBOILER VAPOUR RETURN 246.002 12214 TO V-24601
REBOILER LIQUID RETURN 246.002 12215 TO V-24601
FLOW SET POINT 12234 246.004 TO FC-006
CUTBACK SIGNAL 13128 246.004 TO FX-006
STM HDR PRESSURE 251.110 FROM PX-251022
LC SIGNAL 13139 246.020 TO LV-005
CONDENSATE 12454 246.020 TO E-24606
LP STEAM 246.029 12685 FROM DISTRIBUTION

FFIC 001; FFX 001A RATIO; FFX 001B TRIM; FFX 001C SPLIT
SP FC 005 H L
PI 002 C; I 021
PC 014 L; PT 014
FX 005; I 020
CB 101 A; CB 101 B; CB 101 C
FT 005; FE 005
FV 005 FC
TI 015 L; TT 015
PP
RV 010
LG 005; LT 005; LC 005 L; LX 005
SP LIMIT

24"-SL-246009-SAB
30"-P-246029-DJB(0.4) FREE DRAINING
30"-P-246034-DJB(0.4) FREE DRAINING
30"-P-246032-DJB(0.4)
30"-P-246033-DJB(0.4)
24"-P-246030-DJB(0.4)
24"-P-246031-DJB(0.4)
2"-P-246108-DJB(0.4)
24"-P-246082-DJB(0.4)
10"-SCL-246001-SAB FREE DRAINING
2"-SL-246010-SAB DO NOT POCKET
4"-VA-246005-SAB 1/2" WEEP HOLE
3"-SL-246005-SAB
1"-SL-246009-SAB
1"-SCL-246003-SAB 246.029 SCL 12228
8"-SCL-246002-SAB TWO PHASE FLOW
TO ATMOSPHERE AT SAFE LOCATION
FIRE 2J3 SET@ 500 kPa-g

HLL=4200 mm
V-24603A
NLL=1020 mm
LLL=250 mm
2920 mm

FREE DRAINING

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3. CONTROL VALVE BYPASS TO BE INSTALLED SO FREE DRAINING.
4. BOTTOM TAN LINE OF V-24603A TO BE SET 2920 mm BELOW BOTTOM TUBE SHEET OF REBOILER.
5. ALL REBOILER PIPING TO BE SYMMETRICAL.
6. WEIR TO BE SET AT SAME ELEVATION AS HLL IN AMINE STRIPPER.
7. ELECTRIC TRACE PIPE TO ELEVATION OF WEIR IN REBOILER
8. ELECTRIC TRACE (ET 10).
9. HIGH HIGH AMINE STRIPPER LEVEL TO FORCE FX-005 INTO MANUAL WITH 0% OUTPUT, CLOSING FV-005.
10. STAGED CUTBACK SCHEME FOR REDUCTION OF LP STEAM FLOW TO REBOILERS IN THE EVENT OF LOW UTILITY PLANT HEADER PRESSURE. FOR DETAILS, REFER TO CONTROL NARRATIVE 246.1611.000.012.xxx.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- NUMBER AND LOCATION OF STEAM TRAPS TO BE DETERMINED BASED ON PIPING LAYOUT.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
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ISSUED FOR HAZOP

SHELL CANADA
QUEST CCS PROJECT
FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
STRIPPER REBOILER "A" AND CONDENSATE POT

SCALE: NONE
SHELL DWG NO.: 246.0000.000.041.003 REV. G

246.003
FILE:\\F:\1025\DRAWINGS\CO2\246\246.003.pid MODEL DATE:6/14/2011 10:40:16 AM BY:bes29451

E-24603B
STRIPPER REBOILER

	SHELL	TUBE
RATED DUTY:	50.4 MW (PER SHELL)	
SURFACE AREA:	1755.5 m^2 (PER SHELL)	
TEMA TYPE:	BKU	
DESIGN PRESS:	385 kPa-g / FV	500 kPa-g / FV
DESIGN TEMP:	150 °C / 150 °C	250 °C / 250 °C
MATERIAL:	CS + 3 mm 304L SS CLAD	316L SS + 0.6 mm CA
INSULATION TYPE/THK:	H /	NONE /
TRIM:	P-246126-DJB(0.4)	

V-24603B
STRIPPER REBOILER CONDENSATE POT

SIZE: 1500 mm ID x 4200 mm T/T
DESIGN PR. & TEMP: 500 kPa-g @ 250 °C / FV @ 250 °C
MATERIAL(VESSEL/INTERNALS): CS + 3 mm CA
INSULATION TYPE/THK: H / (8)
TRIM: SL-246031-SAB

FLOW SET POINT
12234 | 246.003
FROM FFX-001C

REBOILER FEED
12210 | 246.002
FROM V-24601
30"-P-246035-DJB(0.4) H 75
FREE DRAINING

REBOILER VAPOUR RETURN
246.002 | 12288
TO V-24601
36"-P-246040-DJB(0.4) H 50
FREE DRAINING

REBOILER LIQUID RETURN
246.002 | 12207
TO V-24601
24"-P-246083-DJB(0.4) H 50

TI 016 L
TT 016
1-1/2"
30"-P-246039-DJB(0.4)
30"-P-246038-DJB(0.4)
36"x30"
24" MW
E-24603B
24"-P-246036-DJB(0.4)
24"-P-246037-DJB(0.4)
30"x24"
ET 10 N/A
2"-P-246109-DJB(0.4)
FREE DRAINING
2920 mm
HLL=4200 mm
V-24603B
NLL=1020 mm
LLL=250 mm
10"-SCL-246004-SAB
FREE DRAINING

SP FC 006 H L
PC 016 L
PT 016
FX 006
I 020
SP LIMIT
FV 006
FC
24"-SL-246002-SAB
24"x20"
20"
2"
FT 006
FE 006
H 50
CUTBACK SIGNAL
246.003 | 13128
FROM CB-101A/B/C
LP STEAM
246.029 | 12655
FROM DISTRIBUTION
N/A ET 10
1"-SL-246002-SAB
1"-SCL-246006-SAB
246.029 SCL 12400

2"-SL-246003-SAB DO NOT PENCIL
FIRE 2/3 SET@ 500 kPa-g
RV 011
TO ATMOSPHERE AT SAFE LOCATION
PP
4"x3"
4"-VA-246006-SAB
3"x2"
1/2" WEEP HOLE
3"-SL-246004-SAB

LG 006
LT 006
LC 006 L
LX 006
LC SIGNAL
13140 | 246.020
TO LV-0006

8"-SCL-246005-SAB
TWO PHASE FLOW
CONDENSATE
12680 | 246.020
TO E-24606

ISSUED FOR HAZOP

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3. CONTROL VALVE BYPASS TO BE INSTALLED SO FREE DRAINING.
4. BOTTOM TAN LINE OF V-24603B TO BE SET 2920 mm BELOW BOTTOM TUBE SHEET OF REBOILER.
5. ALL REBOILER PIPING TO BE SYMMETRICAL.
6. WEIR TO BE SET AT SAME ELEVATION AS HLL IN AMINE STRIPPER.
7. ELECTRIC TRACE PIPE TO ELEVATION OF WEIR IN REBOILER.
8. ELECTRIC TRACE (ET 10).
9. HIGH HIGH AMINE STRIPPER LEVEL TO FORCE FX-006 INTO MANUAL WITH 0% OUTPUT, CLOSING FV-006.
10. STAGED CUTBACK FOR REDUCTION OF LP STEAM FLOW TO REBOILERS IN THE EVENT OF LOW UTILITY PLANT HEADER PRESSURE FOR DETAILS. REFER TO CONTROL NARRATIVE 246.1611.000.012.xxx.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- NUMBER AND LOCATION OF STEAM TRAPS TO BE DETERMINED BASED ON PIPING LAYOUT.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

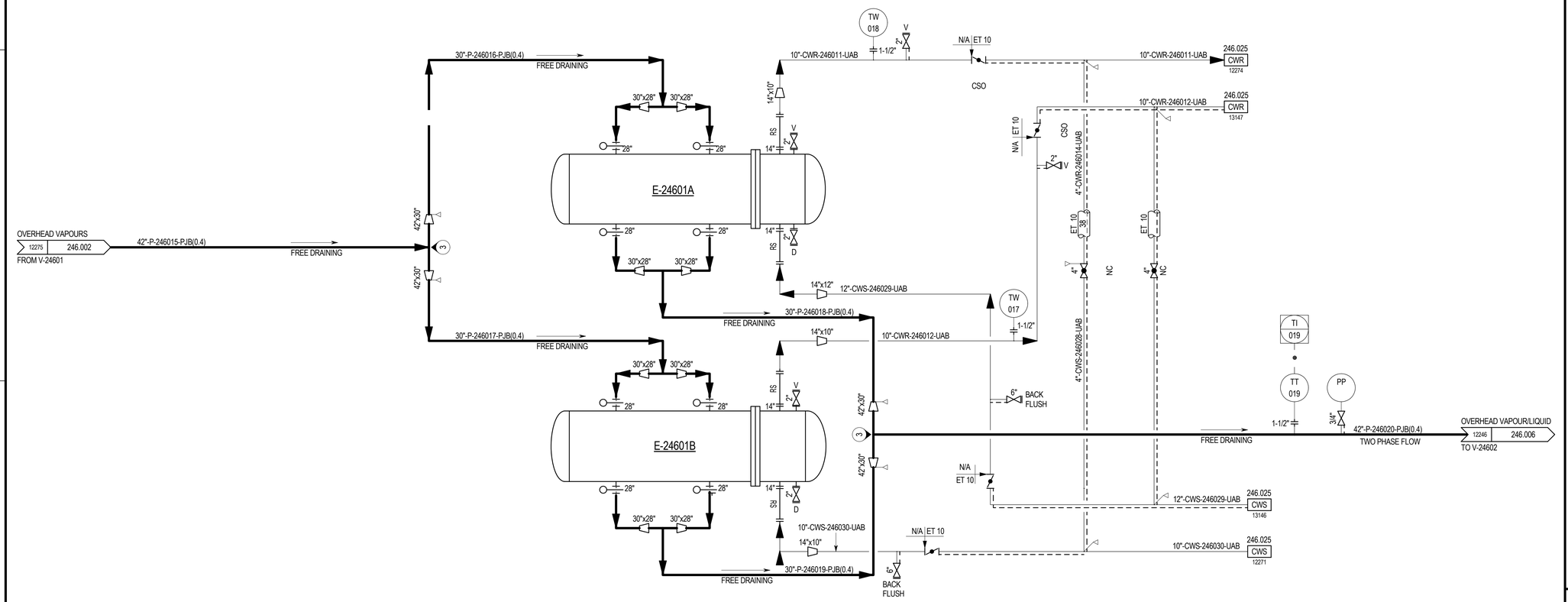
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
STRIPPER REBOILER "B" AND CONDENSATE POT

SCALE: NONE
SHELL DWG NO.: 246.0000.000.041.004
REV. G

246.004
FILE:\\F\1025\DRAWINGS\CC\246\246.004.pid MODEL DATE:6/14/2011 10:40:18 AM BY:tes29451

E-24601A
STRIPPER OVERHEAD CONDENSER

RATED DUTY:	26.60 MW (TOTAL)	
SURFACE AREA:	2272.0 m^2	
TEMA TYPE:	BHU	
	SHELL	TUBE
DESIGN PRESS:	385.00 kPa-g /FV	1100.00 kPa-g/
DESIGN TEMP:	150 °C/150 °C	58 °C/
MATERIAL:	CS + 3 mm 304L SS CLAD	DUPLEX 2205 + 0.38 mm CA
INSULATION TYPE/THIK:	PP/	NONE/
HEAT TRACE MEDIA/TEMP:		
TRIM:	P-246127-PJB(0.4)	CWR-246030-UAB
	P-246128-PJB(0.4)	CWR-246031-UAB



ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . SYMMETRICAL PIPING.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
STRIPPER OVERHEAD CONDENSER

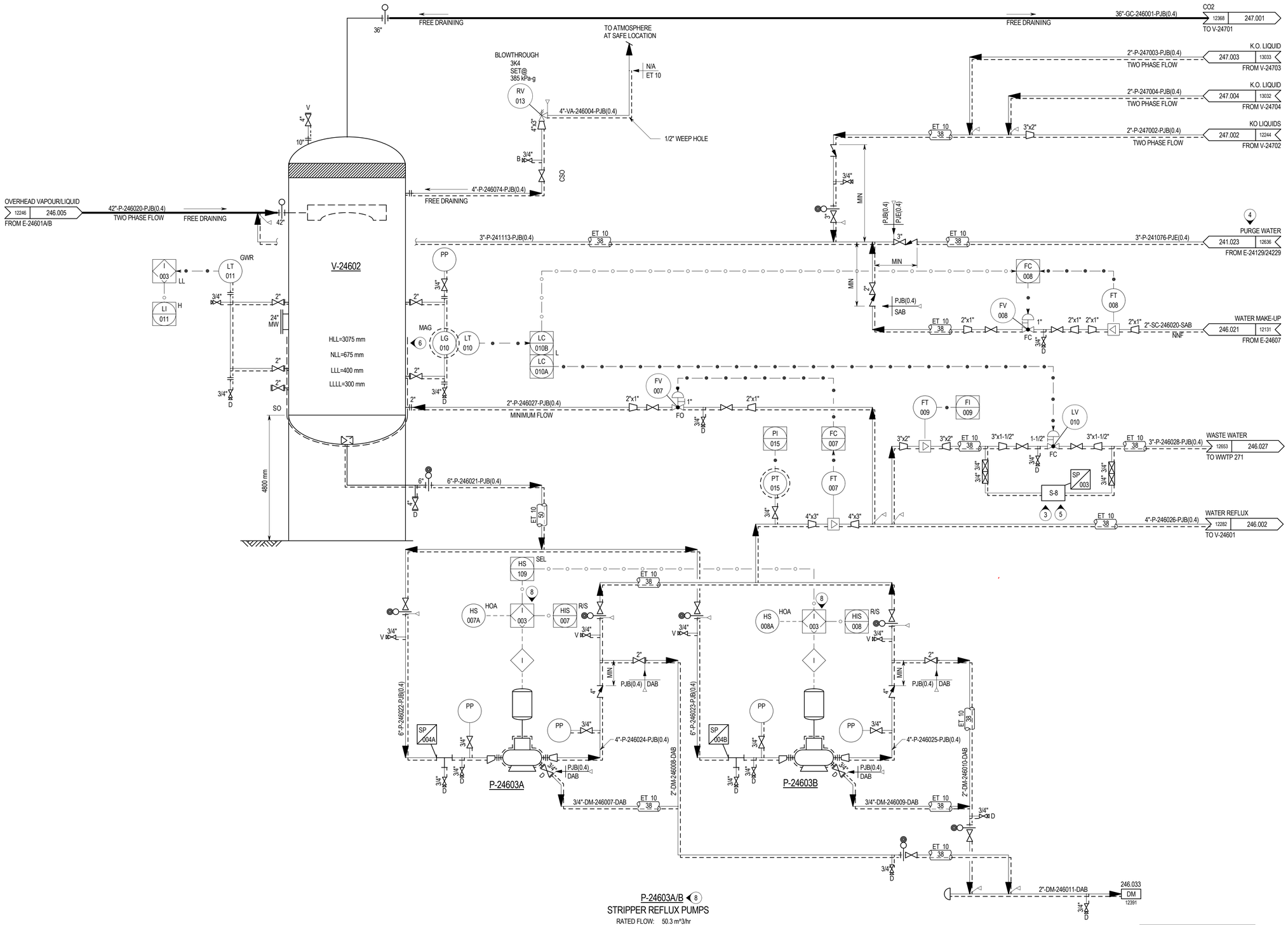
SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.005 REV. G

246.005
FILE:\\F:\1025\DRAWINGS\CO2\246\246.005.pid MODEL DATE:6/14/2011 10:41:48 AM BY:bes29451

V-24602
STRIPPER REFLUX DRUM

SIZE: 3300 mm ID x 7300 mm T/T
DESIGN PR. & TEMP: 385 kPa-g @ 150 °C / FV @ 150 °C
MATERIAL(VESSEL/INTERNALS): CS + 3 mm 304L SS CLAD / 316L SS
INSULATION TYPE/THK: H /
TRIM: P-246129-PJB(0.4) (6)



P-24603A/B (8)
STRIPPER REFLUX PUMPS

RATED FLOW:	50.3 m^3/hr	
DIFF. PR.:	559 kPa	
DRIVER:	15.0 kW	
	CASING	INTERNALS
MATERIAL:	316 SS	316 SS
INSULATION TYPE/THK:	/	(7)
TRIM:		

ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.
4 . MAKE-UP WATER REQUIREMENTS TO THE AMINE SYSTEM ARE NORMALLY SATISFIED BY THE PURGE WATER FLOW FROM HMU 1 AND 2.
5 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
6 . ELECTRIC TRACE TO HLL (ET 10).
7 . ELECTRIC TRACE (ET 10).
8 . AUTO-START BY PUMP ON RUN FAILURE OF PRIMARY PUMP.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
STRIPPER REFLUX DRUM & REFLUX PUMPS

SCALE: NONE
SHELL DWG NO.: 246.0000.000.041.006 REV. G

246.006
FILE:\\F:\1025\DRAWINGS\CO2246\246.006.pid MODEL DATE:6/14/2011 10:42:30 AM BY:bes29451

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . SUCTION PIPING TO BE AS SYMMETRICAL AS POSSIBLE.
4 . 3 x 50% PUMPS FOR TOTAL DESIGN FLOW RATE OF 1510.6 m3/h.
5 . AUTO-START LOGIC FOR P-24601A/B/C SHALL TAKE INTO CONSIDERATION THE NUMBER OF LEAN AMINE CHARGE PUMPS COMMANDED TO RUN SIMULTANEOUSLY. REFER TO DRAWING 246.011.
6 . ELECTRIC TRACE (ET 10).
7 . AUTO-START STAND-BY PUMP ON RUN FAILURE OF EITHER PRIMARY PUMP.
8 . VALVE AND SPACER TO BE ORIENTED IN THE HORIZONTAL PLANE.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

LEAN AMINE
12182 246.002
FROM V-24601

24"-P-246041-DJB(0.4)

ET 10 75

FI 010
FT 010

14"
16"x14" 16"x14"

ET 10 63

16"-P-246048-DJE(0.4)

LEAN AMINE
12230 246.001
TO E-24602A/B

12"-P-246048-DJE(0.4)

ET 10 63

DJB(0.4) DJE(0.4)
2" V
MIN

ET 10 50

16"-P-246042-DJE(0.4)
16"-P-246043-DJE(0.4)
16"-P-246044-DJE(0.4)

12"-P-246045-DJE(0.4)
12"-P-246046-DJE(0.4)
12"-P-246047-DJE(0.4)

DJE(0.4) DAB
2"
1"
3/4" 3/4"
PP

SP 005A
SP 005B
SP 005C

SI 001 / SI 002 / SI 003
XL 001 / XL 002 / XL 003
XA 001 / XA 003
LOCAL/ REMOTE
VFD FAULT

2"-DM-246015-DAB
2"-DM-246019-DAB
2"-DM-246023-DAB

3/4" 3/4"
DJE(0.4) DAB
D
16"x12" 12"x8"
VFD
I 002
5
7
I 001
R/S
HIS 001 / HIS 002 / HIS 003
HS 001A / HS 002A / HS 003A
HOA

3/4"-DM-246012-DAB
2"-DM-246013-DAB
3/4"-DM-246016-DAB
2"-DM-246017-DAB
3/4"-DM-246020-DAB
2"-DM-246021-DAB

P-24601A
4
3/4"-DM-246014-DAB

P-24601B
4
3/4"-DM-246018-DAB

P-24601C
4
3/4"-DM-246022-DAB

AMINE DRAIN
246.013 13130
TO V-24606

6"-DM-246006-DAB

HS 104 SEL

AMINE DRAIN
13125 246.002
FROM V-24601

6"-DM-246005-DAB

VFD SET POINT
246.011 12904
FROM PC-041

4 7
P-24601A /B /C
LEAN AMINE PUMPS

RATED FLOW:	755.3 m^3/hr	
DIFF. PR.:	909 kPa	
DRIVER:	261.0 kW (EACH)	
	CASING	INTERNALS
MATERIAL:	316 SS	316 SS
INSULATION TYPE/THK:	H /	6
TRIM:	P-246132-DJE(0.4)	
	P-246133-DJE(0.4)	
	P-246134-DJE(0.4)	

ISSUED FOR HAZOP

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
LEAN AMINE PUMPS

SCALE: NONE
SHELL DWG NO.: 246.0000.000.041.007
REV. G

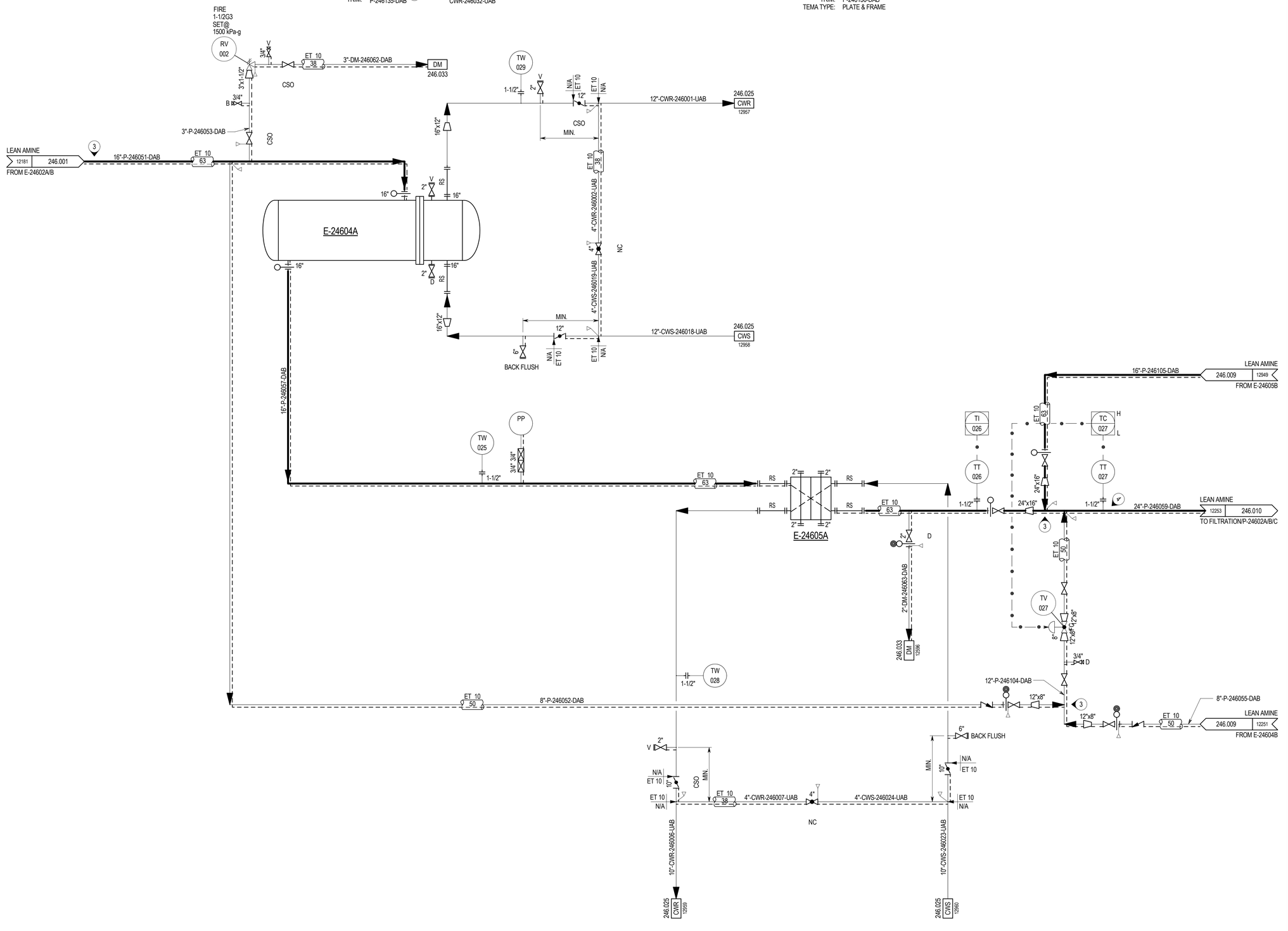
246.007
FILE:\\F:\1025\DRAWINGS\CO2\246\246.007.pid MODEL DATE:6/14/2011 1:17:29 PM BY:bes29451

E-24604A
LEAN AMINE COOLER

	SHELL	TUBE
RATED DUTY:	20.8 MW	
SURFACE AREA:	829.0 m^2	
TEMA TYPE:	BEU	
DESIGN PRESS:	1500 kPa-g / HV	1155 kPa-g /
DESIGN TEMP:	130 °C / 150 °C	58 °C /
MATERIAL:	CS + 3mm 304L SS CLAD	DUPLEX 2205 + 0.38 mm CA
INSULATION TYPE/THK:	/	/
TRIM:	P-246135-DAB	CWR-246032-UAB

E-24605A
LEAN AMINE TRIM COOLER

	HOT	COLD
RATED DUTY:	15.5 MW	
SURFACE AREA:	676.0 m^2	
DESIGN PRESS:	1500 kPa-g / HV	1155 kPa-g /
DESIGN TEMP:	105 °C / 150 °C	58 °C /
MATERIAL:	PLATES: 316L SS / GRAPHITE FRAME: CS	
INSULATION TYPE/THK:	/	/
TRIM:	P-246136-DAB	
TEMA TYPE:	PLATE & FRAME	



ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . PIPING BETWEEN TRAIN "A" AND TRAIN "B" TO BE AS SYMMETRICAL AS POSSIBLE.
4 . LOCATE TT-027 MINIMUM 10 PIPE DIAMETERS DOWNSTREAM OF BYPASS MIXING POINT.
5 . ELECTRIC TRACE (ET 10).

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
LEAN AMINE COOLING TRAIN "A"

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.008 REV. G

246.008

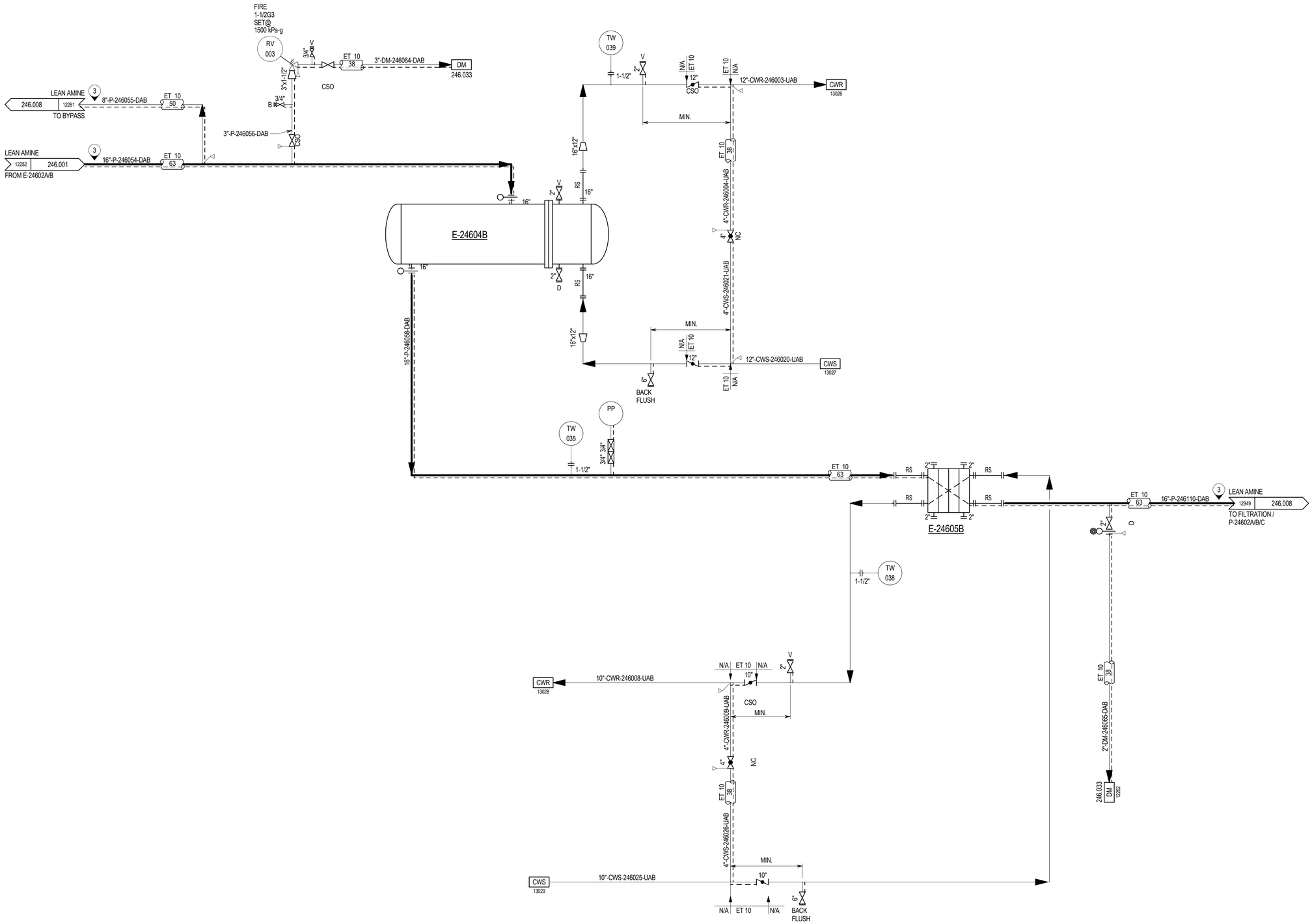
FILE:\\F:\1025\DRAWINGS\CO2\246\246.008.pid MODEL DATE:6/14/2011 1:17:30 PM BY:bes29451

E-24604B
LEAN AMINE COOLER

	SHELL	TUBE
RATED DUTY:	20.8 MW	
SURFACE AREA:	829.0 m^2	
TEMA TYPE:	BEU	
DESIGN PRESS:	1500 kPa-g / HV	1155 kPa-g /
DESIGN TEMP:	130 °C / 150 °C	58 °C /
MATERIAL:	CS + 3 mm 304L SS CLAD	DUPLEX 2205 + 0.38 mm CA
INSULATION TYPE/THK:	/	/
TRIM:	P-246137-DAB	CWR-246034-UAB

E-24605B
LEAN AMINE TRIM COOLER

	HOT	COLD
RATED DUTY:	15.5 MW	
SURFACE AREA:	676.0 m^2	
DESIGN PRESS:	1500 kPa-g / HV	1155 kPa-g /
DESIGN TEMP:	105 °C / 150 °C	58 °C /
MATERIAL:	PLATES: 316L SS / GRAPHITE FRAME: CS	
INSULATION TYPE/THK:	/	/
TRIM:	P-246138-DAB	
TEMA TYPE:	PLATE & FRAME	



ISSUED FOR HAZOP

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3. PIPING BETWEEN TRAIN "A" AND TRAIN "B" TO BE AS SYMMETRICAL AS POSSIBLE.
4. ELECTRIC TRACE (ET 10).

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

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FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
LEAN AMINE COOLING TRAIN "B"

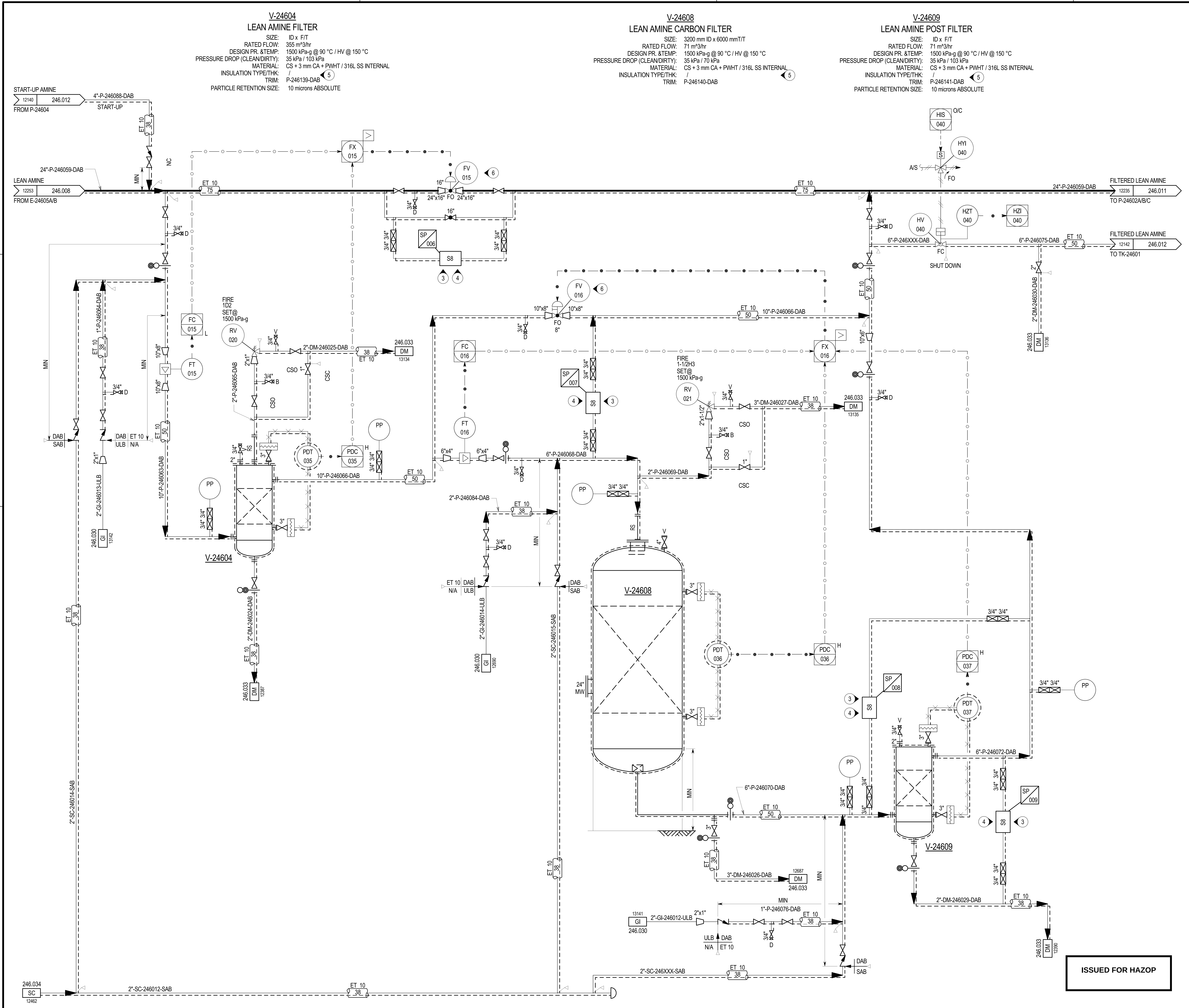
SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.009

REV. G

246.009

FILE:\F:\1025\DRAWINGS\CO2\246\246.009.pid MODEL DATE:6/14/2011 2:59:13 PM BY:bes29451


V-24604
LEAN AMINE FILTER
SIZE: ID x F/T
RATED FLOW: 355 m^3/hr
DESIGN PR. &TEMP: 1500 kPa-g @ 90 °C / HV @ 150 °C
PRESSURE DROP (CLEAN/DIRTY): 35 kPa / 103 kPa
MATERIAL: CS + 3 mm CA + PWHT / 316L SS INTERNAL
INSULATION TYPE/THK: /
TRIM: P-246139-DAB
PARTICLE RETENTION SIZE: 10 microns ABSOLUTE
V-24608
LEAN AMINE CARBON FILTER
SIZE: 3200 mm ID x 6000 mmT/T
RATED FLOW: 71 m^3/hr
DESIGN PR. &TEMP: 1500 kPa-g @ 90 °C / HV @ 150 °C
PRESSURE DROP (CLEAN/DIRTY): 35 kPa / 70 kPa
MATERIAL: CS + 3 mm CA + PWHT / 316L SS INTERNAL
INSULATION TYPE/THK: /
TRIM: P-246140-DAB
V-24609
LEAN AMINE POST FILTER
SIZE: ID x F/T
RATED FLOW: 71 m^3/hr
DESIGN PR. &TEMP: 1500 kPa-g @ 90 °C / HV @ 150 °C
PRESSURE DROP (CLEAN/DIRTY): 35 kPa / 103 kPa
MATERIAL: CS + 3 mm CA + PWHT / 316L SS INTERNAL
INSULATION TYPE/THK: /
TRIM: P-246141-DAB
PARTICLE RETENTION SIZE: 10 microns ABSOLUTE
START-UP AMINE
12140 246.012
FROM P-24604
4"-P-246088-DAB
START-UP
LEAN AMINE
12253 246.008
FROM E-24605A/B
24"-P-246059-DAB
FILTERED LEAN AMINE
12235 246.011
TO P-24602A/B/C
FILTERED LEAN AMINE
12142 246.012
TO TK-24601
FX 015
FV 015
FC 015
FT 015
SP 006
FV 016
FC 016
FT 016
FX 016
SP 007
RV 020
RV 021
PDT 035
PDC 035
PDT 036
PDC 036
PDT 037
PDC 037
SP 008
SP 009
HIS 040
HYI 040
HV 040
HZT 040
HZI 040
SHUT DOWN
FIRE 1D2 SET@ 1500 kPa-g
FIRE 1-1/2H3 SET@ 1500 kPa-g
10"-P-246066-DAB
2"-DM-246025-DAB
3"-DM-246027-DAB
6"-P-246068-DAB
2"-P-246069-DAB
2"-P-246084-DAB
1"-P-246064-DAB
2"-P-246065-DAB
10"-P-246063-DAB
2"-GI-246013-ULB
2"-DM-246024-DAB
2"-GI-246014-ULB
2"-SC-246015-SAB
2"-SC-246014-SAB
2"-SC-246012-SAB
2"-SC-246XXX-SAB
6"-P-246070-DAB
3"-DM-246026-DAB
2"-GI-246012-ULB
1"-P-246076-DAB
6"-P-246072-DAB
2"-DM-246029-DAB
6"-P-246XXX-DAB
6"-P-246075-DAB
2"-DM-246030-DAB
V-24604
V-24608
V-24609
246.033 DM 13134
246.033 DM 13135
246.033 DM 12387
246.033 DM 12687
246.033 DM 12390
246.033 DM 13136
246.030 GI 13142
246.030 GI 12690
13141 GI 246.030
246.034 SC 12462
ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.
4 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
5 . ELECTRIC TRACE (ET 10).
6 . MECHANICAL MINIMUM FLOW STOP TO BE PROVIDED.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

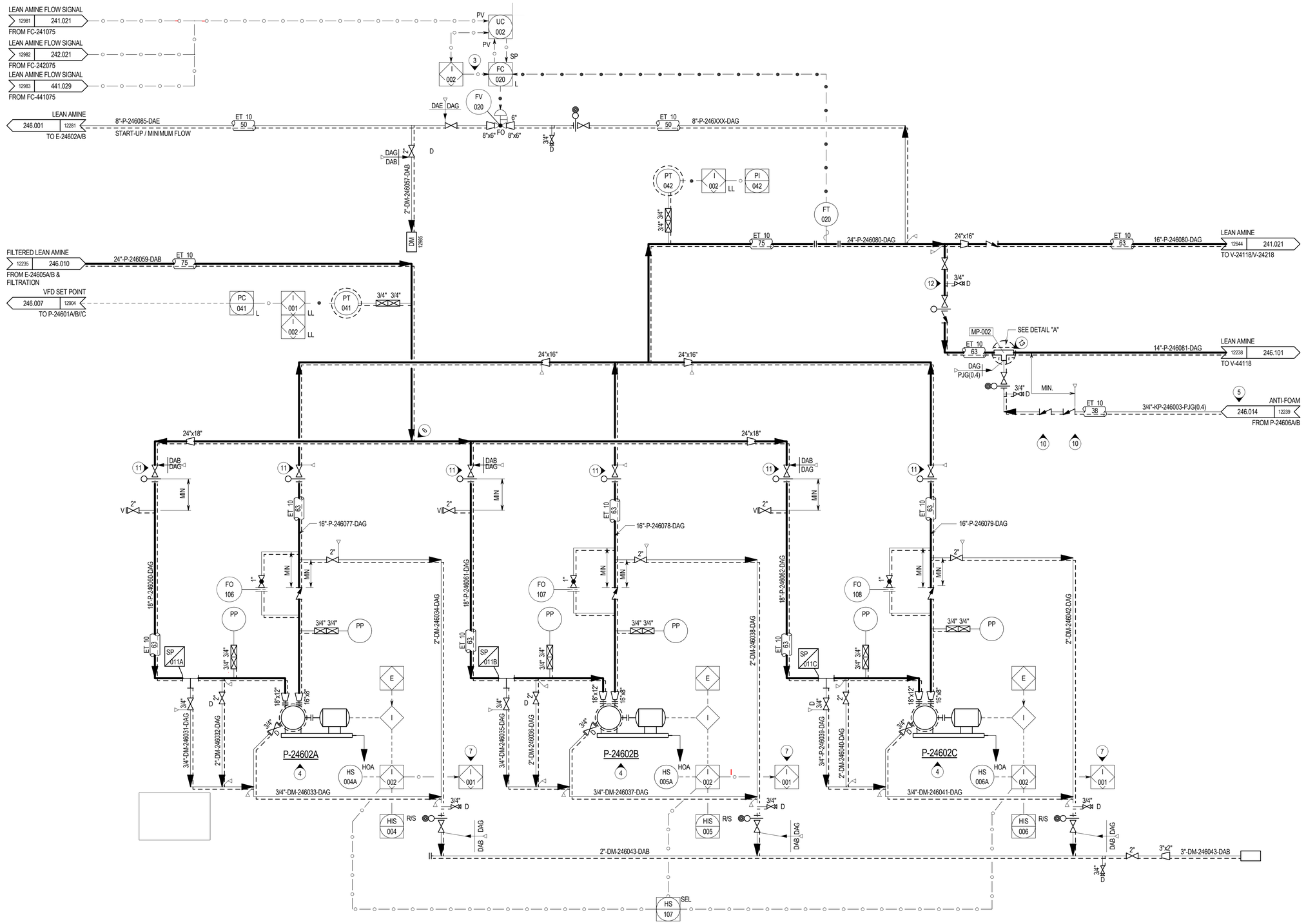
SHELL CANADA
QUEST CCS PROJECT

FLUOR

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
LEAN AMINE FILTRATION

SCALE: NONE
SHELL DWG NO.: 246.0000.000.041.010
REV. G

246.010 FILE:\\F:\1025\DRAWINGS\CO2\246\246.010.pid MODEL DATE:6/14/2011 3:04:21 PM BY:bes29451



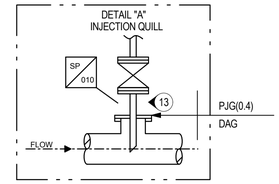
4 P-24602A/B/C

LEAN AMINE CHARGE PUMPS

RATED FLOW:	709.0 m^3/hr (EACH)	
DIFF. PR.:	3603 kPa	
DRIVER:	1119.0 kW (EACH)	
	CASING	INTERNALS
MATERIAL:	316 SS	316 SS
INSULATION TYPE/THK:	/	9
TRIM:	P-246142-DAG	
	P-246143-DAG	
	P-246144-DAG	

ISSUED FOR HAZOP

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3. CLOSES FV-020 IF NO LEAN AMINE CHARGE PUMPS ARE RUNNING.
4. 3 x 50% PUMPS FOR A TOTAL FLOW OF 1418 m3/h.
5. ANTI-FOAM IS ADDED INTERMITTENTLY BY THE OPERATOR ON HIGH DP ACROSS THE AMINE ABSORBERS. ON HIGH DP IN EITHER V-24118 OR V-24218, ANTI-FOAM WILL BE SENT TO BOTH ABSORBERS.
6. PUMP SUCTION PIPING TO BE AS SYMMETRICAL AS POSSIBLE.
7. AUTO-START LOGIC FOR P-24602A/B/C SHALL ALSO CONSIDER THE NEED TO RAMP UP AND/OR AUTOSTART P-24601A/B/C. REFER TO DRAWING 246.007.
8. UC-002 SHALL MONITOR LEAN AMINE FLOWS TO EACH HMU PLANT AND THE TOTAL LEAN AMINE FLOW INCLUDING THE MINIMUM FLOW RECYCLE. UC-002 WILL PROVIDE A SET POINT TO FC-020 BASED ON THE NUMBER OF RUNNING PUMPS AND WILL AUTOMATICALLY PREVENT EXCESSIVE PUMPING BY STOPPING ONE OF THE RUNNING PUMPS VIA I-002.
9. ELECTRIC TRACE (ET 10).
10. TWO CHECK VALVES IN SERIES, ONE IN THE HORIZONTAL AND ONE IN THE VERTICAL POSITION, SEPARATED BY AT LEAST 500 mm.
11. VALVE AND SPACER TO BE ORIENTED IN THE HORIZONTAL PLANE.
12. VALVES ARE FOR BATTERY LIMIT ISOLATION OF UNIT.
13. 316 SS INJECTION QUILL AND 304 SS HEADER TEE. OUTLET OF INJECTION QUILL TO BE CENTERED IN PROCESS PIPE.



HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- DETAILS FOR INJECTION QUILL TO BE FINALIZED.
- SAFETY SYSTEM PUMP TRIP REQUIREMENTS TO BE CONFIRMED DURING DETAILED ENGINEERING.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

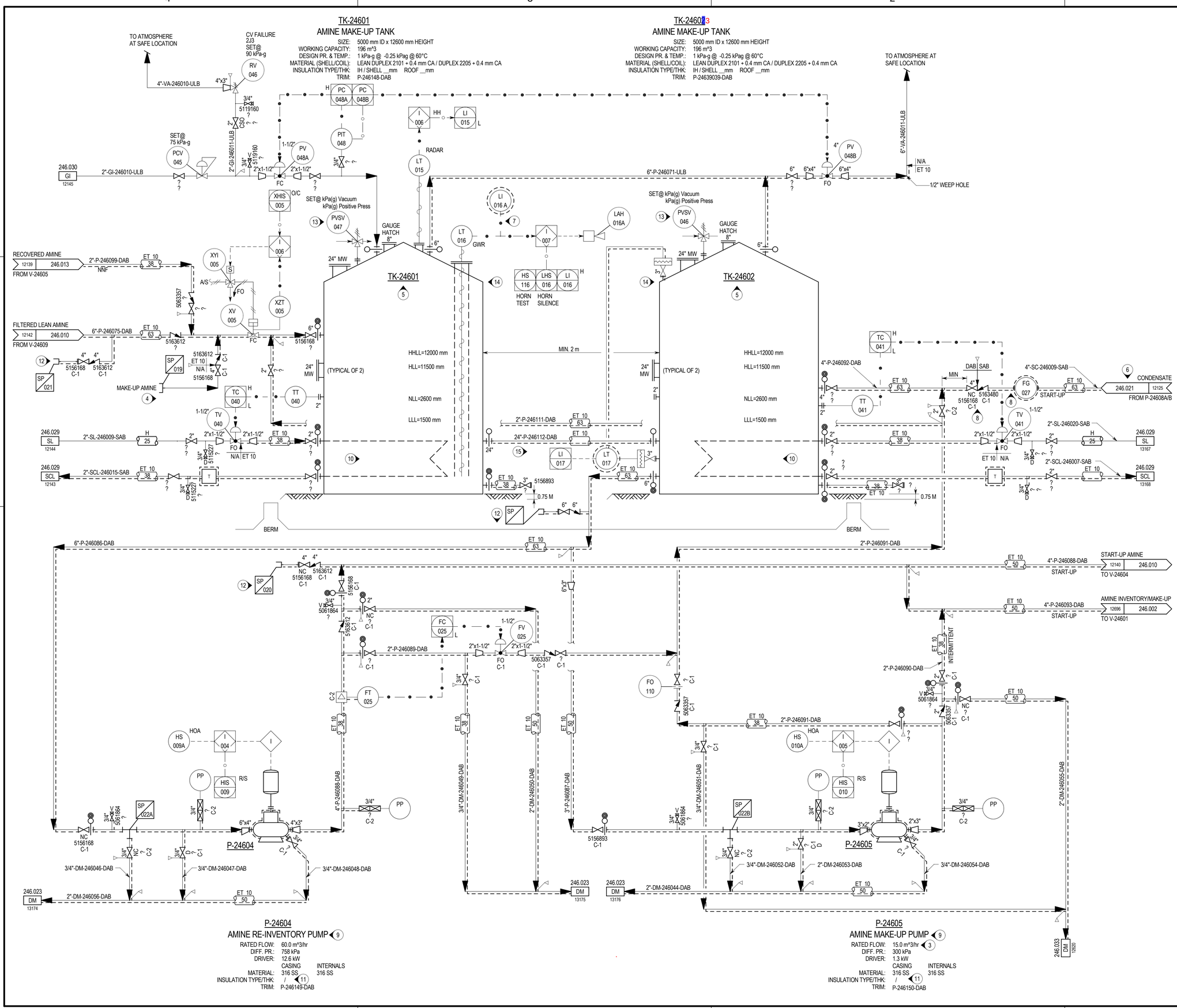
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
LEAN AMINE CHARGE PUMPS

SCALE: NONE	
SHELL DWG NO.: 246.0000.000.041.011	REV. G

246.011
FILE:\\F:\1025\DRAWINGS\CC\246246.011.pid MODEL DATE:6/14/2011 1:17:35 PM BY:bes29451



1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3. PUMP WILL HAVE A WAREHOUSE SPARE.
4. TRUCK CONNECTION NEAR TANK. LOCAL CONTAINMENT FOR TRUCK UNLOADING. TEMPORARY / RENTAL TANKS TO BE PLACED ON PAVED, CURBED AREA BESIDE AMINE STORAGE FACILITY. PAVED AREA TO BE PART OF THE CAPTURE AREA STORMWATER DRAINAGE FACILITIES.
5. AMINE MAKE-UP TANK CONTAINS UNDILUTED AMINE.
6. START-UP PIPING REQUIRED FOR INITIAL AMINE FILL AND DILUTION WITH CONDENSATE.
7. LEVEL INDICATION AT GRADE TO BE VISIBLE AT TRUCK UNLOADING LOCATION.
8. FG-027 TO BE VISIBLE FROM VALVE. FLOW GAUGE AND VALVE TO BE AT GRADE NEAR TANK.
9. ALL AMINE PUMPS ARE CONTAINED WITHIN CURBED CONTAINMENT AREA.
10. STEAM COIL AND ALL TANK APPURTENANCES LOCATED BELOW LLL.
11. ELECTRIC TRACE (ET 10), PIPING,PUMPS & NOZZLES.
12. RENTAL TANK CONNECTION.
13. TANK VENDOR TO SUPPLY PVSV.
14. PLATFORM BETWEEN ROOF AREAS OF EACH TANK.
15. TANKS TO BE NO FURTHER THAN 2m APART, 24 NPS TIE LINE TO BE MINIMUM LENGTH AND TANK NOZZLES TO BE LOCATED AS CLOSE TO GRADE AS POSSIBLE, NO POCKET.

HOLDS:

- STORAGE FACILITY TO BE VERTICAL TANK (API 650) OR HORIZONTAL DRUM (ASME SECT VIII). MECHANICAL TO ADVISE LEAST COST ALTERNATIVE.
- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
AMINE MAKE-UP TANK & PUMPS

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.012 REV. G

246.012

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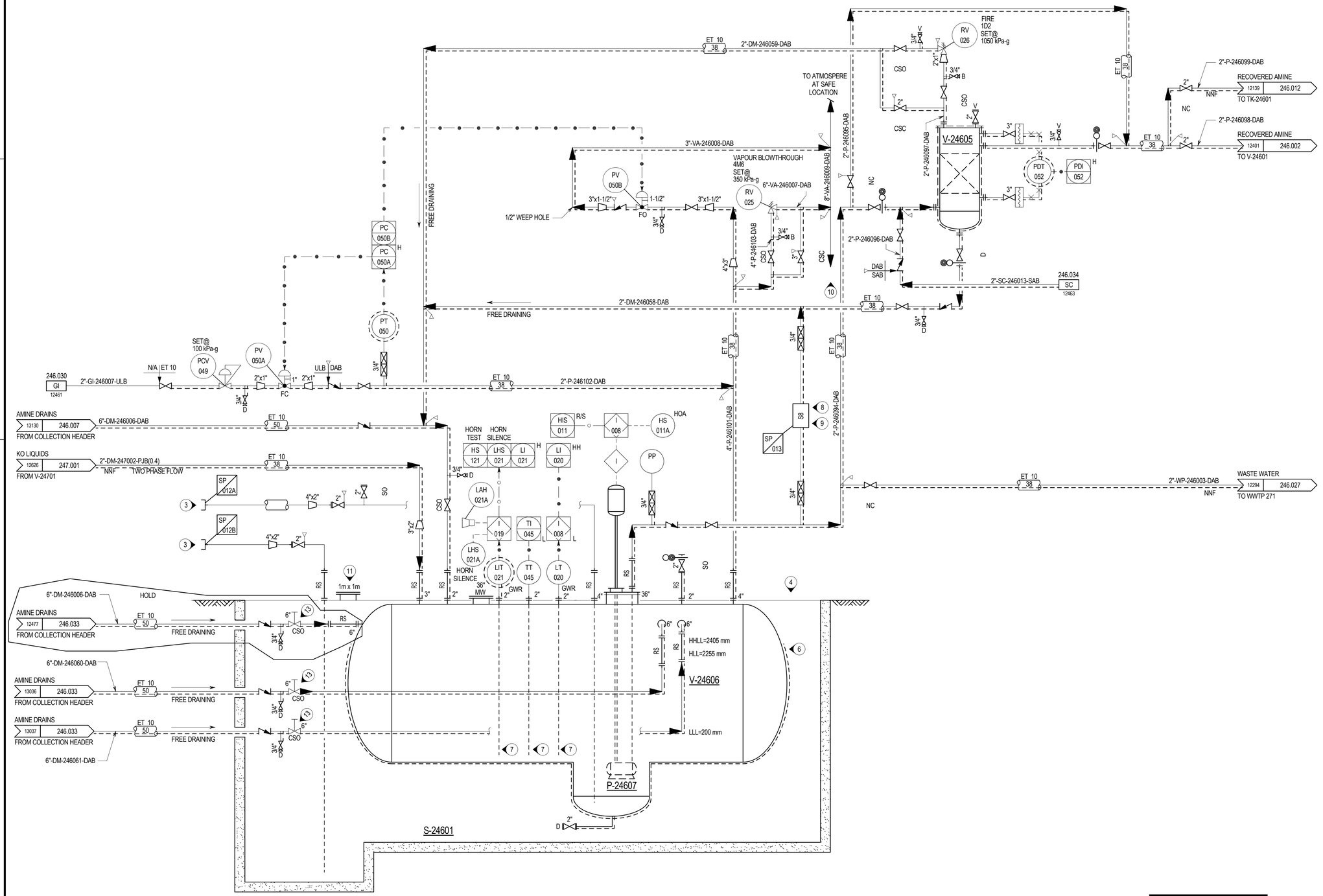
V-24606
AMINE DRAIN DRUM

SIZE: 2600 mm ID x 8100 mm T/T
DESIGN PR. & TEMP: 350 kPa-g @ 150 °C / HV @ 150 °C
MATERIAL(VESSEL/INTERNALS): CS + 6 mm CA + PWHT / 316 SS + 0.4 mm CA
INSULATION TYPE/THK: H /
TRIM: P-246145-DAB (6)

V-24605
DRAINED AMINE FILTER

SIZE: ID x
RATED FLOW: 25 m^3/hr
DESIGN PR. &TEMP: 1050 kPa-g @ 150 °C/ HV @ 150 °C
PRESSURE DROP (CLEAN/DIRTY): 35 kPa / 150 kPa
MATERIAL: CS + 3 mm CA + PWHT / 316 SS INTERNAL
INSULATION TYPE/THK: /
TRIM: P-246146-DAB (12)
PARTICLE RETENTION SIZE: 10 microns ABSOLUTE



P-24607
AMINE DRAIN PUMP (5)

RATED FLOW: 25.0 m^3/hr
DIFF. PR.: 641 kPa
DRIVER: 7.5 kW
MATERIAL: CASING 316 SS, INTERNALS 316 SS
INSULATION TYPE/THK: /
TRIM: P-246147-DAB (12)

S-24601
AMINE DRAIN DRUM SUMP

ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . VACUUM TRUCK CONNECTION.
4 . CHECKER PLATE ON TOP OF SUMP.
5 . PUMP WILL HAVE A WAREHOUSE SPARE.
6 . ELECTRIC TRACING TO HLL (ET 10).
7 . EXTEND BELOW LLL.
8 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
9 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.
10. DISCHARGE PIPE FOR RELIEF VALVE TO BE DIRECTED INTO BOTTOM OF AMINE DRAIN DRUM SUMP. ENTRY PROCEDURES INTO SUMP ARE REQUIRED FOR OPERATION / MAINTENANCE TO ENSURE THERE IS NO RELIEF OR OVERFILL OF AMINE INTO THE SUMP.
11. ACCESS HATCH.
12. ELECTRIC TRACE (ET 10).
13. VALVE STEM TO EXTEND ABOVE GRADE.
14. PUMP P-24607 TO BE MANUALLY STARTED ON HIGH LEVEL ALARM.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

REV.	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT
FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
AMINE DRAIN DRUM

SCALE: NONE
SHELL DWG NO.: 246.0000.000.041.013
REV. G

246.013
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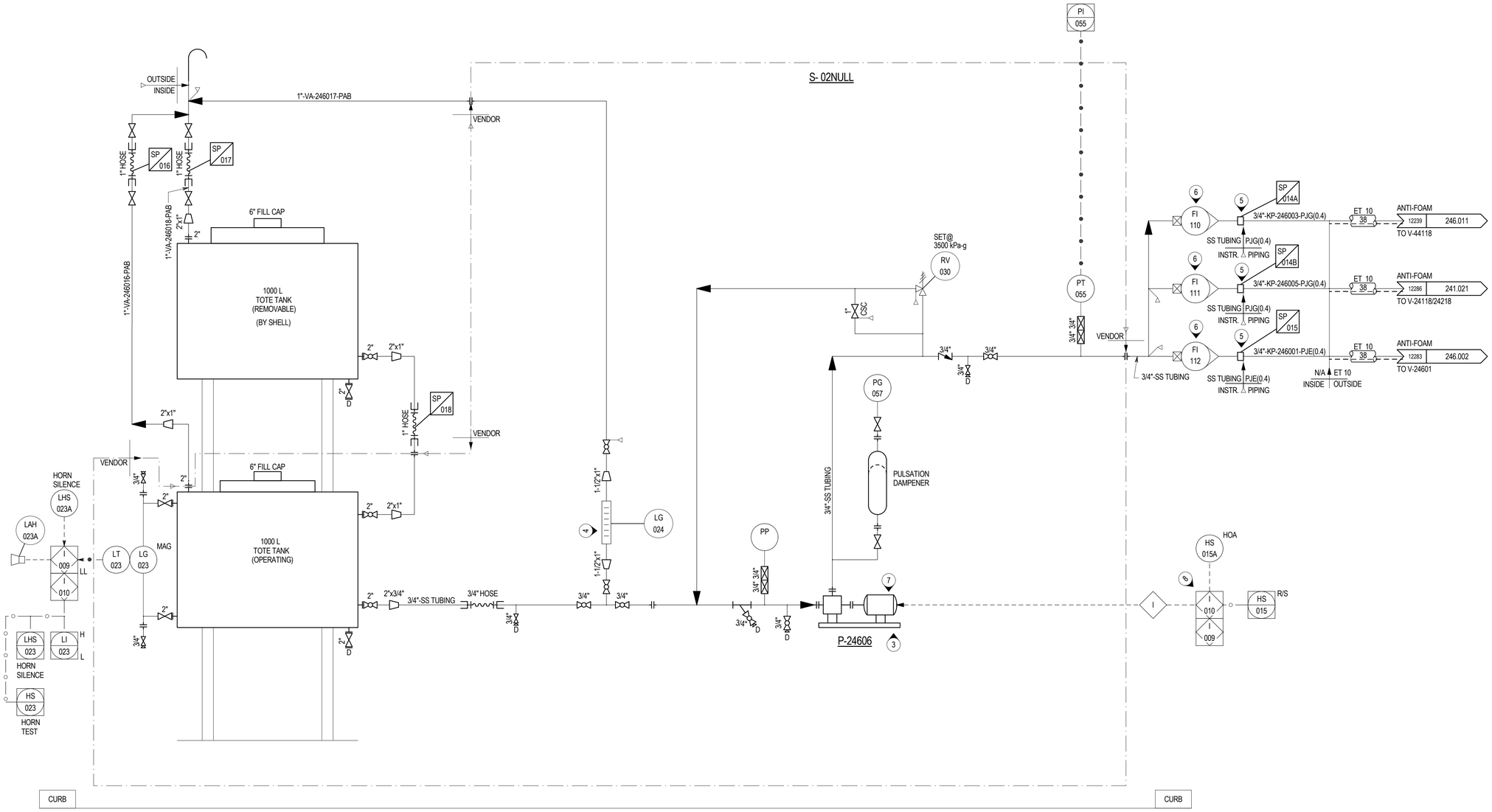
S- 02NULL
ANTI-FOAM INJECTION PACKAGE



7
P-24606 3
ANTI-FOAM INJECTION PUMP

RATED FLOW:	160 L/hr	
DIFF. PR.:	3850 kPa	
DRIVER:	0.75 kW	
	CASING	INTERNALS
MATERIAL:	316 SS	316 SS
INSULATION TYPE/THK:	NONE /	
TRIM:		

ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . POSITIVE DISPLACEMENT PUMP WITH ADJUSTABLE STROKE.
4 . GRADUATED GLASS COLUMN FOR CONTINUOUS TOTE TANK LEVEL INDICATION AND INJECTION PUMP CALIBRATION.
5 . SS TUBING TO PIPE CONNECTOR.
6 . VERTICAL ORIENTATION REQUIRED FOR ROTAMETER WITH INLET FLOW INTO THE BOTTOM OF THE INSTRUMENT.
7 . WAREHOUSE SPARE PUMP TO BE PROVIDED AND STORED IN THE ANTI-FOAM INJECTION SHELTER.
8 . ANTI-FOAM INJECTION PUMP TO AUTOMATICALLY STOP 5 MINUTES AFTER BEING STARTED.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
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SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
ANTI-FOAM INJECTION PACKAGE

SCALE: NONE
SHELL DWG NO.: 246.0000.000.041.014
REV. G

246.014
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V-24607
CONDENSATE FLASH DRUM

SIZE: 3000 mm ID x 6300 mm T/T
DESIGN PR. & TEMP: 500 kPa-g @ 150 °C / FV @ 150 °C
MATERIAL(VESSEL/INTERNALS): CS + 3 mm CA
INSULATION TYPE/THK: IH / ◁5
TRIM: SCL-246XXX-SAG

E-24606A/B
LP COND. / DEMIN WATER EXCHANGER

RATED DUTY: 13.5 MW (TOTAL)
SURFACE AREA:

	HOT	COLD
DESIGN PRESS:	1150 kPa-g / FV	1450 kPa-g / HV
DESIGN TEMP:	150 °C / 150 °C	125 °C / 125 °C
MATERIAL:	PLATES: 304 SS FRAME: CS	
INSULATION TYPE/THK:	/	/ ◁5
TRIM:	SCL-246030-SAB WI-246020-UJB(0.4)	

CONDENSATE 12454 246.003 FROM E-24603A / V-24603A — 8"-SCL-246002-SAB — ET 10 100
CONDENSATE 12680 246.004 FROM E-24603B / V-24603B — 8"-SCL-246005-SAB — ET 10 100
8" 5156140 C-2
6" 5242525 C-2
ET 10 75 — 6"-WI-246007-UJB(0.4) — HOT DEMIN WATER 12681 246.101 TO V-25102
6" CSO 5242525 C-2
1-1/2" D ? C-2
TW 055 — TW 057 — TW 051 — TW 054 — TW 053 — TW 056 — TW 052
6"-WI-246011-UJB(0.4)
E-24606B — E-24606A
DEMIN WATER 12270 246.023 FROM P-24610A/B — 6"-WI-246006-UJB(0.4) — ET 10 50
6" 5245480 C-2
ET 10 50 — 6"-WI-246010-UJB(0.4)
6" CSO 5245480 C-2
13139 246.003 FROM LX-005
13140 246.004 FROM LX-006
4" LV 006 6"x4" FC — 4" LV 005 6"x4" FC
6"x4" — 6" 5156140 ? — 8"x6"
TO ATMOSPHERE AT SAFE LOCATION
4"-VA-246019-ULB
CV FAILURE 2J3 SET@ 90 kPa-g
RV 034 — 4"x3" C-1 — 3/4" 5119160 C-2 — 1" CSO C-1
SPLIT PC 061 H
TO ATMOSPHERE AT SAFE LOCATION
12"-VA-246020-SAB
10" 12"x10" FO C-1
PV 061B — 12"x10" — 4" 5156140 C-1
CV FAILURE 3L4 SET@ 500 kPa-g
RV 033 — 6"x4" — 4"x3" C-1
TO ATMOSPHERE AT SAFE LOCATION
6"-VA-246015-SAB
1/2" WEEP HOLE
ET 10 75 — 6"-SC-246XXX-SAB
ET 10 88
PT 061 — 3/4" 5115277 C-2
4" CSO 5156140 C-1 — 3/4" B 5115227 C-2 — 4"-VA-246014-SAB
SET@ 75 kPa-g
PCV 060 — 2"-GI-246006-ULB — 1-1/2" PV 061A — 2"x1-1/2" — FC C-1
2"x1-1/2" — 3/4" V 5119160 C-2 — ULB SAB 5070551 C-2 — 2" 5156862 C-1
246.030 GI 12664 — 2"-GI-246005-ULB — ? C-2 — C-1
2" C-1 — 10" — 12"
PP
V-24607
HHLL=3800 mm
HLL=2900 mm
LLL=1150 mm
LLLL=250 mm
24" MW
8" 5156140 C-1
8"-SC-246016-SAB — ET 10 75
3/4" 5115277 C-3
2" 5158143 2" C-2
MAG — LG 025 — LT 025
LP CONDENSATE 12457 246.029 FROM COLLECTION — 3"-SCL-246012-SAB — ET 10 38
3" 5156863 C-1
2" 5158143 2" C-1
3/4" D 5115277 C-3
5300 mm
SLOPE
ET 10 75 — 8"-SC-246001-SAB
START-UP
ET 10 75 — 6"-SC-246011-SAB — CONDENSATE 246.027 12126 FROM TK-25101 — 4
TC 050 H — TX 050 — FC 030 L — MINIMUM FLOW SIGNAL 246.021 12130 FROM FT-030
3" TV 050 — 4"x3" — FO C-1
8"x4" — 5156140 C-1 — 4"x3" — 3/4" 5115277 C-2 — 5156140 C-1
ET 10 50 — 4"-SC-246016-SAB — RECYCLED CONDENSATE 246.021 12127 FROM E-24607
LEVEL SIGNAL 12129 246.021 TO LC-025
ET 10 38 — 2"-SCH-248002-SAG — TWO PHASE FLOW — HP CONDENSATE 248.002 12427 FROM V-24805
TT 050 — 1-1/2"
ET 10 88 — 10"-SC-246002-SAB — RECOVERED CONDENSATE 12128 246.021 TO P-24608A/B

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . HP CONDENSATE AND FLASHING LP CONDENSATE LINES TO ENTER V-24607 BELOW LLL.
4 . START-UP PIPING REQUIRED FOR INITIAL AMINE FILL AND DILUTION WITH CONDENSATE.
5 . ELECTRIC TRACE TO HHLL (ET 10) AND EXCHANGERS.
6 . REQUIRE HEIGHT TO BE AS LOW AS POSSIBLE (MINIMUM 2.6m) FOR PROCESS HYDRAULICS.
7 . VESSEL SUPPORTED BY MODULE STRUCTURE AND IS LOCATED ABOVE EXCHANGERS E-24606A/B.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- RELIEF LINE (INLET AND OUTLET) SIZING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
CONDENSATE RECOVERY EXCHANGER & FLASH DRUM

SCALE: NONE
SHELL DWG NO.: 246.0000.000.041.020 REV. G

246.020
FILE:\\F:\1025\DRAWINGS\CO2246\246.020.pid MODEL DATE:7/10/2011 9:29:49 PM BY:mjk22296

E-24607A/B
CONDENSATE COOLER

	SHELL	TUBE
RATED DUTY:	0.7 MW (TOTAL)	
SURFACE AREA:	TBD	
TEMA TYPE:	BEU	
DESIGN PRESS:	1200 kPa-g / FV	1200 kPa-g /
DESIGN TEMP:	150 °C / 150 °C	/ 58 °C
MATERIAL:		
INSULATION TYPE/THK:	/ (5)	/ (5)
TRIM:	SC-246040-SAB CWR-246035-UAB	

RECYCLED CONDENSATE 246.020 12127 — 4"-SC-246016-SAB — ET 10 38 — TO V-24607

ET 10 38 — 2"-SC-246020-SAB — NNF — WATER MAKE-UP 12131 246.006 — TO V-24602

ET 10 38 — 2"-SC-246017-SAB — COOLED CONDENSATE 12123 246.022 — TO P-24609A/B

5156140 C-2 — 3/4" D 5115227 C-2 — 6"x4" — 1-1/2" — 6"x4"

TI 062 H — TT 062

BACK FLUSH 3" 5115273 C-2 — 6"x4" — 5307521 C-2 — ET 10 50 — 6"-CWS-246031-UAB — 246.025 CWS 12120

RS

E-24607B

E-24607A

RS

TW 064 — 1-1/2" — 6"x4" — ET 10 50 — 6"-CWR-246014-UAB — 246.025 CWR 12119

3/4" D 5115273 C-2 — CSO 5307521 C-2

TW 061 — 1-1/2" — 6"x4" — 3/4" D 5115227 C-2 — 5156140 C-2

4"-SC-246007-SAB

LC 025 H L — I 011 LL — LEVEL SIGNAL 246.020 12129 FROM LT-025

LV 025 — 6" 5156140 C-1 — FC C-1 — 6" — 3/4" D 5115227 C-2 — 6" 5156140 C-1

4" NC 5156140 C-2

ET 10 50 — 6"-SC-246008-SAB — RECOVERED CLEAN CONDENSATE 12654 246.027 — TO TK-25101

ET 10 38 — 2"-SC-246010-SAB — FLUSHING CONDENSATE 12579 246.034 — TO DISTRIBUTION

START-UP — ET 10 38 — 4"-SC-246009-SAB — CONDENSATE 12125 246.012 — TO TK-24601 / TK-24602 (4)

MINIMUM FLOW SIGNAL 246.020 12130 — TO FC-030

FT 030 — C-2

PI 065 L — PT 065 — I 012 LL — 3/4" ? C-2

HS 017A HOA — HIS 017 R/S — I 012 — I

HS 018A HOA — HS 119 SEL — I 012 — I — HIS 018 R/S

5156140 C-1

3/4" D 5115227 C-1 — 5163480 C-1 — 3/4" ? C-1 — PP

ET 10 50

6"-SC-246005-SAB

6"-SC-246006-SAB

RECOVERED CONDENSATE 12128 246.020 — FROM V-24607

10"-SC-246002-SAB — ET 10 50 — 10"x8" — 5156140 C-1 — V 5115227 C-1 — SP 023A — 8"-SC-246003-SAB

SP 023B — 8"-SC-246004-SAB

3" D 5115227 C-1 — 3/4" D 5115227 C-1 — 3/4" ? C-1

P-24608A — P-24608B

P-24608A/B (3)

RECOVERED CLEAN CONDENSATE PUMP

RATED FLOW:	183.0 m^3/hr	
DIFF. PR.:	602 kPa	
DRIVER:	30.5 kW	
	CASING	INTERNALS
MATERIAL:	CS	CS
INSULATION TYPE/THK:	/ (5)	
TRIM:	SC-246041-SAB SC-246042-SAB	

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3. 2x100% PUMPS FOR TOTAL FLOW RATE OF 183 m3/h.
4. START-UP PIPING REQUIRED FOR INITIAL AMINE FILL AND DILUTION WITH CONDENSATE.
5. ELECTRIC TRACE (ET 10).

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
G	07/11/11	ISSUED FOR PHA III									
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E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

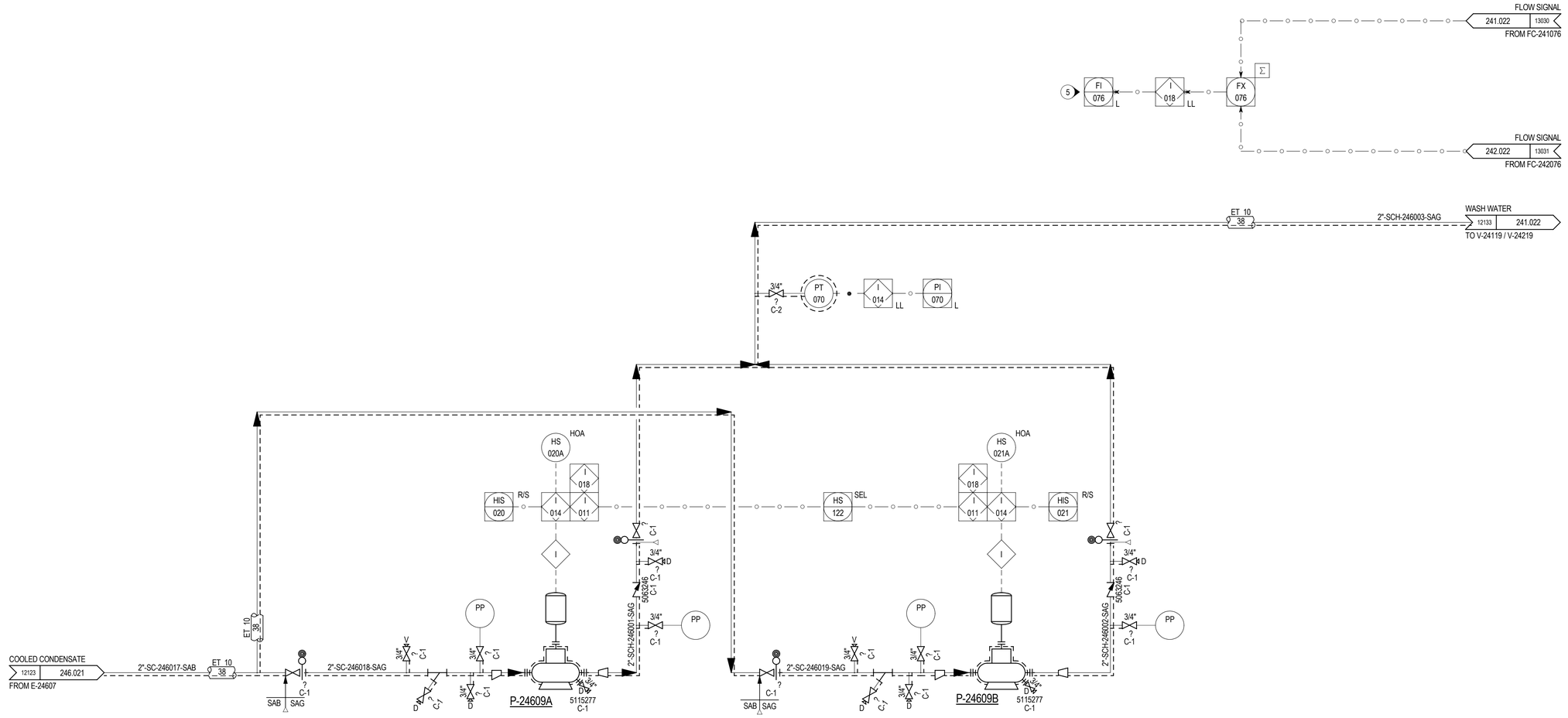
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
CONDENSATE RECOVERY PUMPS & COOLER

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.021 REV. G

246.021

FILE:\\F-\U25\DRAWINGS\CO2\246246.021.pid MODEL DATE:7/10/2011 9:38:48 PM BY:mukz2296



P-24609A/B (3)

WATER MAKE-UP PUMPS

RATED FLOW:	9.9 m^3/hr	
DIFF. PR.:	2741 kPa	
DRIVER:	7.5 kW	
	CASING	INTERNALS
MATERIAL:	CS	CS
INSULATION TYPE/THK:	/	(4)
TRIM:	SCH-246XXX-SAG	
	SCH-246XXX-SAG	

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . 2x100% PUMPS. ONE OPERATING, ONE SPARE.
4 . ELECTRIC TRACE (ET 10).
5 . TOTAL WASH WATER MAKE-UP FLOW TO V-24119 AND V-24219.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSURD FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
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SHELL CANADA

QUEST CCS PROJECT

FLUOR®

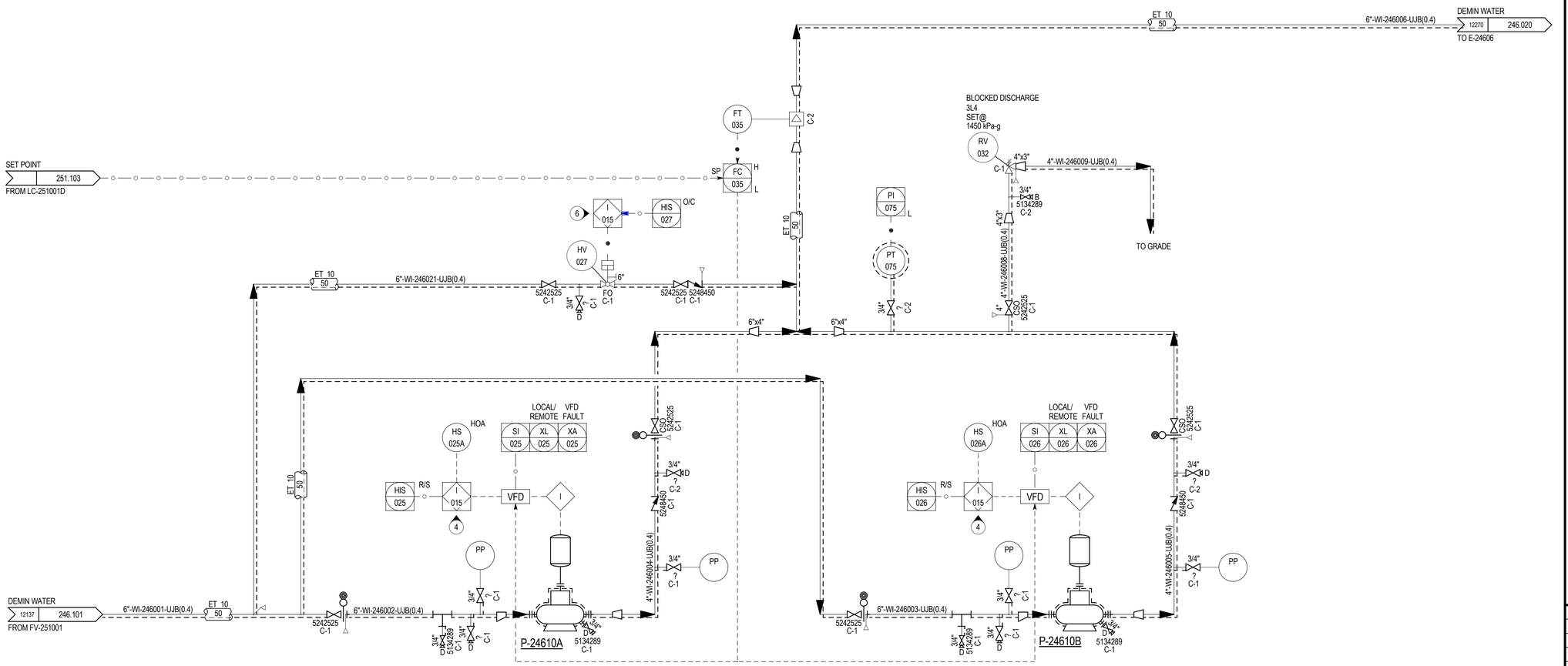
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
WASH WATER MAKE-UP PUMPS

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.022 REV. G

246.022

FILE:\\F:\1020\SIDRAWINGS\CO2246\246.022.pid MODEL DATE:7/4/2011 1:16:19 PM BY:allm14887



P-24610A/B (3)

DEMIN WATER SUPPLY PUMPS

RATED FLOW:	92.5 m*3/hr	
DIFF. PR.:	503 kPa	
DRIVER:	26.0 kW	
	CASING	INTERNALS
MATERIAL:	316 SS	316 SS
INSULATION TYPE/THK:	/	(5)
TRIM:	WI-246031-UJB(0.4)	
	WI-246032-UJB(0.4)	

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . 2x50% PUMPS FOR TOTAL DESIGN FLOW RATE OF 185 m3/h.
4 . TRIP ONE PUMP ON HIGH LEVEL(3234 mm) AND BOTH PUMPS ON HIGH HIGH LEVEL (4801 mm) IN V-25102. REFER TO P&ID 251.0000.000.041.103.
5 . ELECTRIC TRACE (ET 10).
6 . INTERLOCK I-015 TO FORCE HV-027 OPEN WHEN BOTH DEMIN WATER SUPPLY PUMPS ARE STOPPED.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

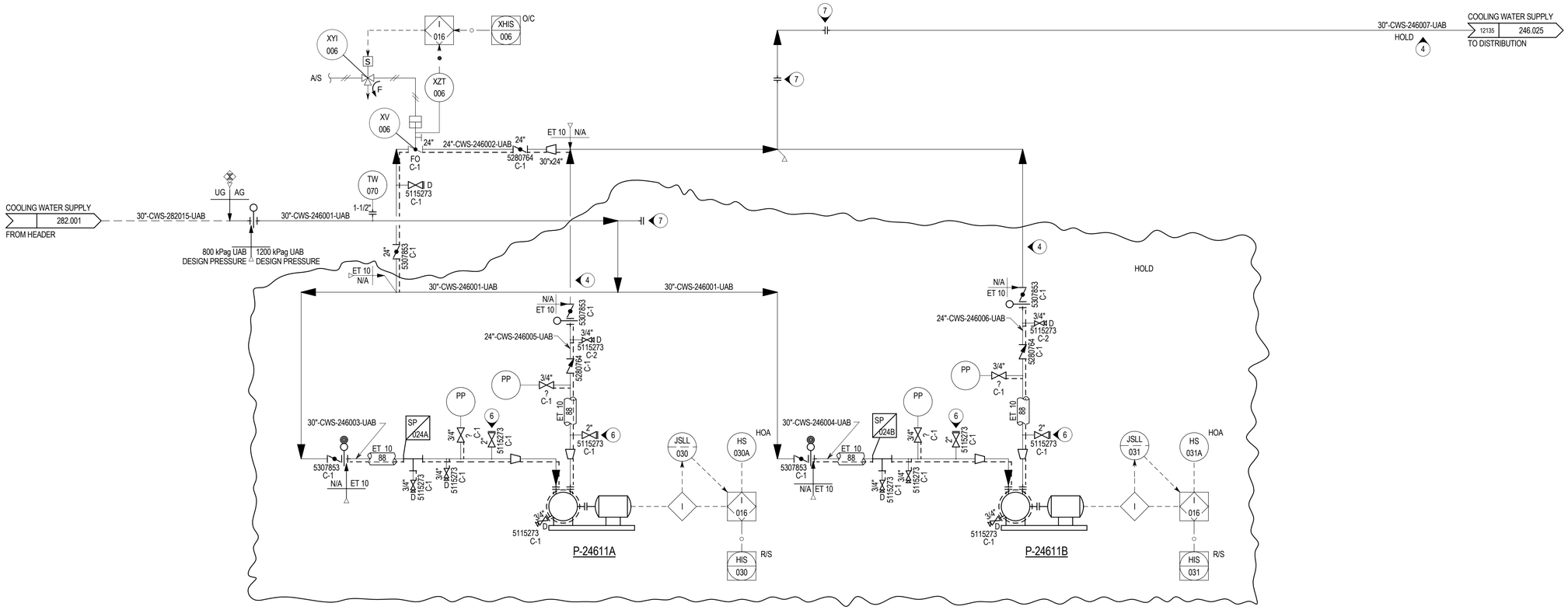
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
DEMIN WATER PUMPS

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.023 REV. G

246.023

FILE:\\F1025\DRAWINGS\CO\246\246.023.pid MODEL DATE:7/6/2011 10:42:58 PM BY:muk22296



P-24611A/B (3) HOLD

COOLING WATER BOOSTER PUMP

RATED FLOW:	3118.0 m^3/hr	
DIFF. PR.:	260 kPa	
DRIVER:	225.0 kW	
	CASING	INTERNALS
MATERIAL:	CS	CS
INSULATION TYPE/THK:	/ (5)	
TRIM:	CWS-246036-UAB	
	CWS-246037-UAB	

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.

3 . 2x50% PUMPS FOR TOTAL DESIGN FLOW RATE OF 6236 m3/h. HOLD

4 . DESIGN CONDITIONS ARE 1200 kPag @ 58 °C AND ARE SUBJECT TO CHANGE BASED ON COOLING WATER BOOSTER PUMP DATA (P-24611).

5 . ELECTRIC TRACE (ET 10) PUMPS AND INDIVIDUAL SUCTION & DISCHARGE PIPING WITHIN BLOCK VALVES.

6 . HIGH POINT VENT. HOLD

7 . PROVIDE 30NPS FLANGES TO ALLOW PROVISION OF 3RD FUTURE PUMP. HOLD

8 . IF POSSIBLE, LEAVE SPACE IN PLOT PLAN FOR FUTURE 3RD CW PUMP. HOLD

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- PUMP SIZING TO BE CONFIRMED PENDING SHELL COOLING WATER SURVEY & FINAL HEAT EXCHANGER COOLING WATER FLOWRATES.
- DESIGN CONDITIONS TO BE CONFIRMED.
- PUMP SELECTION, SIZING, TYPE, NUMBER AND LAYOUT FOR COOLING WATER PUMPS.
- TOTAL REQUIRED FLOW WILL NOT CHANGE.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

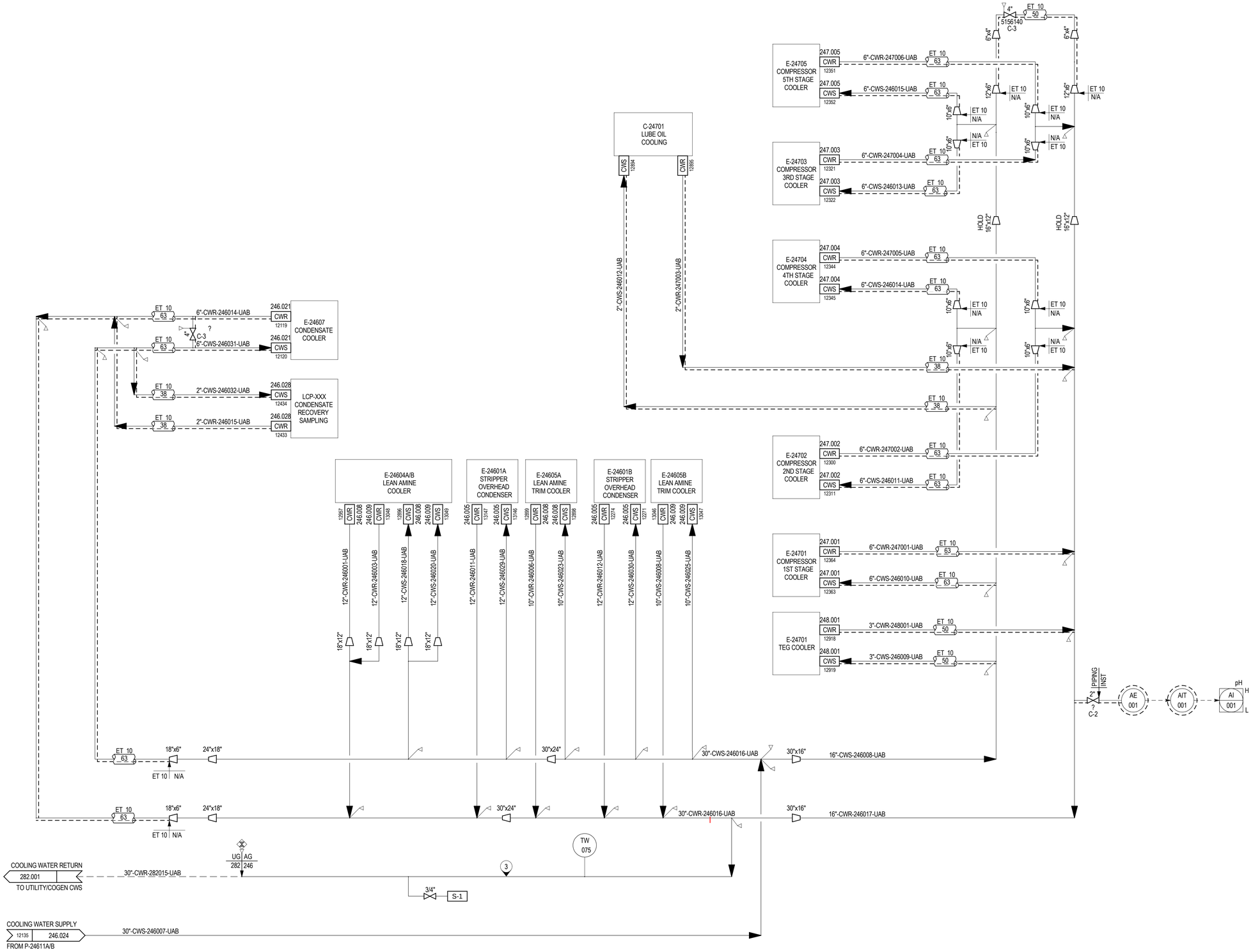
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
COOLING WATER BOOSTER PUMPS

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.024 REV. G

246.024

FILE:\\F-U1025\DRAWINGS\CO2\246\246.024.pid MODEL DATE:7/6/2011 10:49:25 PM BY:miuk22296



1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3. DESIGN CONDITIONS ARE 1200 kPa-g @ 58 °C FOR ABOVE GROUND PIPING. DESIGN CONDITIONS ARE SUBJECT TO CHANGE BASED ON COOLING WATER BOOSTER PUMP (P-24611).

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- ELECTRIC HEAT TRACING AND INSULATION REQUIREMENTS WILL BE EVALUATED BASED ON COMPRESSOR INTERSTAGE COOLER LOCATION.
- CW DESIGN CONDITIONS TO BE CONFIRMED WHEN P-24611A/B IS FINALIZED.
- CW LINE SIZES TO BE CONFIRMED WHEN EXCHANGER CW FLOWS ARE FINALIZED.

ISSUED FOR ESTIMATE

REV.	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
COOLING WATER DISTRIBUTION

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.025

REV. G

246.025

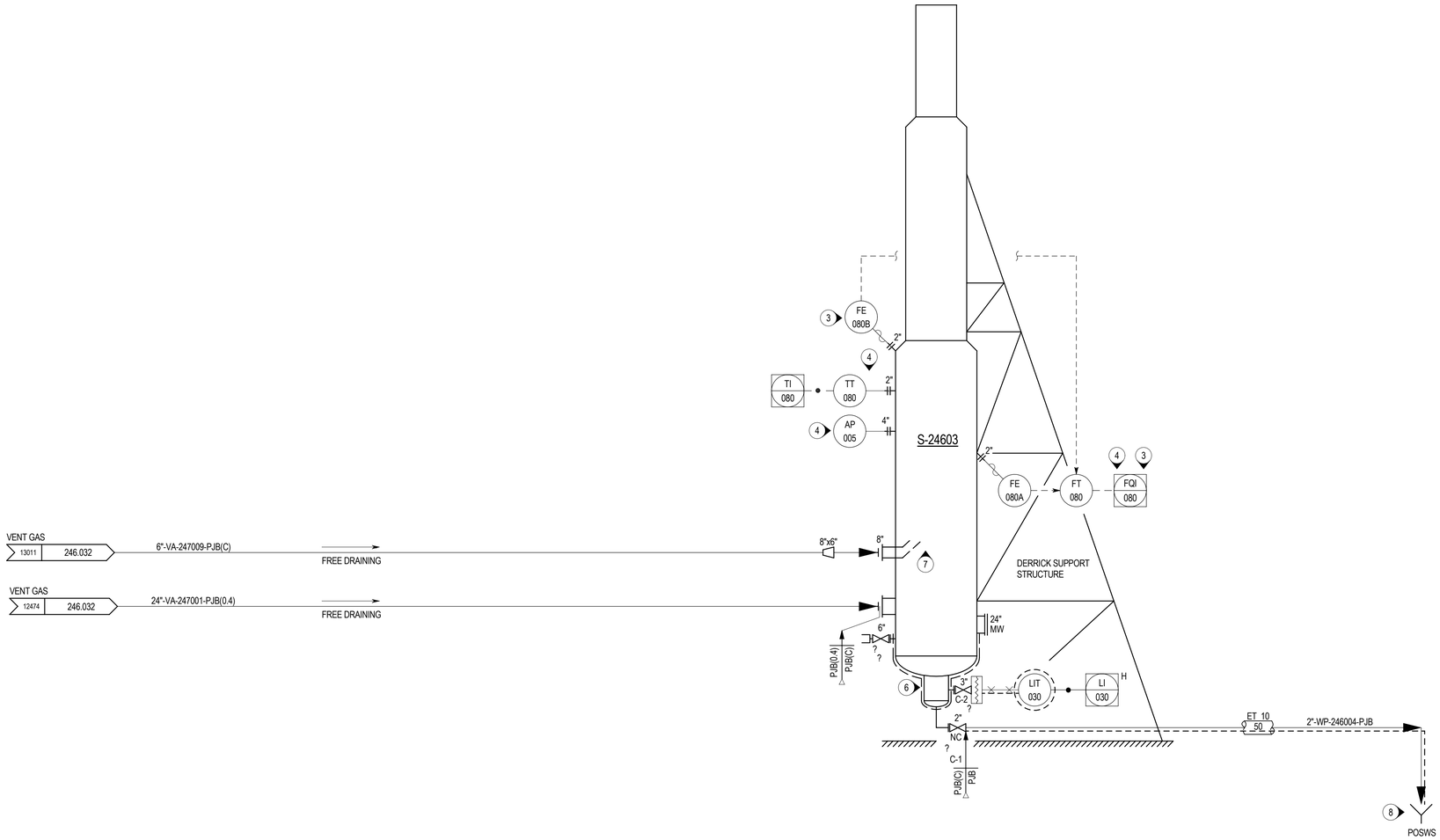
FILE:\\F:\1025\DRAWINGS\CO\246\246.025.pid, MODEL DATE:7/6/2011 11:03:09 PM, BY:muk22296

S-24603

CO2 VENT STACK

SIZE: TIP- 500 mm DIA x 2440 mm H
RISER- 600 mm DIA x 3000 mm H
BASE- 900 mm DIA x 13830 mm H
BOOT- 250 mm DIA x 500 mm H

DESIGN: 100°C/50 kPag
MATERIAL: VENT- 304 SS
DERRICK- CS
INSULATION/THK: 6
MDMT: -80°C
TRIM: VA-246030-PJB(C)



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . VENT STOCK FLOW MEASUREMENT REQUIRED TO EVALUATE UNIT CAPACITY DURING INITIAL START-UP, AS PROPOSED TO THE GOVERMENT OF ALBERTA. TO BE LOCATED NEAR GRADE.
4 . COSTING BASED ON FLOW MEASUREMENT REQUIRED FOR REGULATORY (CEMS).
5 . INSULATION AND EHT TO HLL.
6 . INSULATION AND EHT (ET10) TO 1000mm ABOVE BOTTOM TAN LINE OF 900 mm DIA VENT BASE.
7 . INTERNAL 12 MPS PROJECTION WITH 45° LR ELBOW. PROVIDE 13 mm WEEP HOLE AT LOW POINT MINIMUM DISTANCE TO NOZZLE.
8 . ROUTE DRAIN LINE TO NEAREST POSWS MANHOLE.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- PRELIMINARY DESIGN IS FOR VENT AT HIGH POINT STRUCTURE.
- VENT SIZE LINE REQUIREMENTS FROM PIPELINE.
- VENT STACK DISPERSION MODELLING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

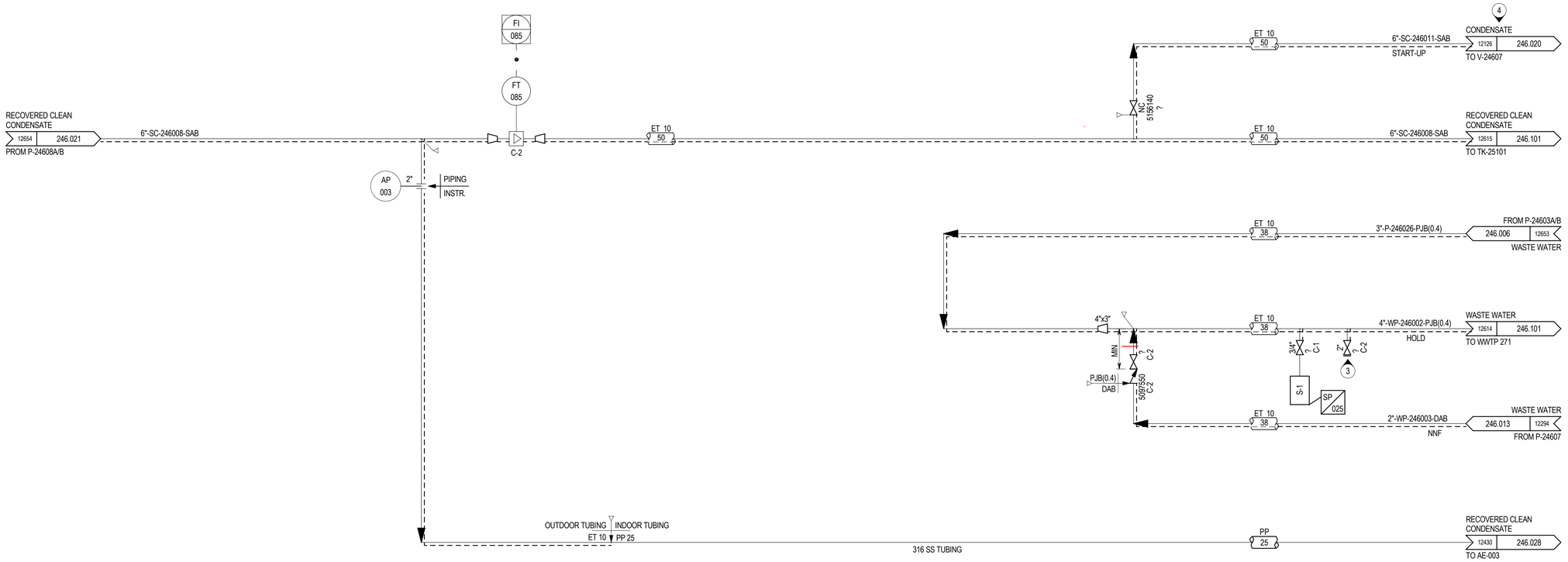
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
CO2 VENT STACK

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.026 REV. G

246.026

FILE:\\F:\1025\DRAWINGS\CO2\246\246.026.pid MODEL DATE:7/6/2011 11:09:45 PM BY:miuk22296



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.

3 . CONNECTION FOR UTILITY WATER TO QUENCH POC IF REQUIRED BY WWTU.

4 . START-UP PIPING REQUIRED FOR INITIAL AMINE FILL AND DILUTION WITH CONDENSATE.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
RECOVERED CLEAN CONDENSATE & WW COLLECTION

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.027 REV. G

246.027

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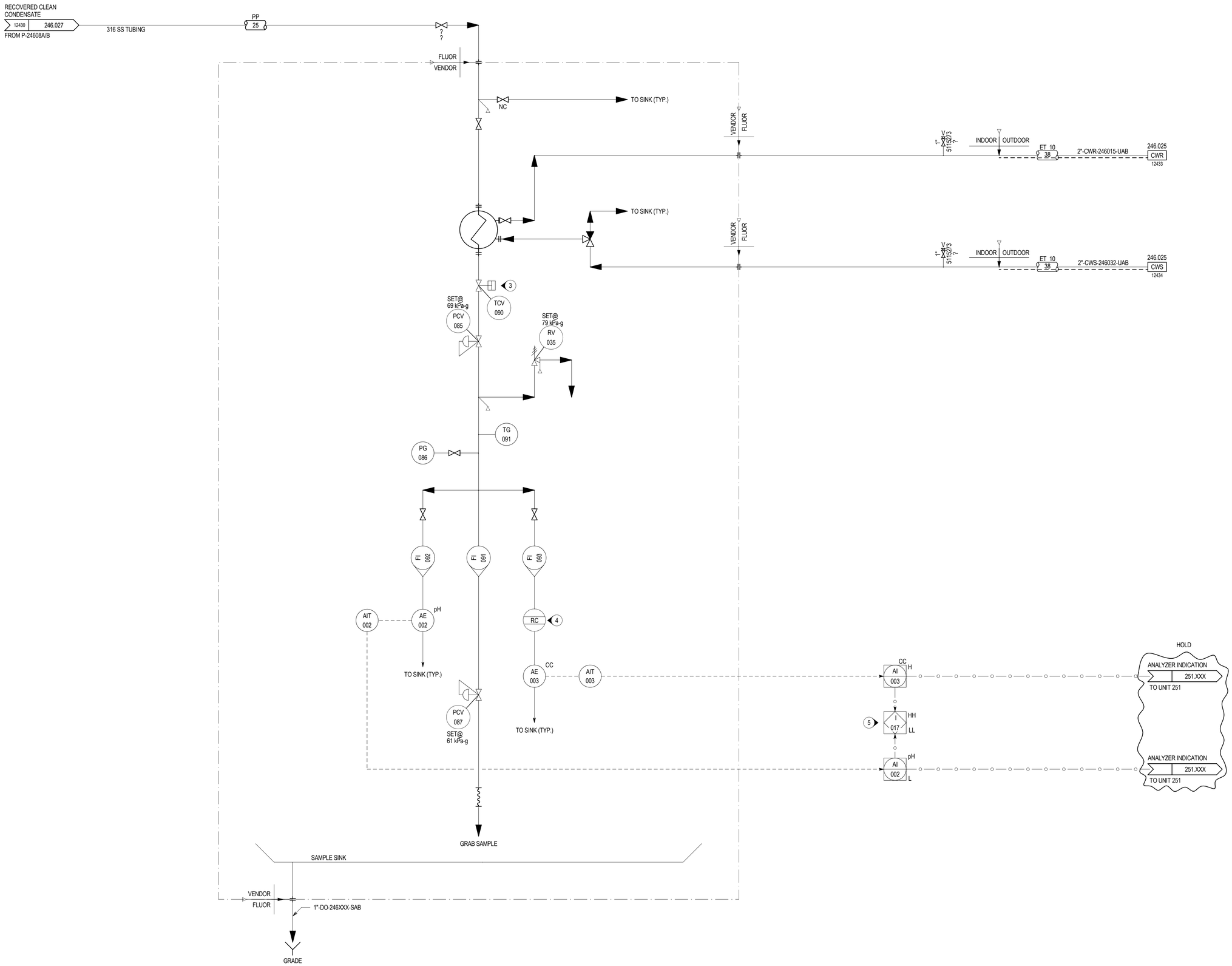

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED

3 . SELF CONTAINED MECHANICAL THERMAL SHUT OFF VALVE.

4 . RC — INSTRUMENT SYMBOL DENOTES REAGENT ADDITION AND CONDITIONING.

5 . FOR CONTAMINATED CONDENSATE SWITCHING VALVES. REFER TO DRAWING 251.0000.000.041.XXX.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- VENDOR PACKAGE DETAILS TO BE CONFIRMED.
- ANALYZER INDICATION DESTINATION DRAWING NUMBERS TO BE CONFIRMED.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
CONDENSATE RECOVERY SAMPLING SYSTEM,LCP-XXX

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.028 REV. G

246.028
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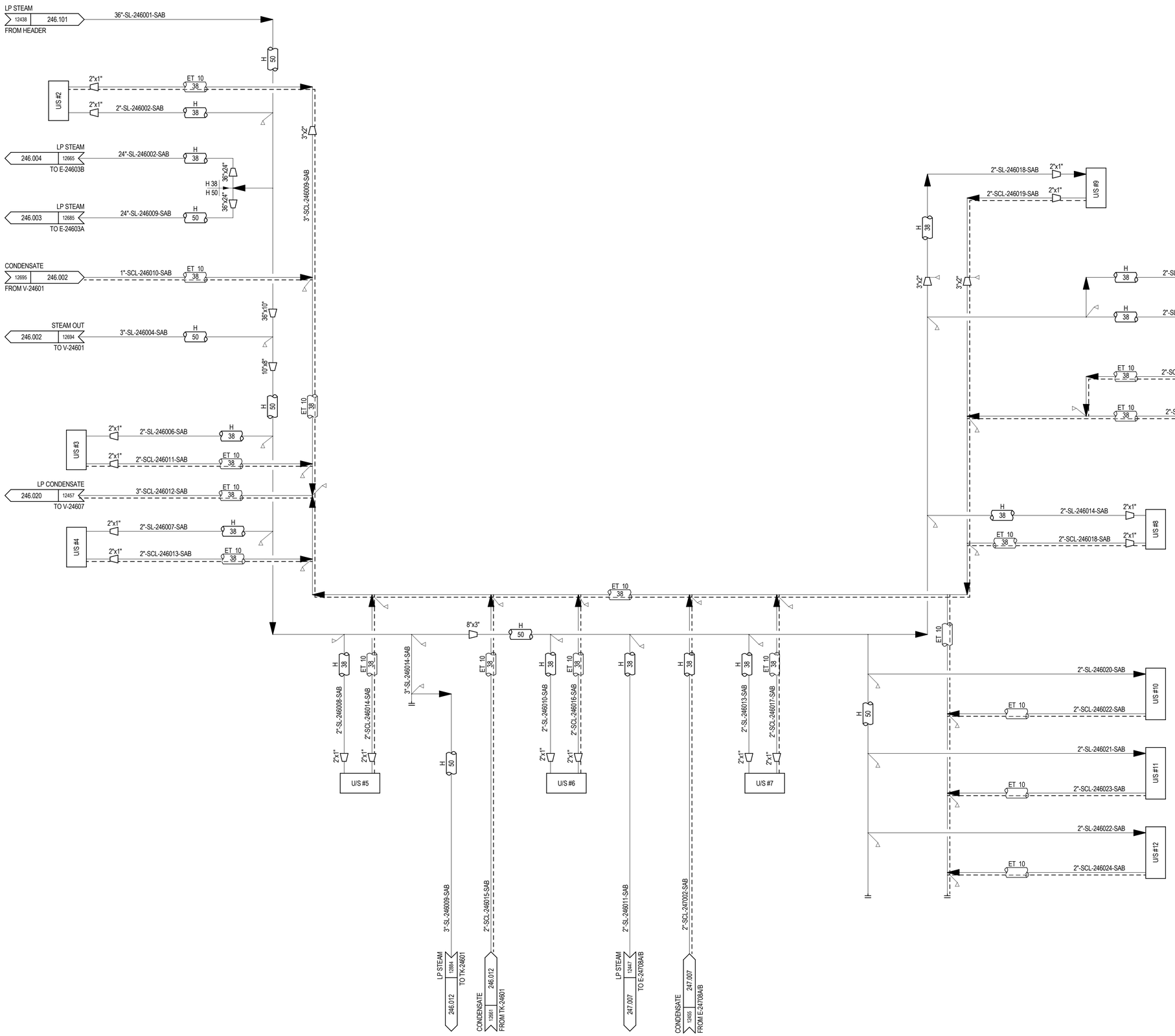


1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.

3 . DEP 31.38.01.11 PIPING DESIGN GENERAL REQUIREMENTS SECTION 5.8 AND FIGURE 18-2 TO 18-5 FOR UTILITY STATION DETAILS.

4 . PIPING HEADER BRANCH CONNECTIONS SHALL BE MADE ON TOP OF PIPE AND BE VALVED.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

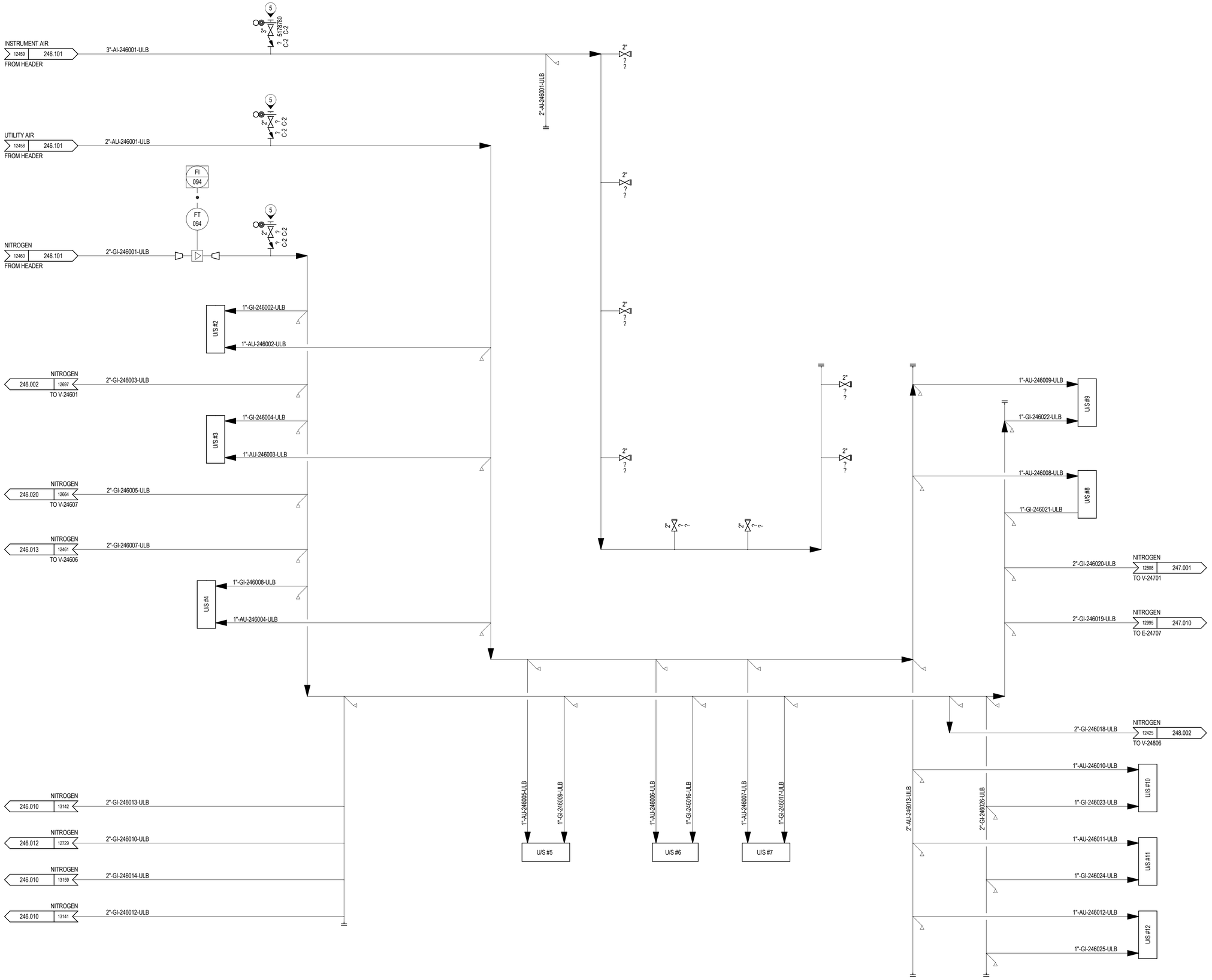
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
LP STEAM DISTRIBUTION AND COND. COLLECTION

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.029 REV. G

246.029

FILE:\\F:\1025\DRAWINGS\CC\2\246\246.029.pid MODEL DATE:7/10/2011 9:41:04 PM BY:mak22296



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY"246' UNLESS OTHERWISE STATED.
3 . DEP 31.38.01.11 PIPING DESIGN GENERAL REQUIREMENTS SECTION 5.8 AND FIGURE 18-2 TO 18-5 FOR UTILITY STATIONDETAILS.
4 . PIPING HEADER BRANCH CONNECTIONS SHALL BE MADE ON TOP OF PIPE AND BE VALVED.
5 . CONNECTION FOR TEMPORARY SUPPLY.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
INST. AIR, UTILITY AIR & NITROGEN DISTRIBUTION

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.030 REV. G

246.030

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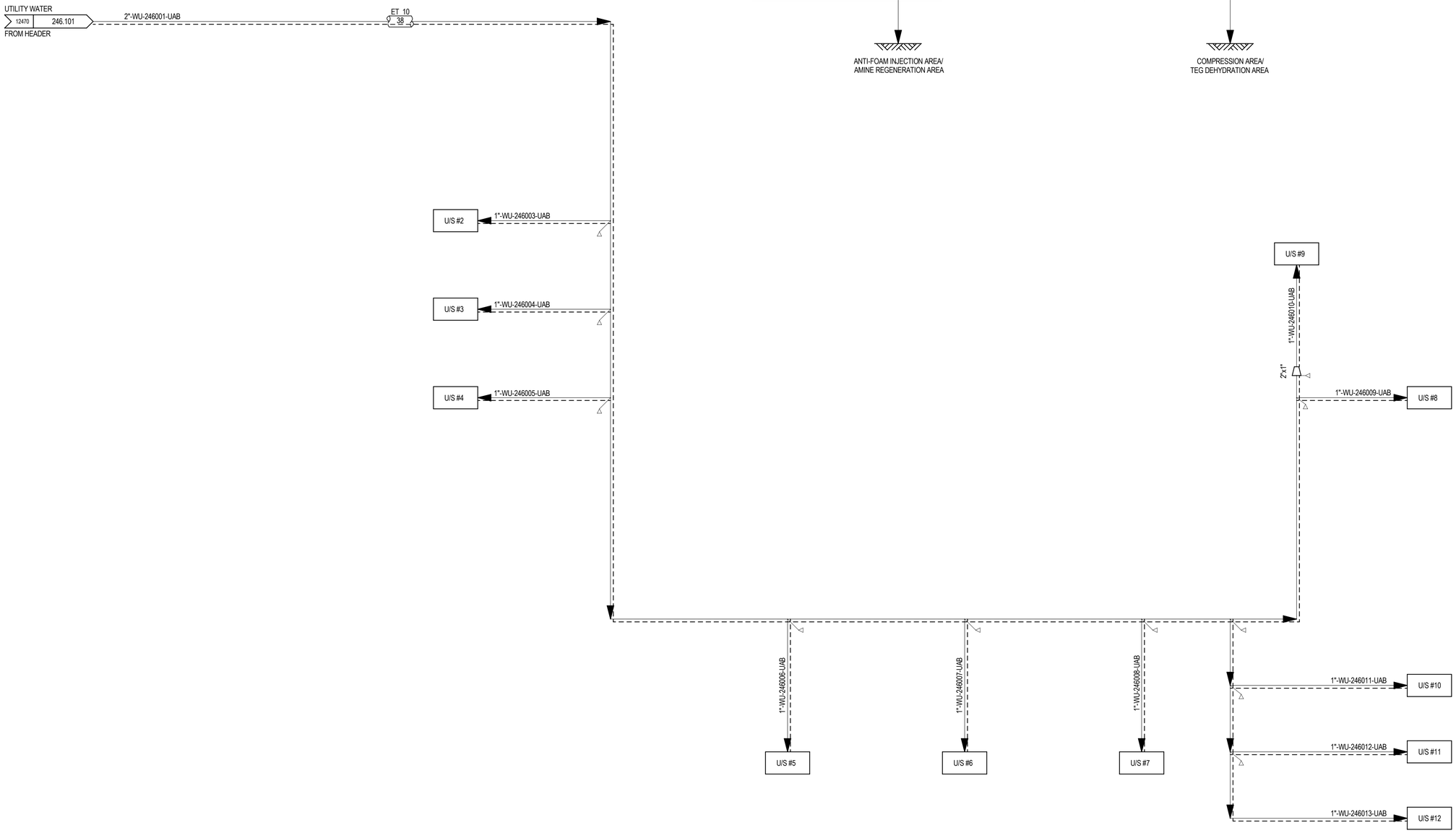
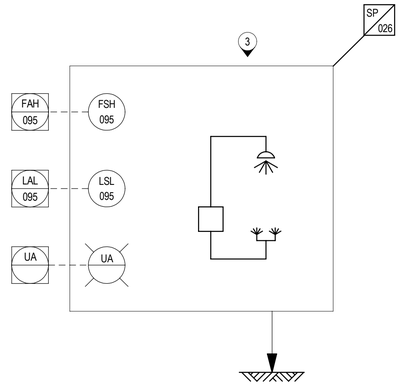
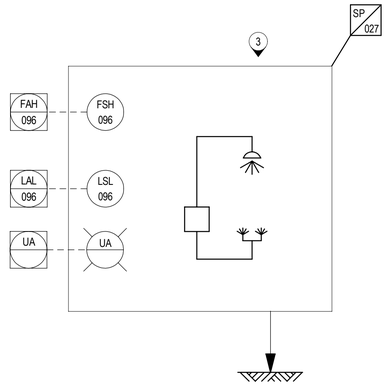






1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.
3 . STANDALONE SAFETY SHOWER WITH INTEGRAL DELUGE TANK. ALARMED FOR LOW LEVEL.
4 . DEP 31.38.01.11 PIPING DESIGN GENERAL REQUIREMENTS SECTION 5.8 AND FIGURE 18-2 TO 18-5 FOR UTILITY STATION DETAILS.
5 . PIPING HEADER BRANCH CONNECTIONS SHALL BE MADE ON TOP OF PIPE AND BE VALVED.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- SOURCE OF POTABLE WATER.
- NUMBER AND LOCATIONS OF EYEWASH STATIONS & SAFETY SHOWERS TO BE DETERMINED.

ISSUED FOR ESTIMATE

REV.	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

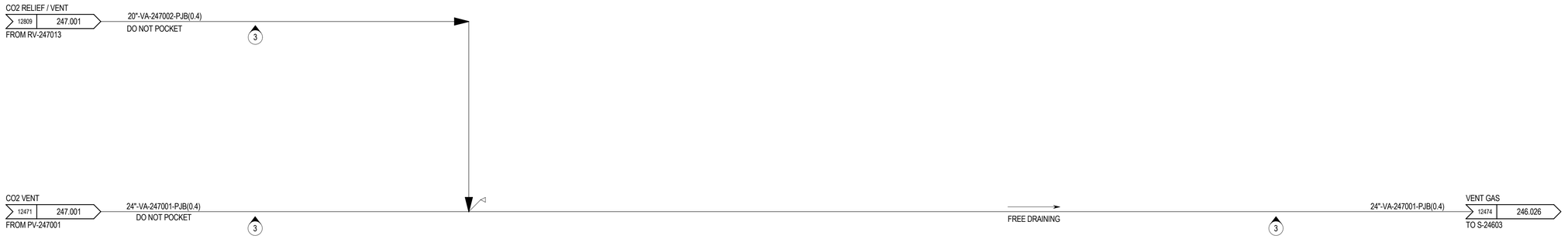
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
UTILITY WATER & SAFETY SHOWERS

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.031 REV. G

246.031

FILE:\\F1025\DRAWINGS\CO2\246\246.031.pid MODEL DATE:7/7/2011 12:51:28 AM BY:mak22296



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED.

3 . LOW POINTS + DRAINS REQUIRE EHT AND INSULATION.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

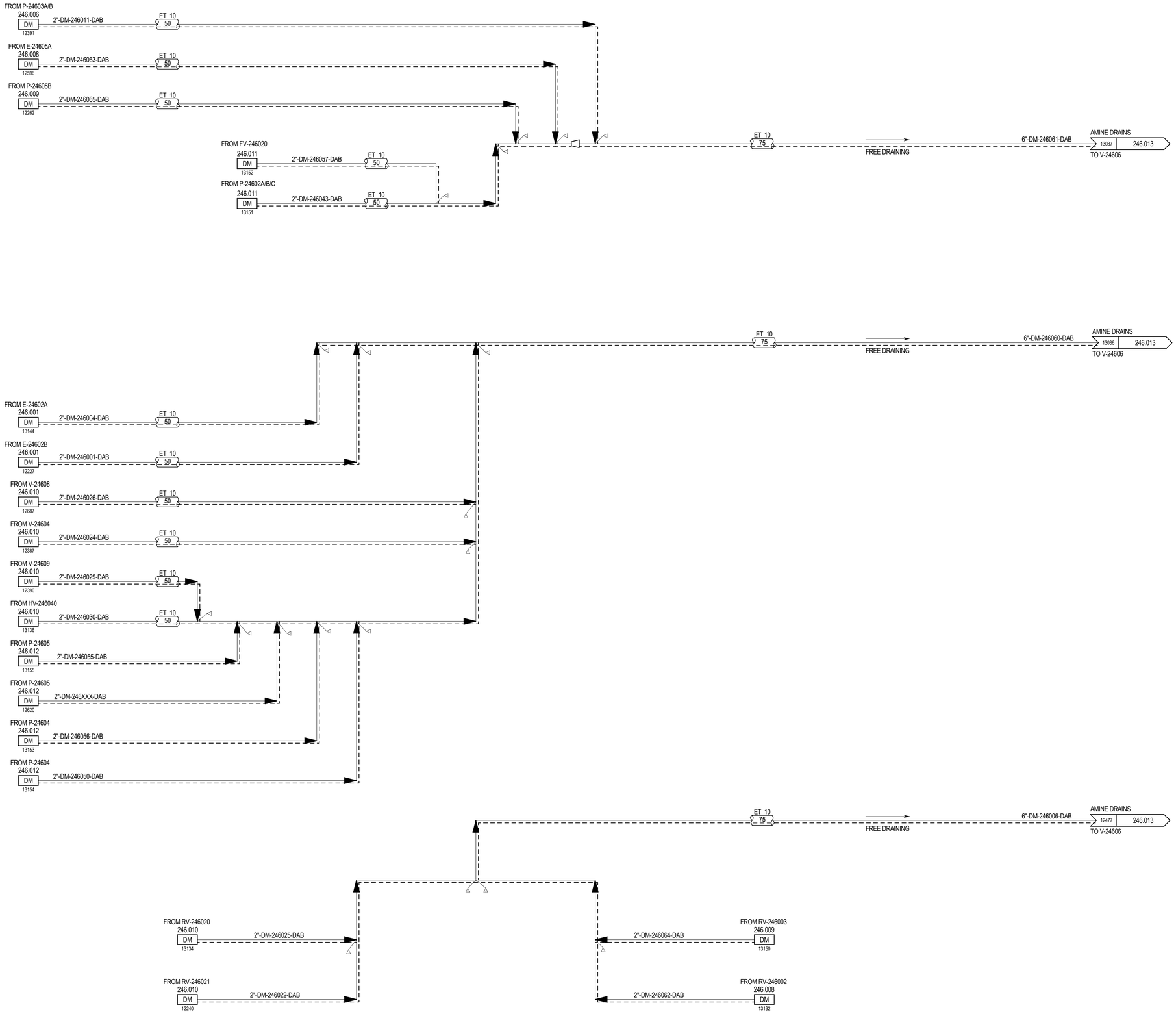
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
VENT GAS COLLECTION

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.032 REV. G

246.032

FILE:\\F1025\DRAWINGS\CO2\246\246.032.pid MODEL DATE:7/4/2011 5:33:19 PM BY:ahm14887



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE STATED

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
AMINE DRAIN SYSTEM

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.033 REV. G

246.033

FILE:\\F-\1025\DRAWINGS\CO\2246246.033.pid MODEL DATE:7/7/2011 4:25:02 PM BY:alim14887

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

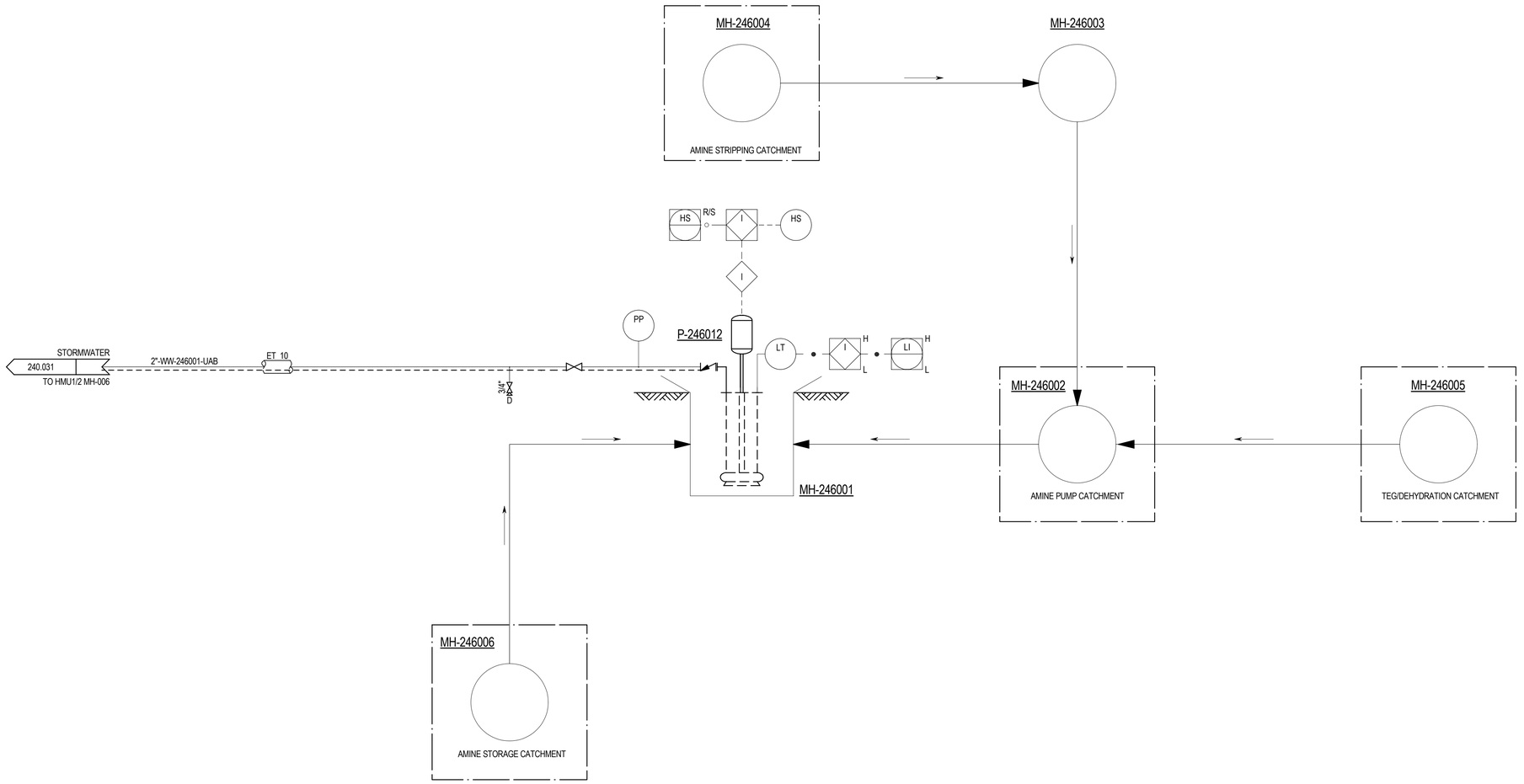
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
FLUSHING CONDENSATE

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.034 REV. G

246.034

FILE:\\F-1025\DRAWINGS\CO2\246\246-034.pid MODEL DATE:7/4/2011 1:27:35 PM BY:ahm14887



P-246012
STORM WATER PUMP

RATED FLOW:	10.00 m^3/hr
DIFF. PR.:	112.00 kPa
DRIVER:	0.30 kW @
INSULATION TYPE/THK:	/
HEAT TRACE MEDIA/TEMP:	2.
	CASING INTERNALS
MATERIAL:	
TRIM:	

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ELECTRIC TRACE 10°C.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
G	07/11/11	ISSUED FOR PHA III									

SHELL CANADA
QUEST CCS PROJECT

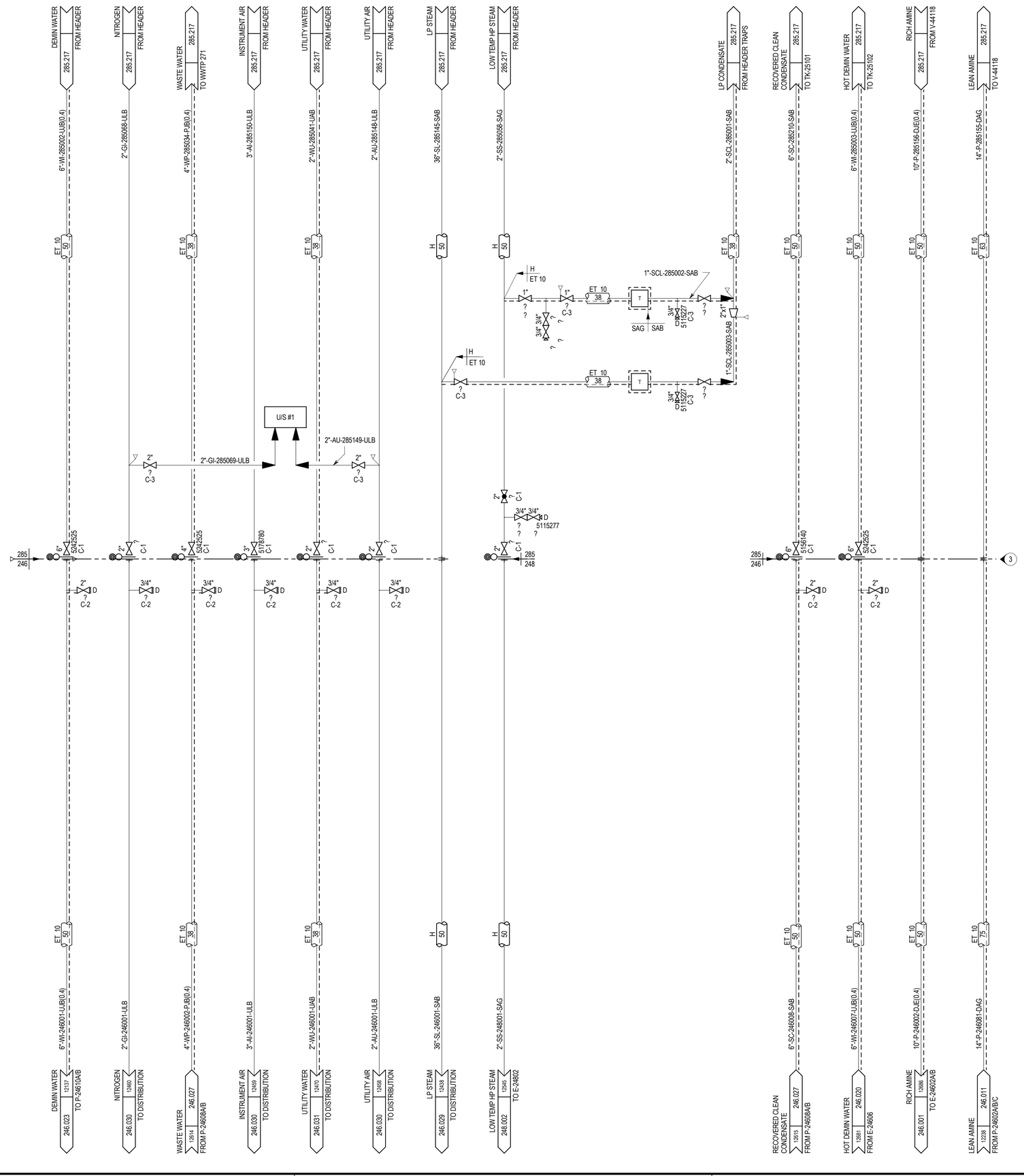
FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
STORMWATER DRAINAGE & POTENTIALLY OILY SWS

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.035 REV. G

246.035
FILE:\\F:\1025\DRAWINGS\CC0246\246.035.pid MODEL DATE:7/10/2011 9:57:36 PM BY:muk22296



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "246" UNLESS OTHERWISE NOTED.

3 . BATTERY LIMIT ACCESS IS ON NORTH SIDE OF 9TH AVE, ACROSS THE ROAD FROM UNIT 246. ALL LINES ARE DEDICATED TO SERVICING UNIT 246.

HOLDS:

- VENT LINE SIZING FROM PIPELINE.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

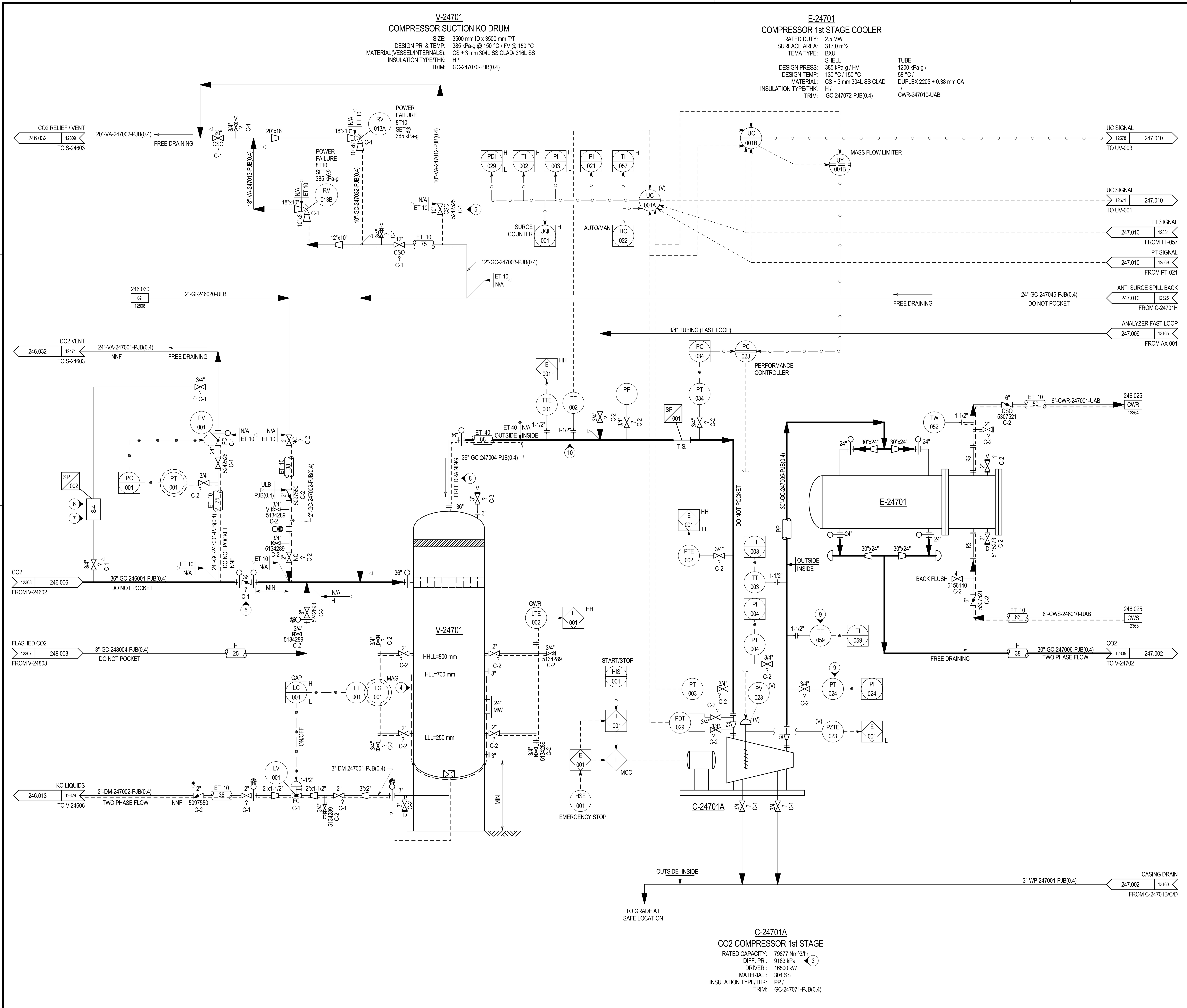
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 246 - REGENERATION/COMMON
NORTH BATTERY LIMITS

SCALE: NONE

SHELL DWG NO.: 246.0000.000.041.101 REV. G

246.101

FILE:\\F-1022\SDRAWINGS\CO2\246\246.101.pid MODEL DATE:7/7/2011 11:16:46 AM BY:alhm14807


V-24701
COMPRESSOR SUCTION KO DRUM
SIZE: 3500 mm ID x 3500 mm T/T
DESIGN PR. & TEMP: 385 kPa-g @ 150 °C / FV @ 150 °C
MATERIAL(VESSEL/INTERNALS): CS + 3 mm 304L SS CLAD/ 316L SS
INSULATION TYPE/THK: H /
TRIM: GC-247070-PJB(0.4)
E-24701
COMPRESSOR 1st STAGE COOLER
RATED DUTY: 2.5 MW
SURFACE AREA: 317.0 m^2
TEMA TYPE: BXU
SHELL / TUBE
DESIGN PRESS: 385 kPa-g / HV / 1200 kPa-g /
DESIGN TEMP: 130 °C / 150 °C / 58 °C /
MATERIAL: CS + 3 mm 304L SS CLAD / DUPLEX 2205 + 0.38 mm CA
INSULATION TYPE/THK: H /
TRIM: GC-247072-PJB(0.4) / CWR-247010-UAB
CO2 RELIEF / VENT
246.032 12809
TO S-24603
20"-VA-247002-PJB(0.4)
FREE DRAINING
CO2 VENT
246.032 12471
TO S-24603
24"-VA-247001-PJB(0.4)
NNF
246.030 GI 12808
2"-GI-246020-ULB
CO2 12368 246.006 FROM V-24602
36"-GC-246001-PJB(0.4)
DO NOT POCKET
FLASHED CO2 12367 248.003 FROM V-24803
3"-GC-248004-PJB(0.4)
KO LIQUIDS 246.013 12626 TO V-24606
2"-DM-247002-PJB(0.4)
TWO PHASE FLOW
3"-DM-247001-PJB(0.4)
POWER FAILURE 8T10 SET@ 385 kPa-g
RV 013A
RV 013B
12"-GC-247003-PJB(0.4)
36"-GC-247004-PJB(0.4)
18"-VA-247013-PJB(0.4)
10"-GC-247032-PJB(0.4)
10"-VA-247012-PJB(0.4)
24"-GC-247002-PJB(0.4)
24"-GC-247001-PJB(0.4)
PDI 029
TI 002
PI 003
PI 021
TI 057
UC 001A
UC 001B
UY 001B
MASS FLOW LIMITER
SURGE COUNTER
UQI 001
AUTO/MAN
HC 022
UC SIGNAL 12578 247.010 TO UV-003
UC SIGNAL 12571 247.010 TO UV-001
TT SIGNAL 247.010 12331 FROM TT-057
PT SIGNAL 247.010 12569 FROM PT-021
ANTI SURGE SPILL BACK 247.010 12326 FROM C-24701H
24"-GC-247045-PJB(0.4)
DO NOT POCKET
ANALYZER FAST LOOP 247.009 13165 FROM AX-001
3/4" TUBING (FAST LOOP)
PC 034
PC 023
PERFORMANCE CONTROLLER
PT 034
V-24701
HHLL=800 mm
HLL=700 mm
LLL=250 mm
LC 001
LT 001
LG 001
LV 001
PV 001
PC 001
PT 001
SP 002
S-4
E-24701
TW 052
BACK FLUSH
246.025 CWR 12364
6"-CWR-247001-UAB
246.025 CWS 12363
6"-CWS-246010-UAB
30"-GC-247005-PJB(0.4)
30"-GC-247006-PJB(0.4)
TWO PHASE FLOW
CO2 12305 247.002 TO V-24702
START/STOP
HIS 001
HSE 001
EMERGENCY STOP
MCC
C-24701A
PT 003
PDT 029
PV 023
PZTE 023
PT 024
PI 024
TT 059
TI 059
PTE 002
TT 003
TI 003
PI 004
PT 004
TTE 001
TT 002
CASING DRAIN 247.002 13160 FROM C-24701B/C/D
3"-WP-247001-PJB(0.4)
TO GRADE AT SAFE LOCATION
OUTSIDE | INSIDE
C-24701A
CO2 COMPRESSOR 1st STAGE
RATED CAPACITY: 79877 Nm^3/hr
DIFF. PR.: 9163 kPa
DRIVER: 16500 kW
MATERIAL: 304 SS
INSULATION TYPE/THK: PP /
TRIM: GC-247071-PJB(0.4)

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3. DRIVER POWER AND DIFFERENTIAL PRESSURE DEPICTED ARE THE TOTAL FOR THE COMPRESSOR.
4. ELECTRIC TRACE TO HLL (ET 10).
5. VALVE TO BE LOCATED AT SAFE ACCESSIBLE LOCATION.
6. SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
7. FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.
8. MAXIMIZE LENGTH OF PIPING THAT FREE DRAINS TO KO DRUM.
9. THE ADDITION AL INSTRUMENTS ARE REQUIRED FOR ON-SITE COMPRESSOR PERFORMANCE TESTING (PTC-10).
10. GTAW ROOT PASS WELD IS MANDATORY ON THIS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- THE NEED TO TRIP THE COMPRESSOR ON EXCESSIVE SURGE CYCLE WILL BE DETERMINED IN DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 COMPRESSOR 1ST STAGE

SCALE: NONE

SHELL DWG NO.: 247.0000.000.041.001 REV. G

FILE:\\F:\1025\DRAWINGS\CO2\247\247.001.pid MODEL DATE:7/7/2011 4:33:20 AM BY:mak22296

247.001

V-24702
COMPRESSOR 2nd STAGE KO DRUM

SIZE:	3000 mm ID x 3100 mm T/T
DESIGN PR. & TEMP:	385 kPa-g @ 115 °C / HV @ 150 °C
MATERIAL(VESSEL/INTERNALS):	CS + 3 mm 304L SS CLAD/ 316L SS
INSULATION TYPE/THK:	H /
TRIM:	GC-247073-PJB(0.4)

E-24702
COMPRESSOR 2nd STAGE COOLER

RATED DUTY:	3.1 MW	
SURFACE AREA:	507.0 m^2	
TEMA TYPE:	BJU	
	SHELL	TUBE
DESIGN PRESS:	530 kPa-g / HV	1200 kPa-g /
DESIGN TEMP:	130 °C / 150 °C	58 °C /
MATERIAL:	CS + 3 mm 304L SS CLAD	DUPLEX 2205 + 0.38 mm CA
INSULATION TYPE/THK:	PP /	/
TRIM:	GC-247075-PJB(0.4)	CWR-247011-UAB

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3. DRIVER POWER AND DIFFERENTIAL PRESSURE DEPICTED ARE THE TOTAL FOR THE COMPRESSOR.
4. ELECTRIC TRACE TO HLL (ET 10).
5. MAXIMIZE LENGTH OF PIPING THAT FREE DRAINS TO KO DRUM.
6. GTAW ROOT PASS WELD IS MANDATORY ON THIS LINE.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 COMPRESSOR 2ND STAGE

SCALE: NONE

SHELL DWG NO.: 247.0000.000.041.002 REV. G

247.002

FILE:\\F:\1025\DRAWINGS\CO2\247\247.002.pid MODEL DATE:7/7/2011 3:55:35 AM BY:mak22296

C-24701B
CO2 COMPRESSOR 2nd STAGE

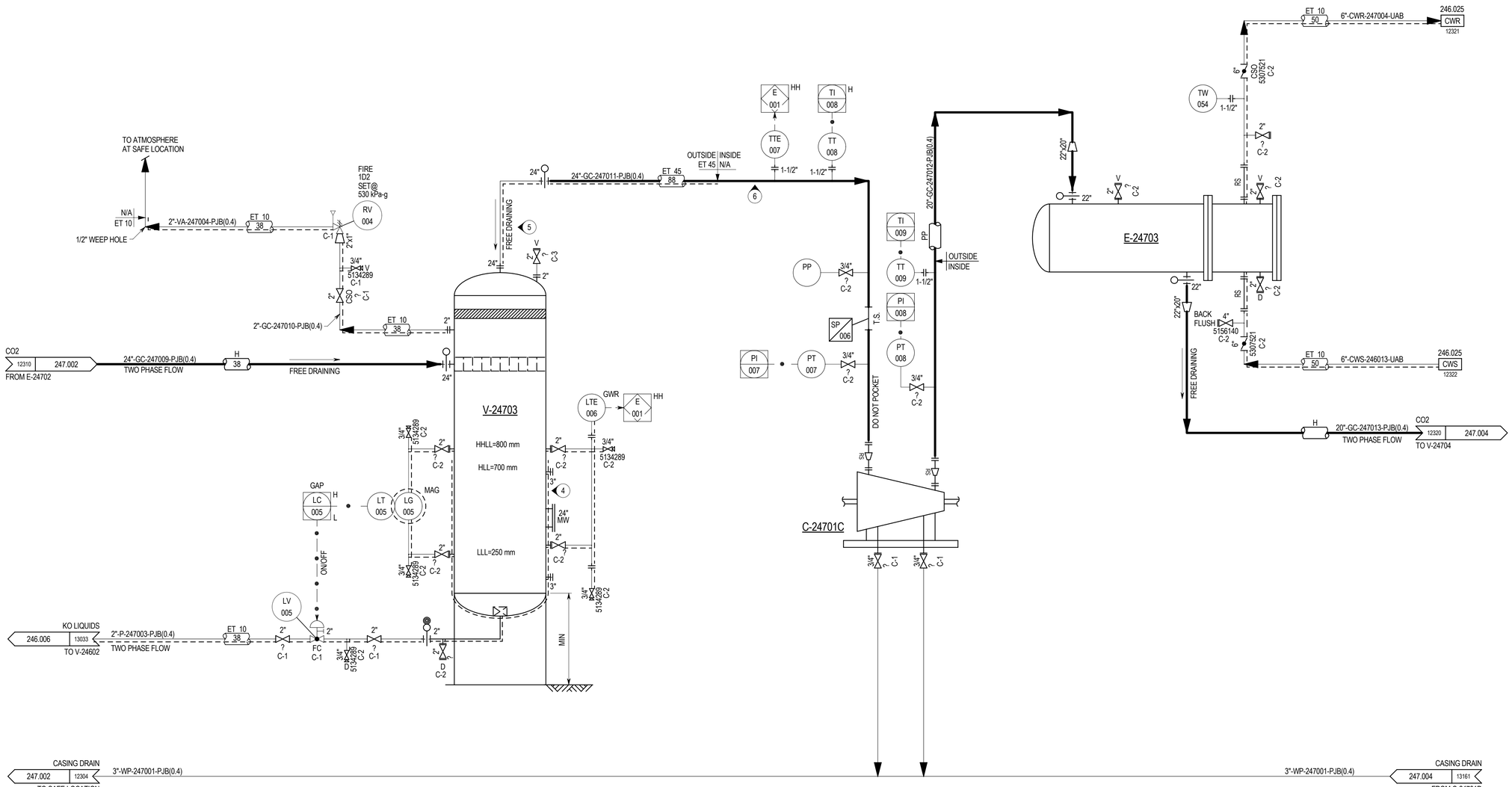
RATED CAPACITY:	79877 Nm^3/hr
DIFF. PR.:	9163 kPa
DRIVER :	16500 kW (3)
MATERIAL :	304 SS
INSULATION TYPE/THK:	PP /
TRIM:	GC-247074-PJB(0.4)

V-24703
COMPRESSOR 3rd STAGE KO DRUM

SIZE:	2600 mm ID x 2700 mm T/T
DESIGN PR. & TEMP:	530 kPa-g @ 100 °C / HV @ 150 °C
MATERIAL(VESSEL/INTERNALS):	CS + 3 mm 304L SS CLAD / 316L SS
INSULATION TYPE/THK:	H /
TRIM:	GC-247076-PJB(0.4)

E-24703
COMPRESSOR 3rd STAGE COOLER

RATED DUTY:	3.0 MW	
SURFACE AREA:	425.0 m^2	
TEMA TYPE:	BEU	
	SHELL	TUBE
DESIGN PRESS:	1200 kPa-g / HV	1200 kPa-g /
DESIGN TEMP:	130 °C / 150 °C	58 °C /
MATERIAL:	CS + 3 mm 304 L SS CLAD	DUPLEX 2205 + 0.38 mm CA
INSULATION TYPE/THK:	PP /	/
TRIM:	GC-247078-PJB(0.4)	CWR-247012-UAB



C-24701C
CO2 COMPRESSOR 3rd STAGE

RATED CAPACITY:	79877 Nm^3/hr
DIFF. PR.:	9163 kPa (3)
DRIVER :	16500 kW
MATERIAL :	304 SS
INSULATION TYPE/THK:	PP /
TRIM:	GC-247077-PJB(0.4)

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3 . DRIVER POWER AND DIFFERENTIAL PRESSURE DEPICTED ARE THE TOTAL FOR THE COMPRESSOR.
4 . ELECTRIC TRACE TO HLL (ET 10).
5 . MAXIMIZE LENGTH OF PIPING THAT FREE DRAINS TO KO DRUM.
6 . GTAW ROOT PASS WELD IS MANDATORY ON THIS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 COMPRESSOR 3RD STAGE

SCALE: NONE

SHELL DWG NO.: 247.0000.000.041.003 REV. G

247.003

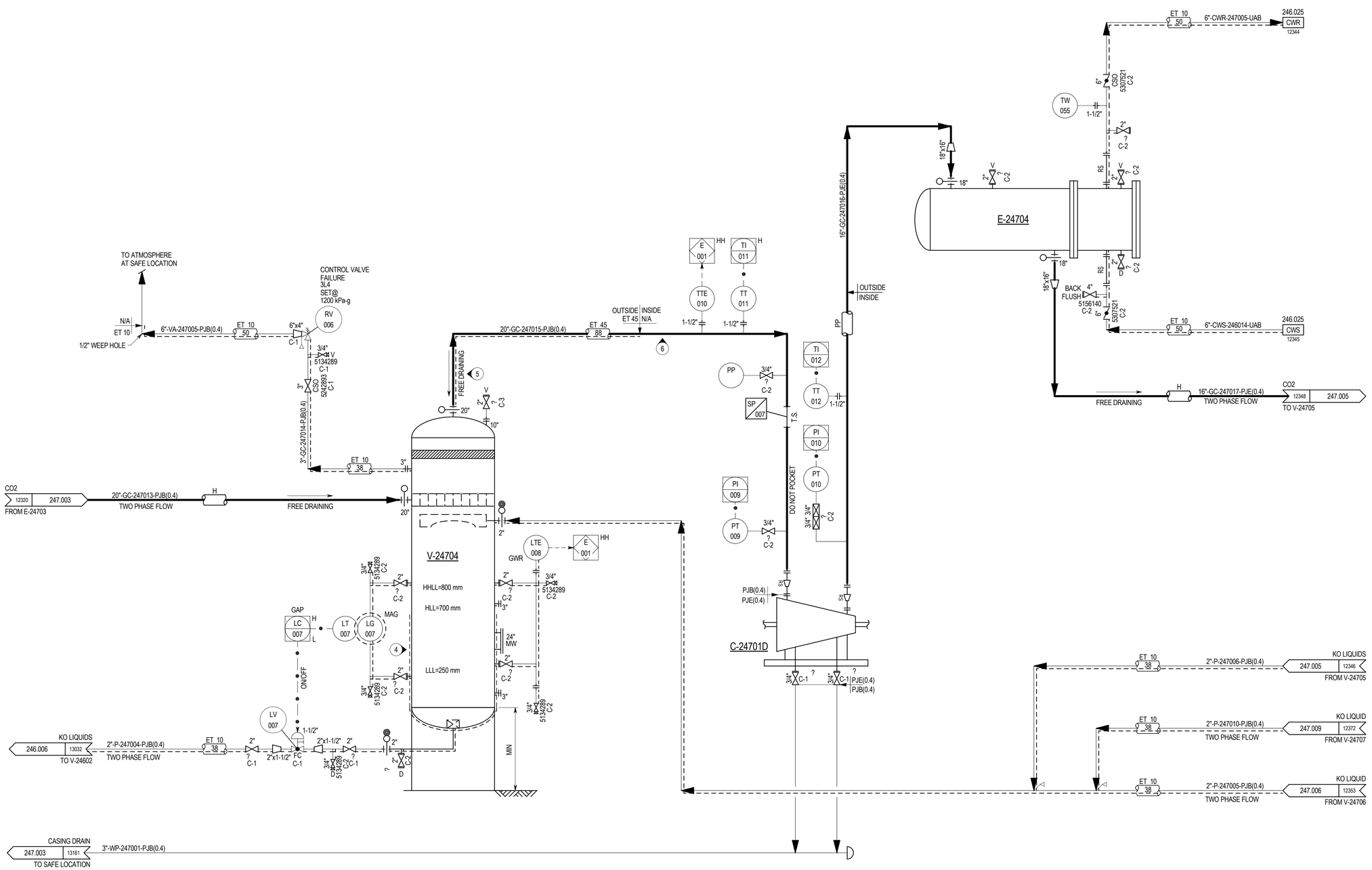
FILE:\\F:\1025\DRAWINGS\CO2\247\247.003.pid MODEL DATE:7/7/2011 3:27:13 PM BY:ahm14887

V-24704
COMPRESSOR 4th STAGE KO DRUM

SIZE:	2300 mm ID x 3400 mm T/T
DESIGN PR. & TEMP:	1200 kPa-g @ 110 °C / HV @ 150 °C
MATERIAL(VESSEL/INTERNALS):	CS + 3 mm 304L SS CLAD / 316L SS
INSULATION TYPE/THK:	H /
TRIM:	GC-247079-PJB(0.4)

E-24704
COMPRESSOR 4th STAGE COOLER

	SHELL	TUBE
RATED DUTY:	2.9 MW	
SURFACE AREA:	343.0 m^2	
TEMA TYPE:	BEU	
DESIGN PRESS:	2200 kPa-g / HV	1700 kPa-g /
DESIGN TEMP:	130 °C / 150 °C	58 °C /
MATERIAL:	CS + 3 mm 304L SS CLAD	DUPLEX 2205 + 0.38 mm CA
INSULATION TYPE/THK:	PP /	/
TRIM:	GC-247081-PJE(0.4)	CWR-247013-UAB



C-24701D
CO2 COMPRESSOR 4th STAGE

RATED CAPACITY:	79877 Nm^3/hr
DIFF. PR.:	9163 kPa (3)
DRIVER :	16500 kW
MATERIAL :	304 SS
INSULATION TYPE/THK:	PP /
TRIM:	GC-247080-PJE(0.4)

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3 . DRIVER POWER AND DIFFERENTIAL PRESSURE DEPICTED ARE THE TOTAL FOR THE COMPRESSOR.
4 . ELECTRIC TRACE TO HLL (ET 10).
5 . MAXIMIZE LENGTH OF PIPING THAT FREE DRAINS TO KO DRUM.
6 . GTAW ROOT PASS WELD IS MANDATORY ON THIS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

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PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 COMPRESSOR 4TH STAGE

SCALE: NONE

SHELL DWG NO.: 247.0000.000.041.004 REV. G

247.004

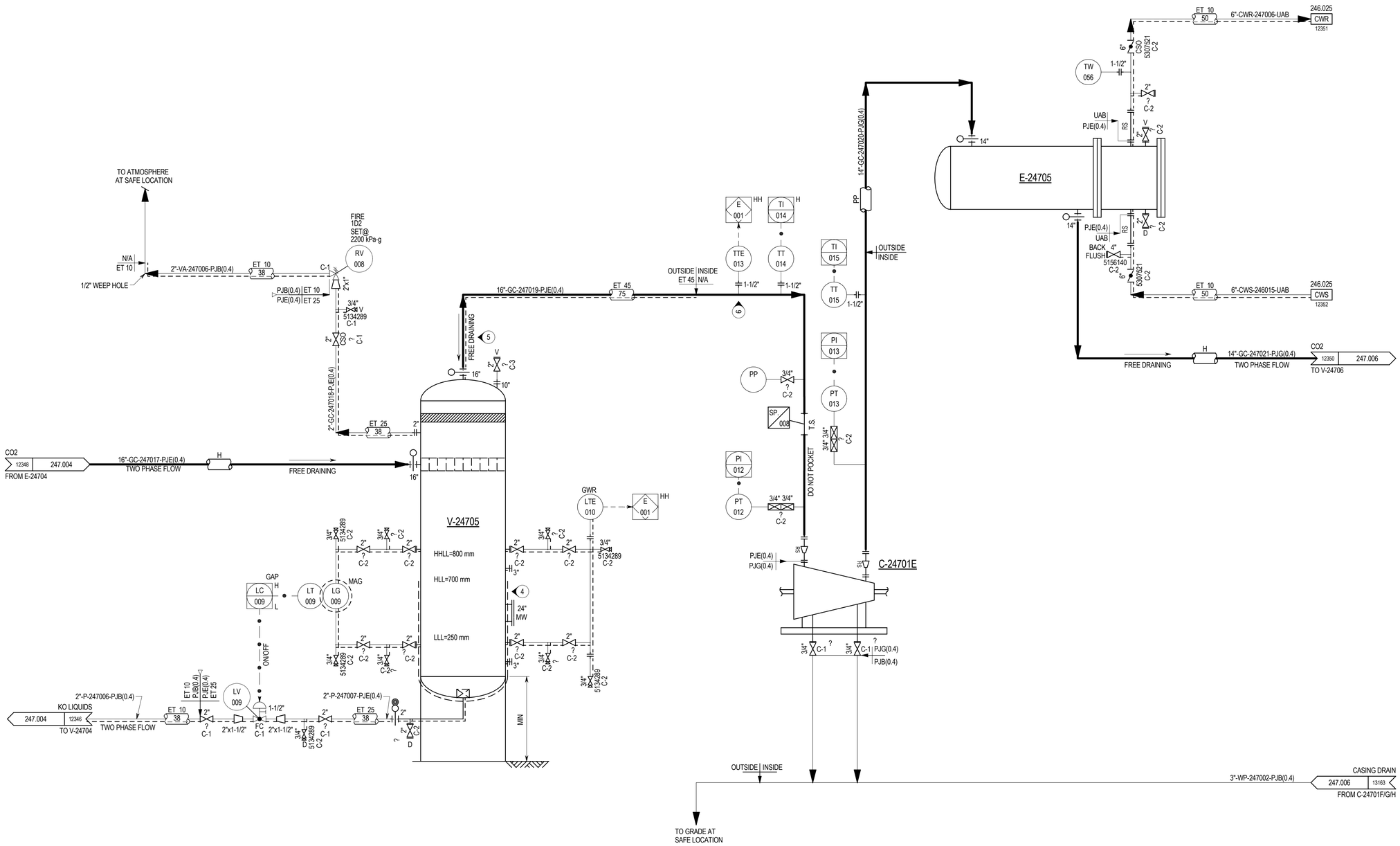
FILE:\\F:\1025\DRAWINGS\CO2\247\247.004.pid MODEL DATE:7/7/2011 3:08:44 AM BY:mak22296

V-24705
COMPRESSOR 5th STAGE KO DRUM

SIZE:	2000 mm ID x 2200 mm T/T
DESIGN PR. & TEMP:	2200 kPa-g @ 100 °C/ HV @ 150 °C
MATERIAL(VESSEL/INTERNALS):	CS + 3 mm 304L SS CLAD / 316L SS
INSULATION TYPE/THK:	H /
TRIM:	GC-247082-PJE(0.4)

E-24705
COMPRESSOR 5th STAGE COOLER

RATED DUTY:	3.0 MW	
SURFACE AREA:	281.0 m^2	
TEMA TYPE:	BEU	
	SHELL	TUBE
DESIGN PRESS:	4200 kPa-g / HV	3300 kPa-g /
DESIGN TEMP:	130 °C / 150 °C	58 °C /
MATERIAL:	CS + 3 mm 304L SS CLAD	DUPLEX 2205 + 0.38 mm CA
INSULATION TYPE/THK:	PP /	/
TRIM:	GC-247084-PJG(0.4)	CWR-247014-PJE(0.4)



C-24701E
CO2 COMPRESSOR 5th STAGE

RATED CAPACITY:	79877 Nm^3/hr
DIFF. PR.:	9163 kPa (3)
DRIVER :	16500 kW
MATERIAL :	304 SS
INSULATION TYPE/THK:	PP /
TRIM:	GC-247083-PJG(0.4)

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3 . DRIVER POWER AND DIFFERENTIAL PRESSURE DEPICTED ARE THE TOTAL FOR THE COMPRESSOR.
4 . ELECTRIC TRACE TO HLL (ET 25).
5 . MAXIMIZE LENGH OF PIPING THAT FREE DRAINS TO KO DRUM.
6 . GTAW ROOT PASS WELD IS MANDATORY ON THIS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

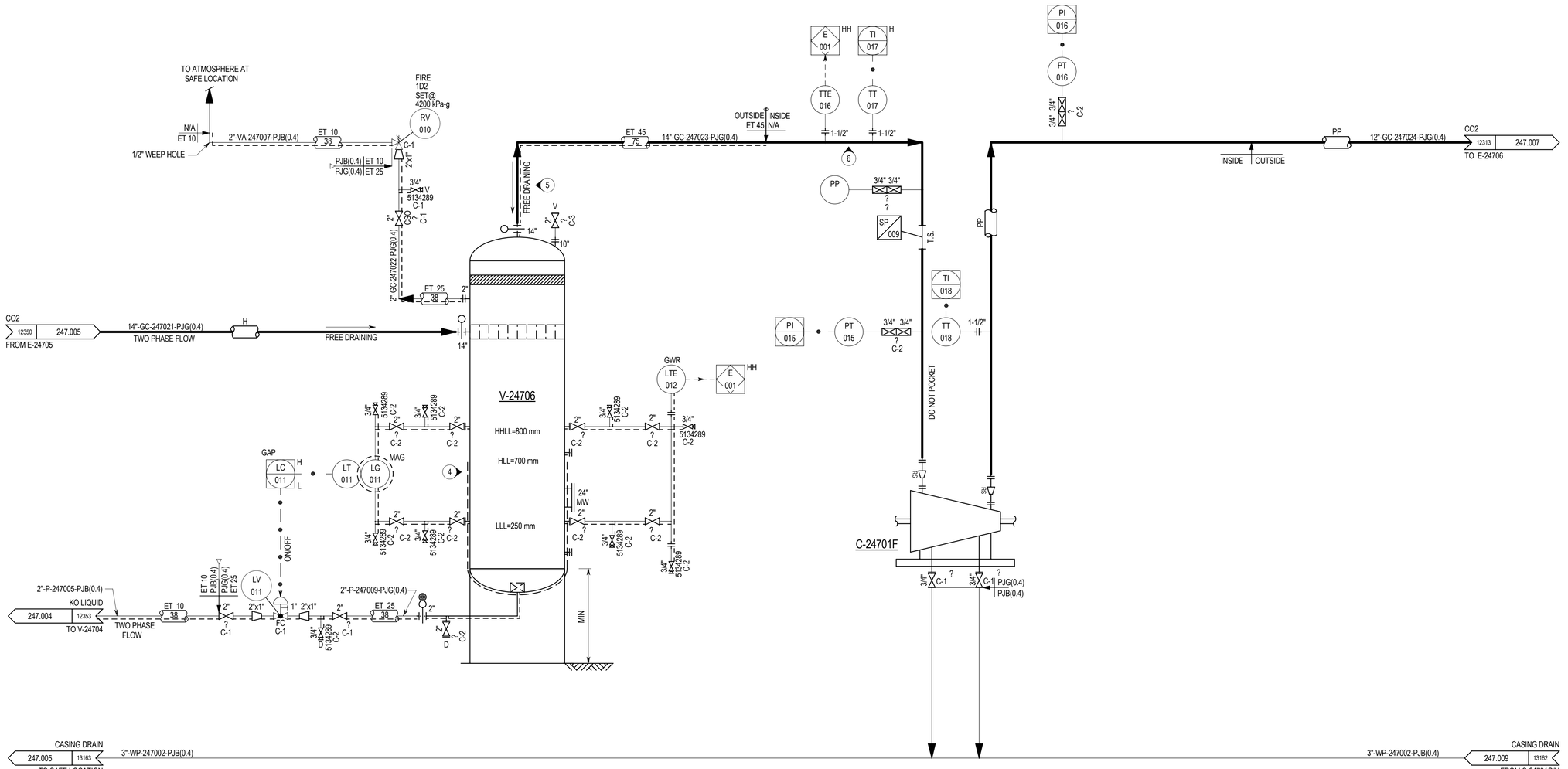
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 COMPRESSOR 5TH STAGE

SCALE: NONE

SHELL DWG NO.: 247.0000.000.041.005 REV. G

247.005

FILE:\\F-\1025\DRAWINGS\CO2\247\247.005.pid MODEL DATE:7/7/2011 2:39:48 AM BY:mak222296



C-24701F
CO2 COMPRESSOR 6th STAGE

RATED CAPACITY: 79877 Nm^3/hr
DIFF. PR.: 9163 kPa (3)
DRIVER : 16500 kW
MATERIAL : 304 SS
INSULATION TYPE/THK: PP /
TRIM: GC-247086-PJG(0.4)

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3 . DRIVER POWER AND DIFFERENTIAL PRESSURE DEPICTED ARE THE TOTAL FOR THE COMPRESSOR.
4 . ELECTRIC TRACE TO HLL (ET 25).
5 . MAXIMIZE LENGTH OF PIPING THAT FREE DRAINS TO KO DRUM.
6 . GTAW ROOT PASS WELD IS MANDATORY ON THIS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 COMPRESSOR 6TH STAGE

SCALE: NONE

SHELL DWG NO.: 247.0000.000.041.006 REV. G

247.006

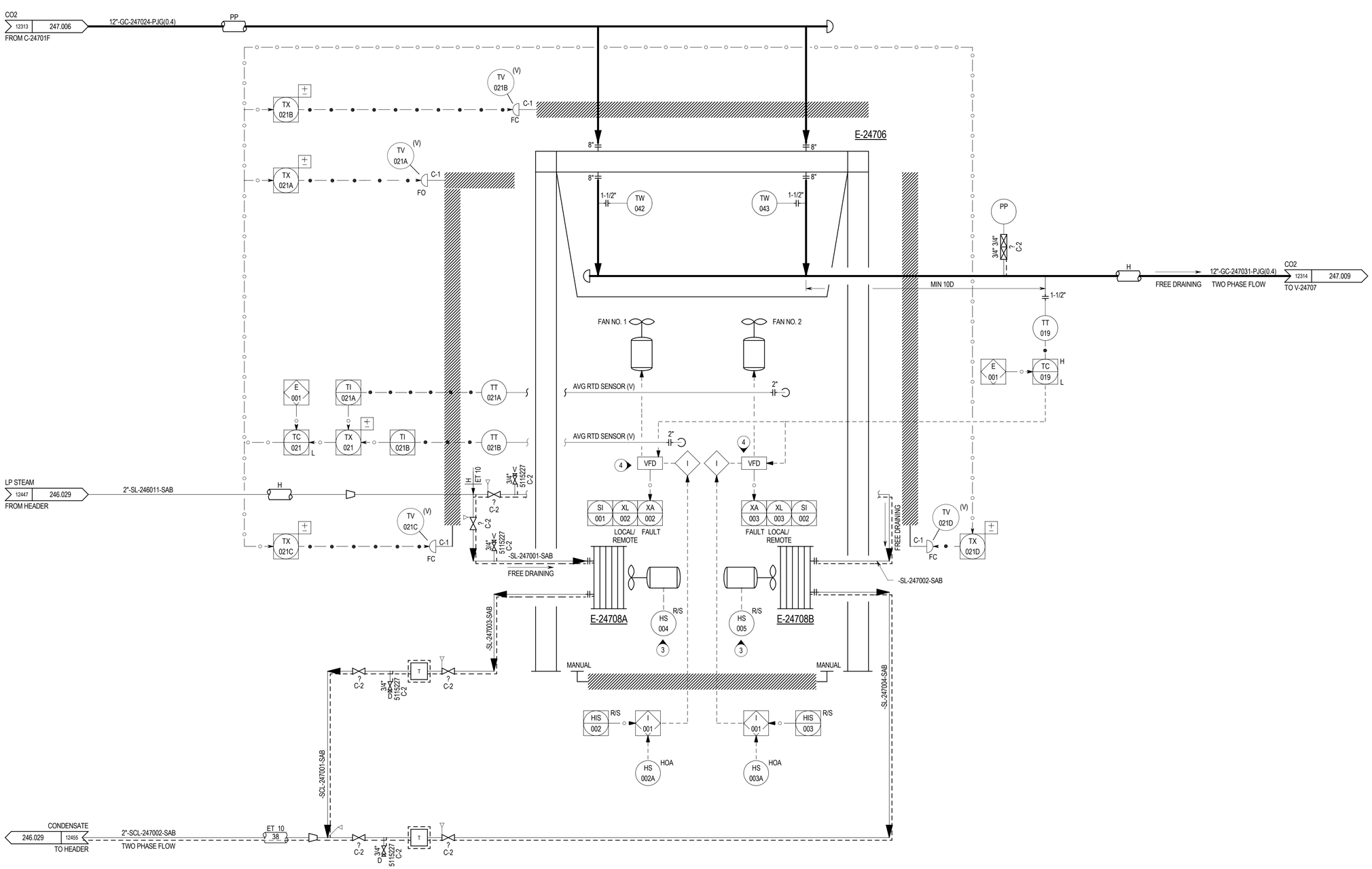
FILE:\\F:\1025\DRAWINGS\CO2\247\247.006.pid MODEL DATE:7/7/2011 2:57:25 PM BY:ahm14887

E-24706
COMPRESSOR 6th STAGE COOLER

RATED DUTY:	3.9 MW
SURFACE AREA [FINNED]:	9596.0 m^2
TUBE DESIGN PR. & TEMP:	6500 kPa-g @ 130 °C / HV @ 150 °C
TUBE MATERIAL:	304L SS + 0.38 mm CA
DRIVER & Nos.:	22.0 kW & 2
WINTERIZATION:	TYPE 3, MODE C
INSULATION TYPE/THK:	/
TRIM:	GC-247087-PJG(0.4)

E-24708A/B
COMPRESSOR 6th STAGE COOLER SPACE HEATERS

RATED DUTY:	
TYPE:	
MATERIAL:	304 SS
TRIM:	(A)SCL-247020-SAB
	(B)SCL-247021-SAB



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.

3 . SWITCH LOCATED AT PLATFORM LEVEL.

4 . MINIMUM VFD SETTING IS 30% SPEED.

HOLDS:

- NUMBER OF BAYS, CONNECTIONS AND CONNECTION SIZES TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
COMPRESSOR 6TH STAGE COOLER

SCALE: NONE

SHELL DWG NO.: 247.0000.000.041.007 REV. G

247.007

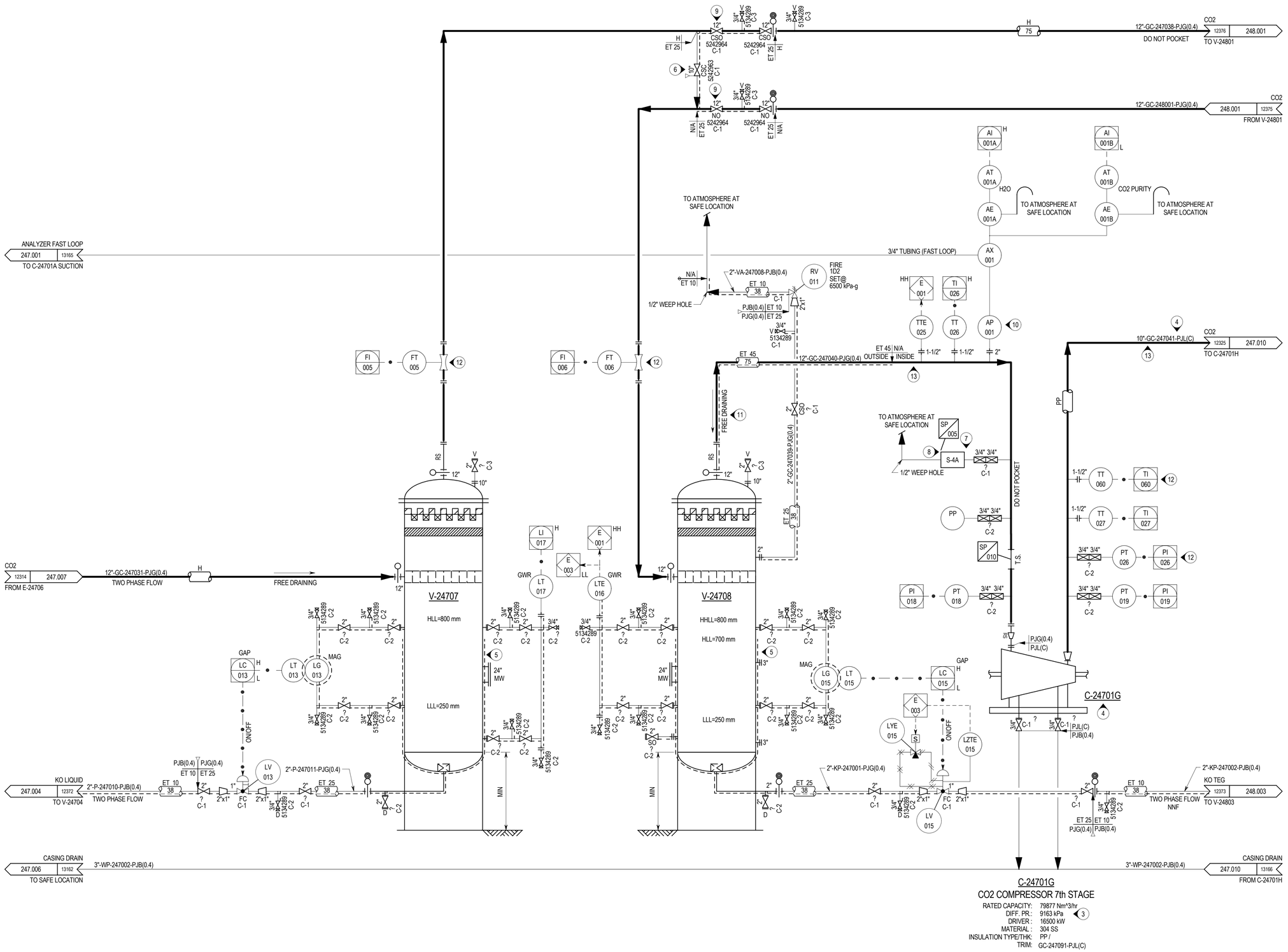
FILE:\\F:\1020\SIDRAWINGS\CO2\247\247.007.pid MODEL DATE:7/7/2011 2:24:26 PM BY:ahm14887

V-24707
TEG INLET SCRUBBER

SIZE: 900 mm ID x 3400 mm T/T
DESIGN PR. & TEMP: 6500 kPa-g @ 105 °C/HV @ 150°C
MATERIAL(VESSEL/INTERNALS): CS + 3 mm 304L SS CLAD / 316L SS
INSULATION TYPE/THK: H /
TRIM: GC-247089-PJG(0.4)

V-24708
COMPRESSOR 7th STAGE KO DRUM

SIZE: 900 mm ID x 3400 mm T/T
DESIGN PR. & TEMP: 6500 kPa-g @ 105 °C/HV @ 150°C
MATERIAL(VESSEL/INTERNALS): CS + 3 mm 304L SS CLAD / 316L SS
INSULATION TYPE/THK: H /
TRIM: GC-247090-PJG(0.4)



C-24701G
CO2 COMPRESSOR 7th STAGE

RATED CAPACITY: 79877 Nm^3/hr
DIFF. PR.: 9163 kPa
DRIVER : 16500 kW
MATERIAL : 304 SS
INSULATION TYPE/THK: PP /
TRIM: GC-247091-PJL(C)

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3 . DRIVER POWER AND DIFFERENTIAL PRESSURE DEPICTED ARE THE TOTAL FOR THE COMPRESSOR.
4 . ELASTOMERS SHALL NOT BE USED FOR DENSE PHASE CO2 SERVICE.
5 . ELECTRIC TRACE TO HLL (ET 25).
6 . DEHYDRATION UNIT BYPASS.
7 . SAMPLE TAKE-OFF POINT TO BE ACCESSIBLE.
8 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.
9 . VALVES ARE FOR BATTERY LIMIT ISOLATION OF UNIT.
10. SAMPLE PROBE INCLUDES A DOUBLE BLOCK AND BLEED VALVE ASSEMBLY.
11. MAXIMIZE LENGTH OF PIPING THAT FREE DRAINS TO KO DRUM.
12. THE FLOW MEASUREMENTS AND ADDITIONAL INSTRUMENTS ARE REQUIRED FOR ON-SITE COMPRESSOR PERFORMANCE TESTING (PTC-10).
13. GTAW ROOT PASS WELD IS MANDATORY ON THIS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- FACILITIES ARE TO BE DETERMINED FOR CLEANING AND WATER PURGE FROM THE COMPRESSOR PIPING DOWNSTREAM OF THE WATER ANALYZER (IN ORDER TO PREVENT CONTAMINATION OF THE PIPELINE DURING COMMISSIONING AND START-UP).

ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

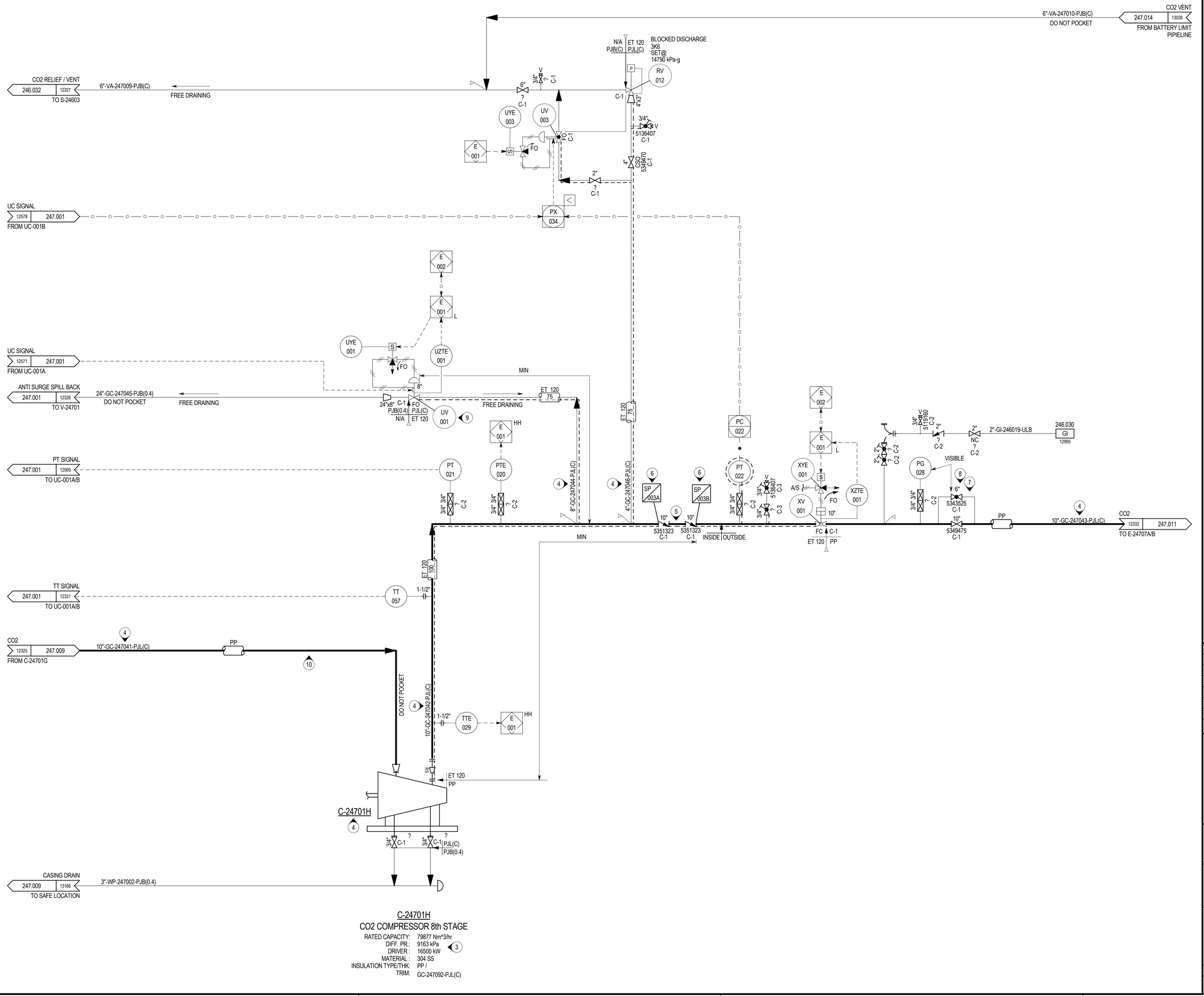
SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
TEG INLET SCRUBBER & CO2 COMP. 7TH STAGE

SCALE: NONE
SHELL DWG NO.: 247.0000.000.041.009 REV. G

247.009
FILE:\\F-\1025\DRAWINGS\CO2\247\247.009.pid MODEL DATE:7/7/2011 2:13:03 AM BY:mak222296



C-24701H
CO2 COMPRESSOR 8th STAGE

RATED CAPACITY:	79877 Nm^3/hr
DIFF. PR.:	9163 kPa
DRIVER :	16500 kW
MATERIAL :	304 SS
INSULATION TYPE/THK:	PP /
TRIM:	GC-247092-PJL(C)

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3 . DRIVER POWER AND DIFFERENTIAL PRESSURE DEPICTED ARE THE TOTAL FOR THE COMPRESSOR.
4 . ELASTOMERS SHALL NOT BE USED FOR DENSE PHASE CO2 SERVICE.
5 . TWO CHECK VALVES IN SERIES SEPARATED BY AT LEAST 500MM.
6 . NON-SLAM CHECK VALVE.
7 . START-UP BYPASS VALVE TO BE LOCATED AT PIPING HIGH POINT WITH PIPING FREE DRAINING INTO THE MAIN PIPING.
8 . VALVE TO BE LOCATED AT SAFE ACCESSIBLE LOCATION.
9 . ANTI-SURGE SPILLBACK VALVE UV-247001 TO BE LOCATED AT PIPING HIGH POINT WITH PIPING FREE DRAINING INTO THE MAIN PIPING.
10. GTAW ROOT PASS WELD IS MANDATORY ON THIS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 COMPRESSOR 8TH STAGE

SCALE: NONE
SHELL DWG NO.: 247.0000.000.041.010
REV. G

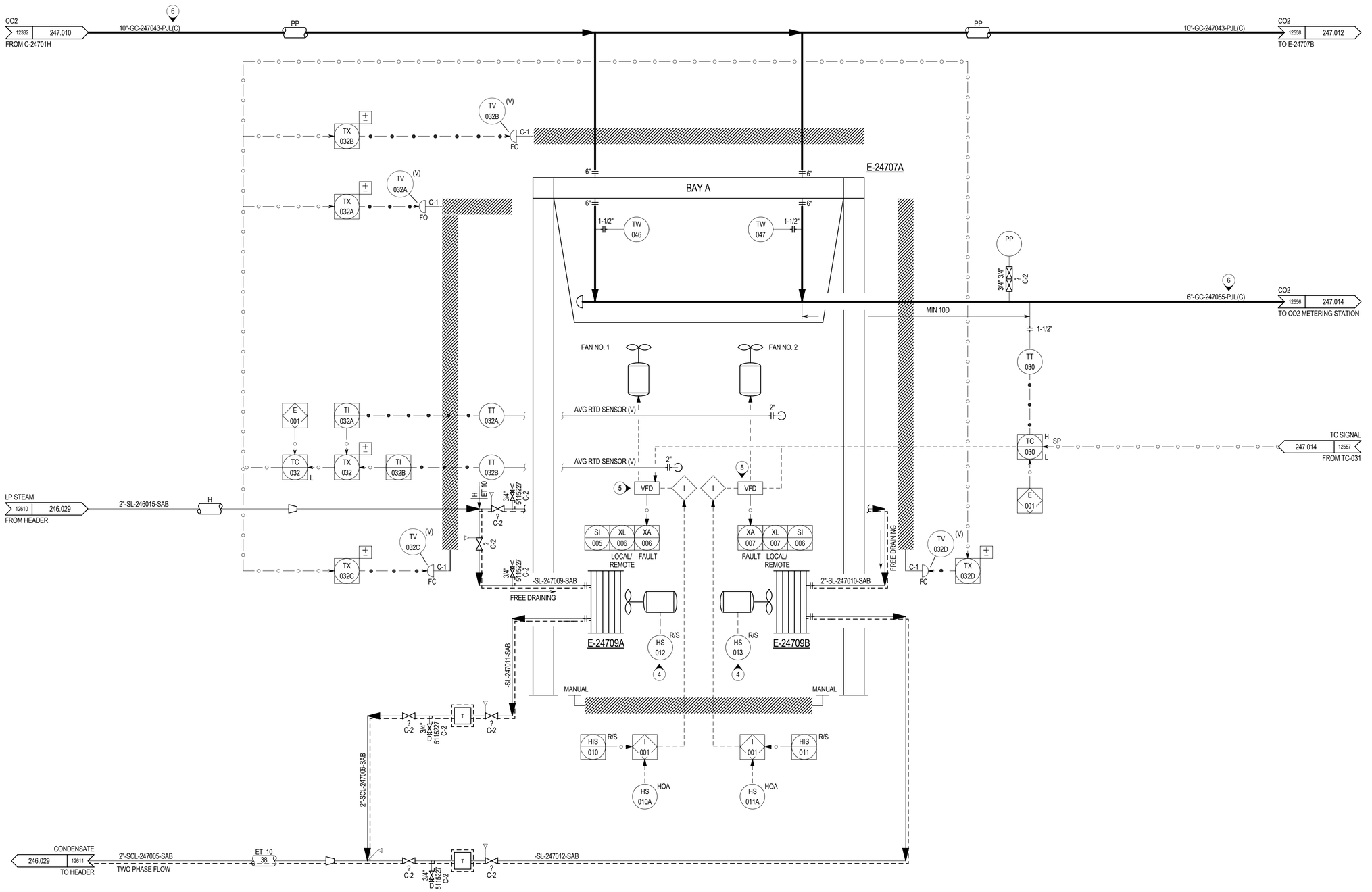
247.010
FILE:\\F-\10259\DRAWINGS\CO2\247247.010.pid MODEL DATE:7/7/2011 2:20:07 PM BY:ahm14887

E-24707A (6)
CO2 COMPRESSOR AFTERCOOLER

RATED DUTY: 10.3 MW (3)
SURFACE AREA [FINNED]: 1385.0 m^2
TUBE DESIGN PR. & TEMP: 14790 kPa-g @ 175 °C
TUBE MATERIAL: 304L SS + 0.38 mm CA
DRIVER & Nos.: 22.0 kW & 2
WINTERIZATION: TYPE 3, MODE C
INSULATION TYPE/THK: /
TRIM: GC-247093-PJL(C)

E-24709A/B
CO2 COMPRESSOR AFTERCOOLER SPACE HEATERS

RATED DUTY:
TYPE:
MATERIAL: 304 SS
TRIM: (A)SCL-247025-SAB
(B)SCL-247024-SAB



1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3. COOLER DUTY DEPICTED IS THE TOTAL FOR ALL BAYS.
4. SWITCH LOCATED AT PLATFORM LEVEL.
5. MINIMUM VFD SETTING IS 30% SPEED.
6. ELASTOMERS SHALL NOT BE USED FOR DENSE PHASE CO2 SERVICE.

HOLDS:

- NUMBER OF BAYS, CONNECTIONS AND CONNECTION SIZES TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 COMPRESSOR AFTERCOOLER-BAY A

SCALE: NONE
SHELL DWG NO.: 247.0000.000.041.011
REV. G

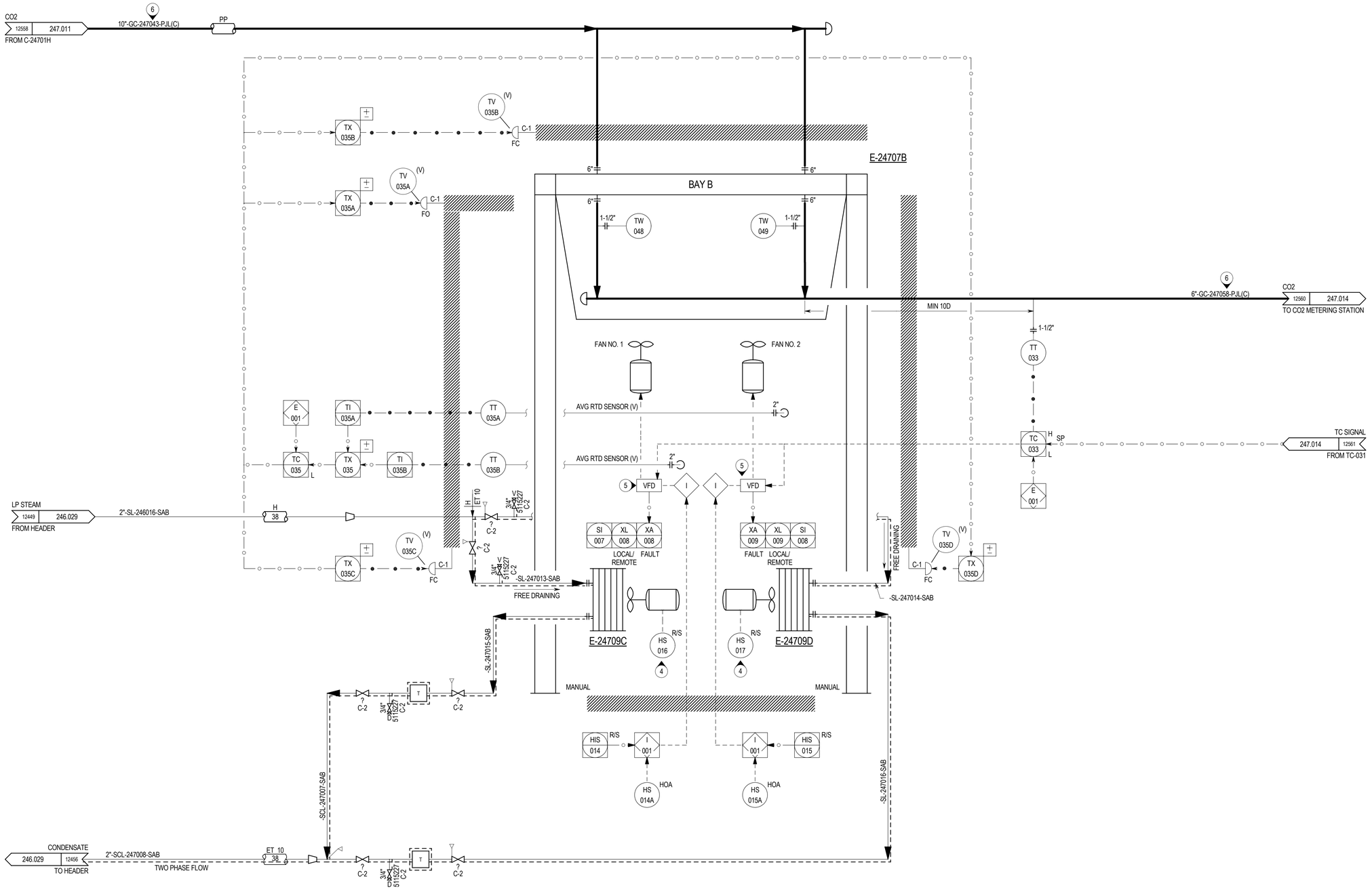
247.011
FILE:\\F:\1025\DRAWINGS\CO2\247\247.011.pid MODEL DATE:7/7/2011 1:54:46 PM BY:ahm14887

E-24707B (6)
CO2 COMPRESSOR AFTERCOOLER

RATED DUTY: 10.3 MW (3)
SURFACE AREA [FINNED]: 1385.0 m^2
TUBE DESIGN PR. & TEMP: 14790 kPa-g @ 175 °C
TUBE MATERIAL: 304L SS + 0.38 mm CA
DRIVER & Nos.: 22.0 kW & 2
WINTERIZATION: TYPE 3, MODE C
INSULATION TYPE/THK: /
TRIM: GC-247094-PJL(C)

E-24709C/D
CO2 COMPRESSOR AFTERCOOLER SPACE HEATERS

RATED DUTY:
TYPE:
MATERIAL: 304 SS
TRIM: (C)SCL-247026-SAB
(D)SCL-247027-SAB



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3 . COOLER DUTY DEPICTED IS THE TOTAL FOR ALL BAYS.
4 . SWITCH LOCATED AT PLATFORM LEVEL.
5 . MINIMUM VFD SETTING IS 30% SPEED.
6 . ELASTOMERS SHALL NOT BE USED FOR DENSE PHASE CO2 SERVICE.

HOLDS:

- NUMBER OF BAYS, CONNECTIONS AND CONNECTION SIZES TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 COMPRESSOR AFTERCOOLER-BAY B

SCALE: NONE
SHELL DWG NO.: 247.0000.000.041.012
REV. G

247.012
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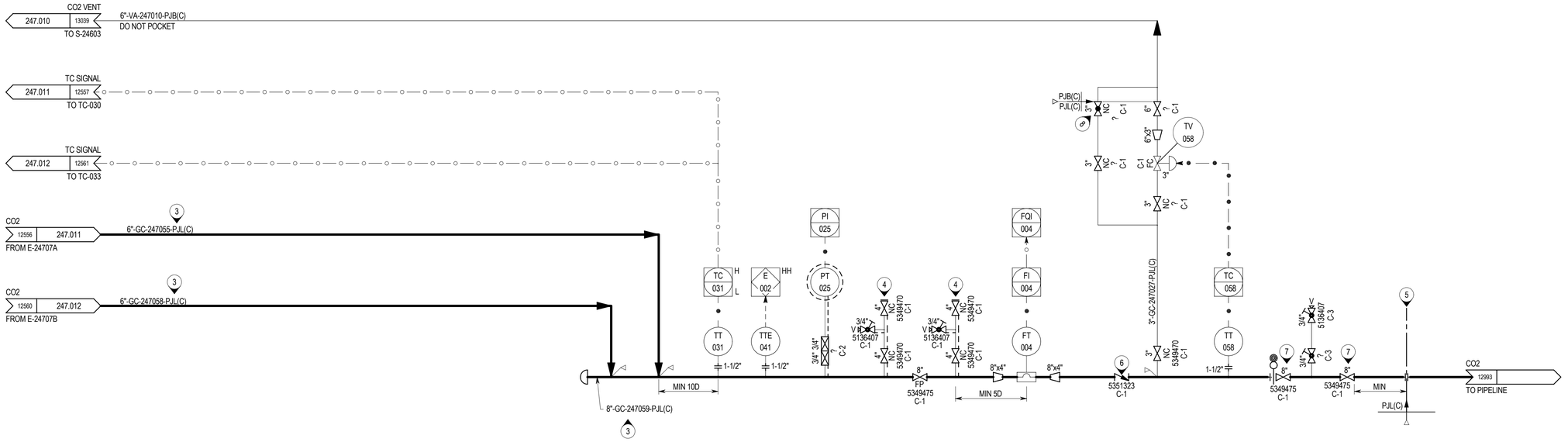


1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "247" UNLESS OTHERWISE STATED.
3 . ELASTOMERS SHALL NOT BE USED FOR DENSE PHASE CO2 SERVICE.
4 . CONNECTIONS FOR METER PROVING AT SAFE ACCESSIBLE LOCATION.
5 . SCOPE BREAK WITH PIPELINE FACILITIES.
6 . CHECK VALVE TO REDUCE CONSEQUENCES OF POTENTIAL AIR COOLER TUBE RUPTURE.
7 . VALVES ARE FOR BATTERY LIMIT ISOLATION OF UNIT.
8 . VALVE TO BE LOCATED AT SAFE ACCESSIBLE LOCATION.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

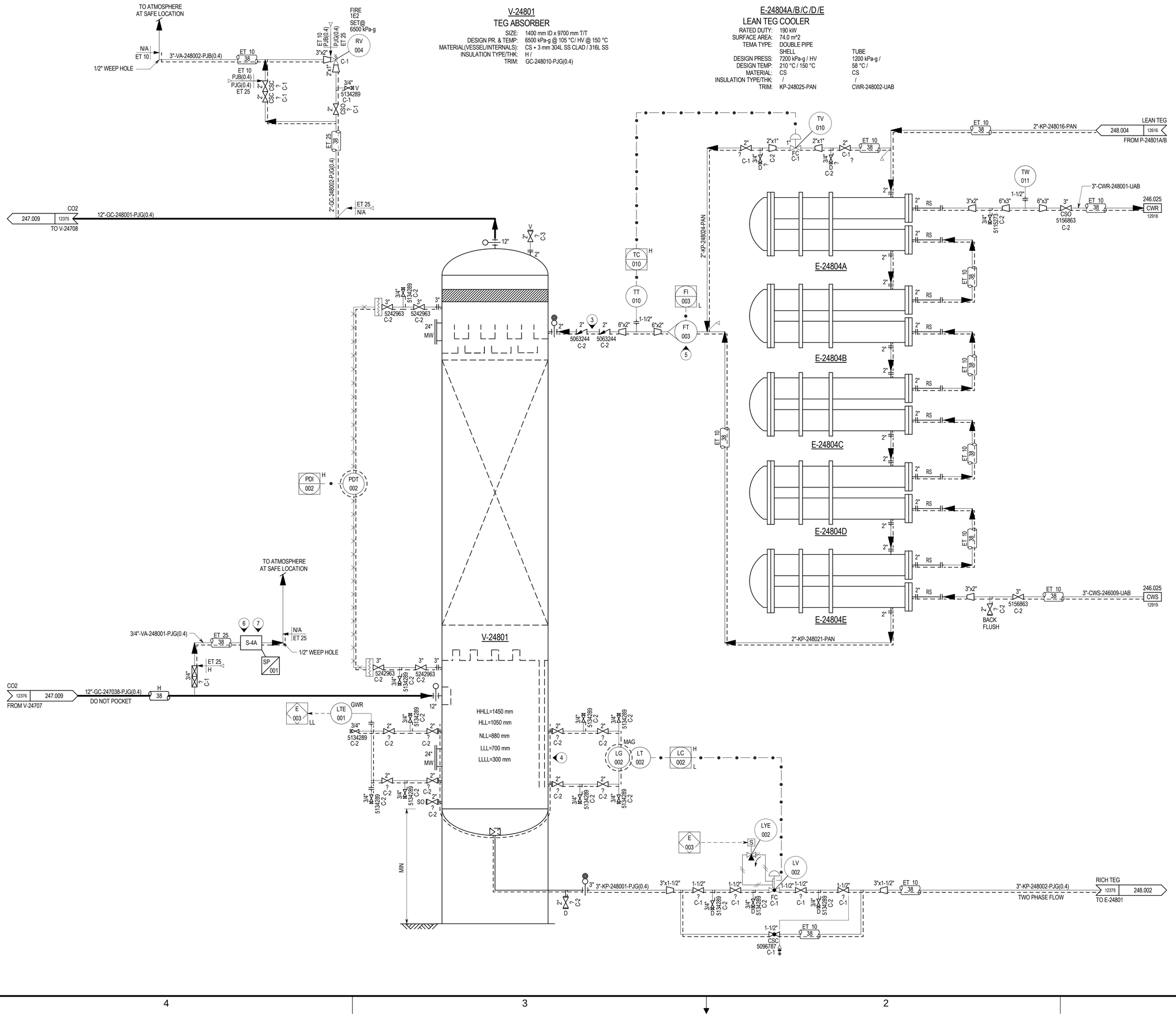
FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 247 - COMPRESSION
CO2 METERING STATION

SCALE: NONE

SHELL DWG NO.: 247.0000.000.041.014 REV. G

247.014
FILE:\\F:\1025\DRAWINGS\CO2\247247.014.pid MODEL DATE:7/7/2011 11:21:54 AM BY:ahm14887



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "248" UNLESS OTHERWISE STATED.
3 . TWO CHECK VALVES IN SERIES, ONE IN THE HORIZONTAL AND ONE IN THE VERTICAL POSITION, SEPARATED BY AT LEAST 500 MM.
4 . ELECTRIC TRACE TO HLL (ET10).
5 . FT-003 TO BE INSTALLED VERTICALLY WITH FLOW UPWARD.
6 . SAMPLE TAKE-OFF POINT TO BE ACCESSIBLE.
7 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 248 - DEHYDRATION
TEG ABSORBER

SCALE: NONE
SHELL DWG NO.: 248.0000.000.041.001
REV. G

248.001
FILE:\\F-U1203\DRAWINGS\CO2\248\248.001.pid MODEL DATE:7/7/2011 5:14:08 AM BY:mak22296

V-24805
TEG STRIPPER REBOILER CONDENSATE POT

SIZE:	600 mm ID x 1800 mm T/T
DESIGN PR. & TEMP:	5170 kPa-g @ 415 °C/ FV @ 415°C
MATERIAL(VESSEL/INTERNALS):	CS +3 mm CA
INSULATION TYPE/THK:	H /
TRIM:	SCH-248005-SAG

V-24802
TEG STRIPPER

SIZE (COLUMN):	500 mm ID x 3500 mm T/T
SIZE (STRIPPER):	400 mm ID x 2400 mm T/T
DESIGN PRESS. & TEMP.:	350 kPa-g @ 230 °C /
MATERIAL (COLUMN / INTERNAL):	CS + 3 mm 316L SS CLAD / 316L SS
MATERIAL (STRIPPER):	316L SS + 3 mm CA
INSULATION TYPE/THK:	H
TRIM:	KP-248026-PJB(0.4)

V-24806
TEG SURGE DRUM

SIZE:	1300 mm ID x 3900 mm T/T
DESIGN PR. & TEMP:	350 kPa-g @ 230 °C/ HV @ 150° C
MATERIAL(VESSEL/INTERNALS):	CS + 3 mm 316L SS CLAD
INSULATION TYPE/THK:	H /
TRIM:	KP-248027-PJB(0.4)

S-24801
TEG REGENERATION PACKAGE

E-24801
TEG STRIPPER CONDENSER

RATED DUTY:	92 kW	
SURFACE AREA:		
TEMA TYPE:		
	SHELL	TUBE
DESIGN PRESS:	1400 kPa-g / FV	350 kPa-g / HV
DESIGN TEMP:	105°C / 105°C	230°C / 150°C
MATERIAL:	CS + 3 mm 316 CLAD	316L SS + 0.38 mm CA
INSULATION TYPE / THK:	H	
TRIM:	KP-248028-PJB(0.4)	

E-24802
TEG STRIPPER REBOILER

RATED DUTY:	396 kW	
SURFACE AREA:		
TEMA TYPE:		
	SHELL	TUBE
DESIGN PRESS:	350 kPa-g / HV	5170 kPa-g / FV
DESIGN TEMP:	230°C / 150°C	415°C / 415°C
MATERIAL:	CS + 3 mm 316 CLAD	316L SS
INSULATION TYPE / THK:	H	
TRIM:	KP-248029-PJB(0.4)	SCH-248006-SAG

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "248" UNLESS OTHERWISE STATED.
3 . CONDENSATE LINES SHOULD BE SUPPORTED FOR VIBRATING SLUGGING SERVICE.
4 . ELECTRIC TRACE TO HLL (ET 10).
5 . FT-001 TO BE INSTALLED VERTICALLY WITH FLOW UPWARD.
6 . 316/316L STAINLESS STEEL PIPING COMPONENTS ARE REQUIRED FOR THIS LINE.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 248 - DEHYDRATION
TEG STRIPPER, REBOILER & CONDENSATE POT

SCALE: NONE

SHELL DWG NO.: 248.0000.000.041.002 REV. G

248.002
FILE:\\F-1\1025\DRAWINGS\CO\248\248.002.pid MODEL DATE:7/7/2011 2:34:26 PM BY:jahm14887

V-24803
TEG FLASH DRUM

SIZE:	1900 mm ID x 4800 mm T/T
DESIGN PR. & TEMP:	480 kPa-g @ 105 °C / FV @ 105°C
MATERIAL(VESSEL/INTERNALS):	CS +3 mm 304L SS CLAD/ 316L SS
INSULATION TYPE/THK:	H /
TRIM:	KP-248030-PJB(0.4)

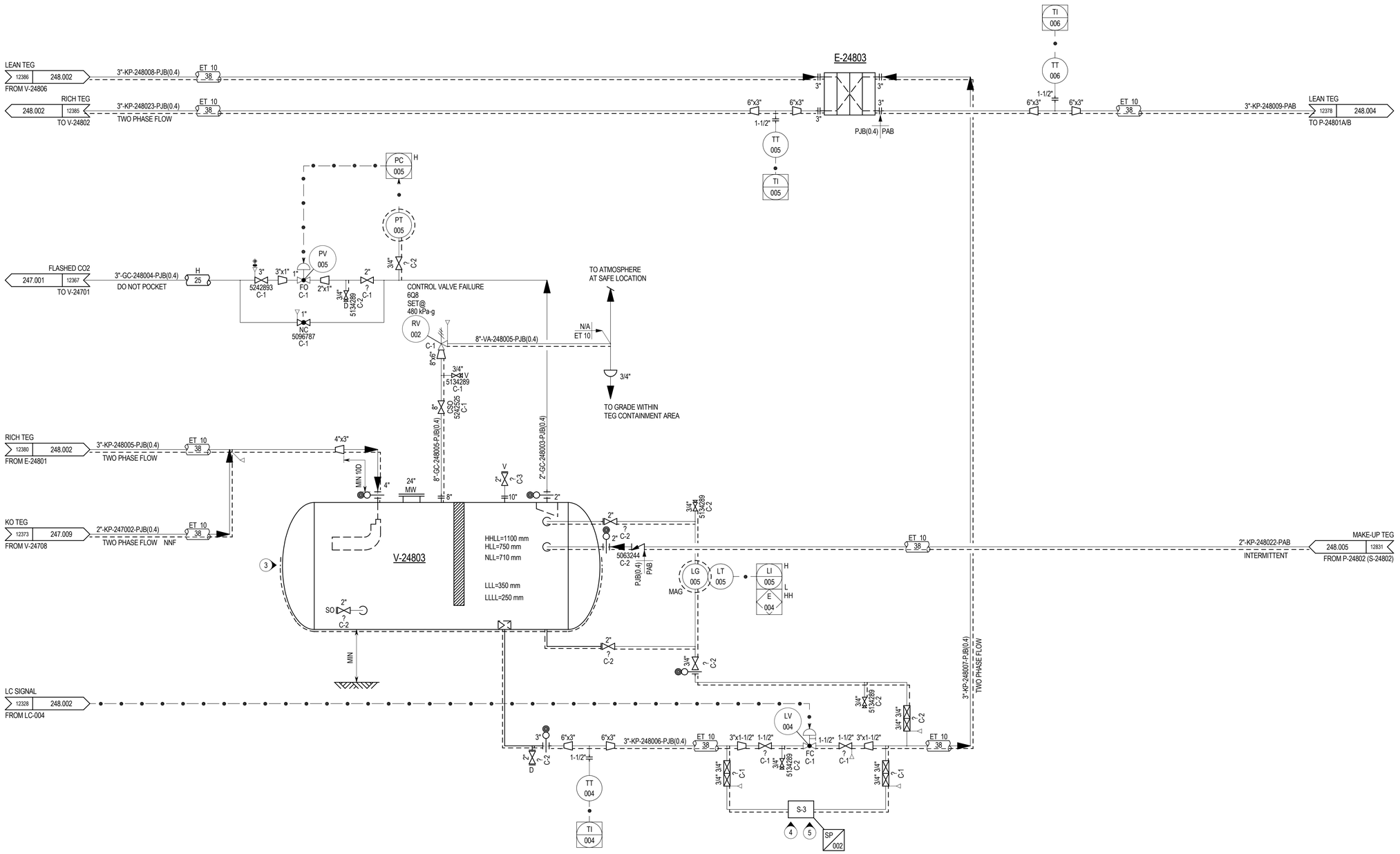
E-24803
LEAN/RICH TEG EXCHANGER

RATED DUTY:	0.6 MW	
SURFACE AREA:		
	HOT	COLD
DESIGN PRESS:	400 kPa-g / HV	520 kPa-g / FV
DESIGN TEMP:	230 °C / 150 °C	210 °C / 210 °C
MATERIAL:	PLATES: 304L SS FRAME: CS	
INSULATION TYPE/THK:	/	/
TRIM:	KP-248031-PJB(0.4)	
TEMA TYPE:	COMPABLOC	

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "248" UNLESS OTHERWISE STATED.
3 . ELECTRIC TRACE TO HLL (ET 10).
4 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
5 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.



ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 248 - DEHYDRATION
TEG FLASH DRUM & LEAN/RICH EXCHANGER

SCALE: NONE
SHELL DWG NO.: 248.0000.000.041.003 REV. G

248.003
FILE:\\F:\1025\DRAWINGS\CO2\248\248.003.pid MODEL DATE:7/7/2011 12:08:22 PM BY:ahm14887

V-24808
LEAN TEG POST FILTER

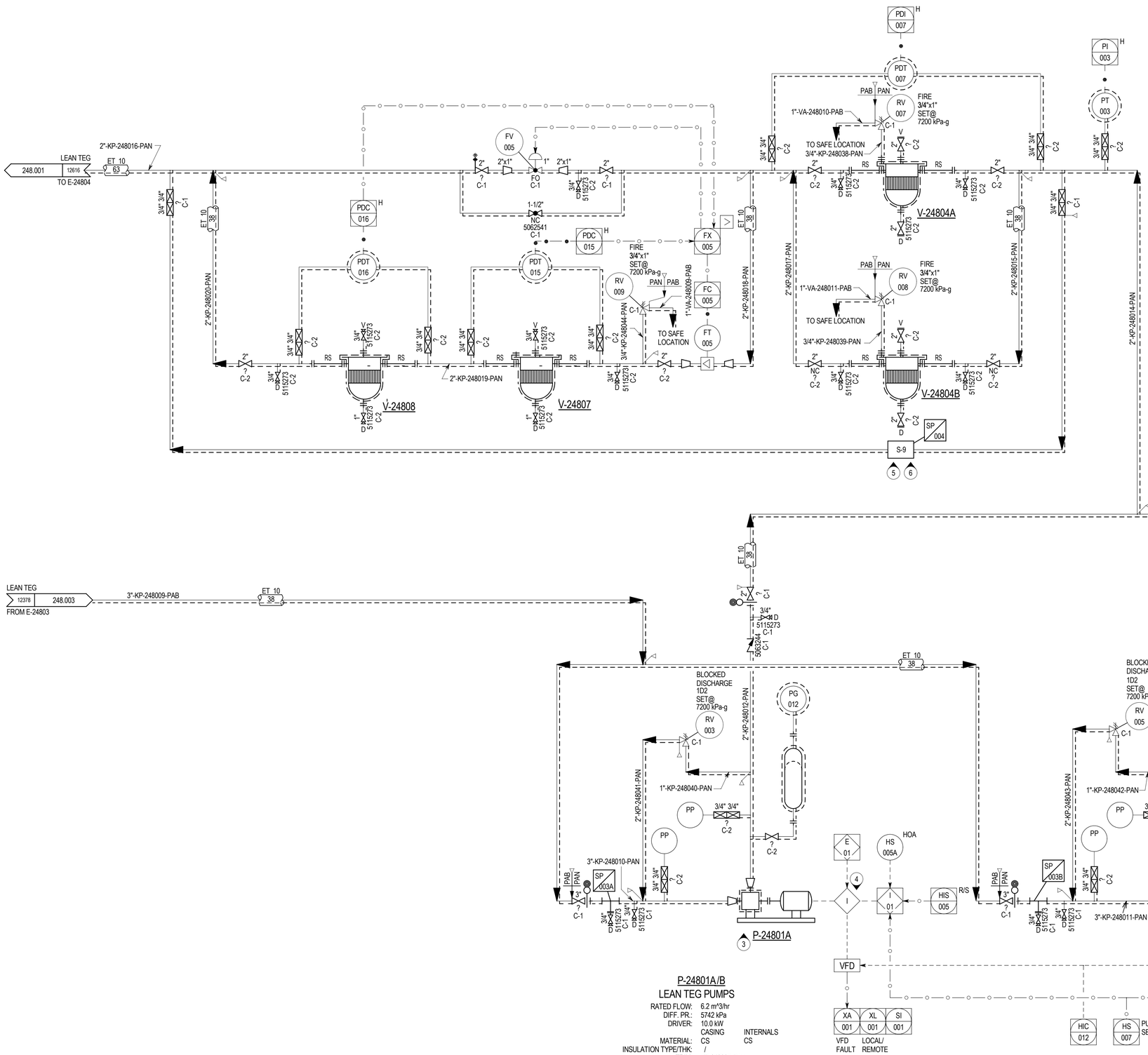
SIZE: mm ID x mm T/T x
RATED FLOW: 1 m^3/hr
DESIGN PR. &TEMP: 7200 kPa-g @ 210 °C / HV @ 150°C
PRESSURE DROP (CLEAN/DIRTY): /
MATERIAL: 304L SS + 0.4 mm CA
INSULATION TYPE/THK: / (7)
TRIM: KP-248035-PAN
PARTICLE RETENTION SIZE: 5 MICRONS

V-24807
LEAN TEG CARBON FILTER

SIZE: mm ID x mm T/T x
RATED FLOW: 1 m^3/hr
DESIGN PR. &TEMP: 7200 kPa-g @ 210 °C / HV @ 150°C
PRESSURE DROP (CLEAN/DIRTY): /
MATERIAL: 304L SS + 0.4 mm CA
INSULATION TYPE/THK: / (7)
TRIM: KP-248034-PAN

V-24804A /B
LEAN TEG FILTER

SIZE: mm ID x mm T/T x
RATED FLOW: 6 m^3/hr
DESIGN PR. &TEMP: 7200 kPa-g @ 210 °C / HV @ 150°C
PRESSURE DROP (CLEAN/DIRTY): /
MATERIAL: 304L SS + 0.4 mm CA
INSULATION TYPE/THK: / (7)
TRIM: KP-248032-PAN
KP-248033-PAN
PARTICLE RETENTION SIZE: 5 MICRONS



P-24801A/B
LEAN TEG PUMPS

RATED FLOW: 6.2 m^3/hr
DIFF. PR.: 5742 kPa
DRIVER: 10.0 kW
CASING INTERNALS
MATERIAL: CS CS
INSULATION TYPE/THK: /
TRIM: KP-248037-PAN
KP-248036-PAN

1. SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2. ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "248" UNLESS OTHERWISE STATED.
3. POSITIVE DISPLACEMENT PUMP.
4. STANDBY PUMP WILL START AUTOMATICALLY ON MAIN PUMP FAILURE.
5. SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
6. FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.
7. ELECTRIC TRACE (ET 10).

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE
11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP.
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

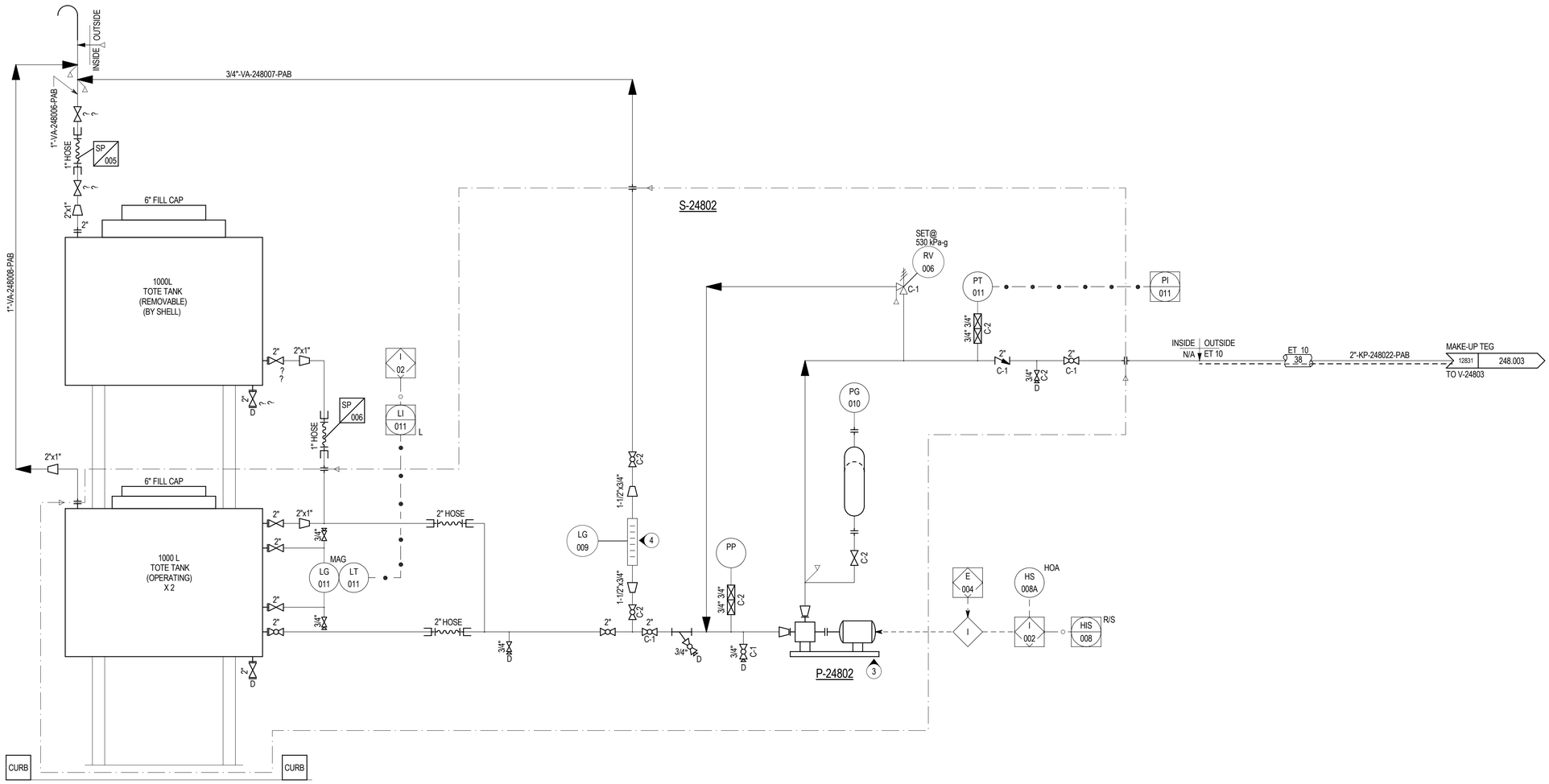
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 248 - DEHYDRATION
LEAN TEG PUMPS & FILTERS

SCALE: NONE
SHELL DWG NO.: 248.0000.000.041.004 REV. G

248.004
FILE:\\F:\1025\DP\DRAWINGS\CO2\248\248.004.pid MODEL DATE:7/7/2011 4:30:49 PM BY:alim14887

S- 24802

TEG MAKE-UP PACKAGE



P-24802

TEG MAKE-UP PUMP

RATED FLOW:	620 L/hr	
DIFF. PR.:	380 kPa	
DRIVER:	1.00 kW	
	CASING	INTERNALS
MATERIAL:	CS	CS
INSULATION TYPE/THK:	/	
TRIM:		

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.

2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "248" UNLESS OTHERWISE STATED.

3 . POSITIVE DISPLACEMENT PUMP WITH ADJUSTABLE STROKE.

4 . GRADUATED GLASS COLUMN FOR CONTINUOUS TOTE TANK LEVEL AND INJECTION PUMP CALIBRATION.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.

ISSUED FOR ESTIMATE

11 Jul 2011

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA

QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 248 - DEHYDRATION
TEG MAKE-UP TANK & PUMP

SCALE: NONE

SHELL DWG NO.: 248.0000.000.041.005 REV. G

248.005

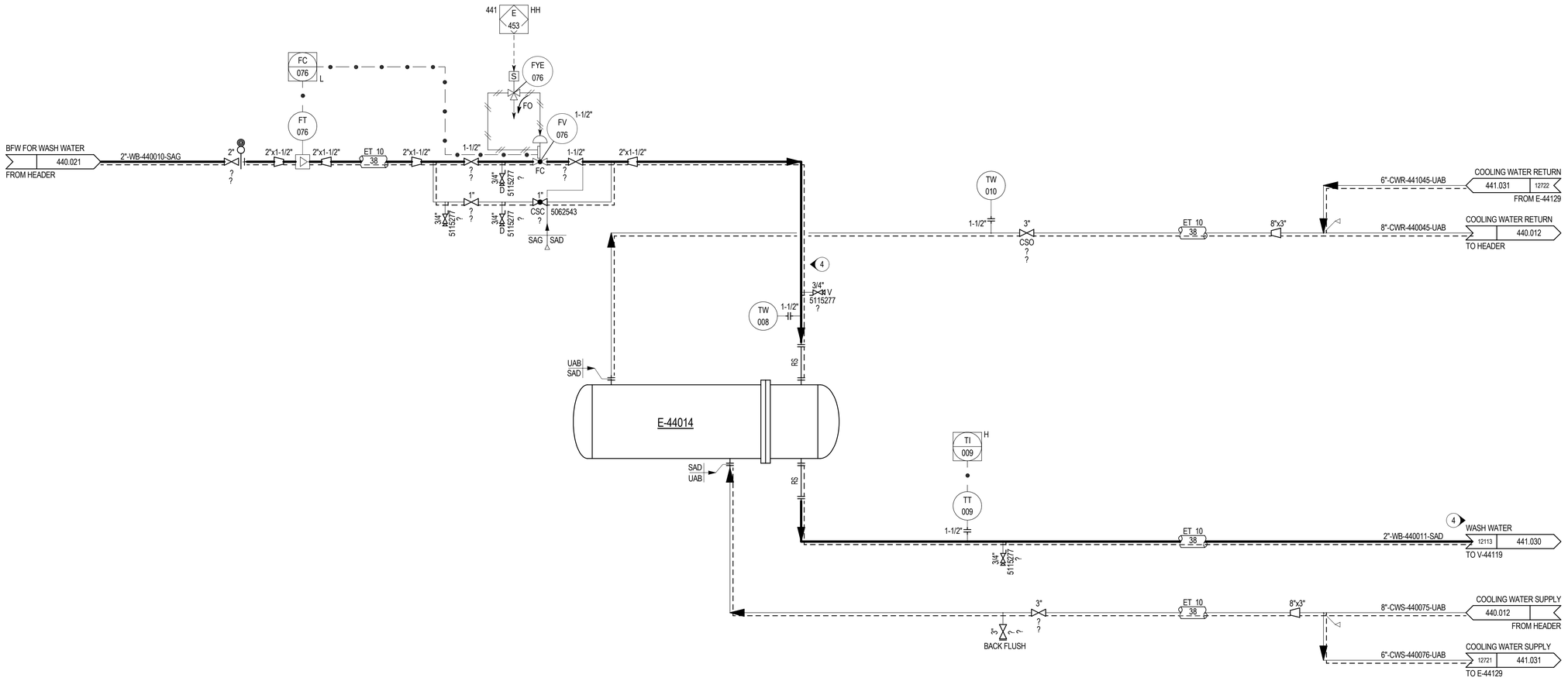
FILE:\\F:\1020\DRAWINGS\CO2\248\248.005.pid MODEL DATE:7/7/2011 12:09:35 PM BY:ahm14887

E-44014
WASH WATER MAKE-UP COOLER

RATED DUTY: 0.7 MW (TOTAL)
SURFACE AREA: 31.8 m^2
TEMA TYPE: BEU

	SHELL	TUBE (4)
DESIGN PRESS:	3100 kPa-g /	4025 kPa-g / FV
DESIGN TEMP:	58 °C /	150 °C / 150 °C
MATERIAL:	CS + 3 mm CA (3)	CS + 0.38 mm CA (3)
INSULATION TYPE/THK:	/	

TRIM: PROCESS SIDE: WB-440012-SAD
COOLING WATER SIDE: CWS-440077-SAD



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY"440' UNLESS OTHERWISE STATED.
3 . ELECTRIC TRACE (ET10) E-44014.
4 . OPEN PATH (NO BLOCK VALVES) REQUIRED FROM E-44014 (FV-440076) TO V-44119 TO MEET SAD LINE SPECIFICATION REQUIREMENTS.

ISSUED FOR ESTIMATE
11 Jul 2011

REV.	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	07/11/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRILIMINARY REVIEW									

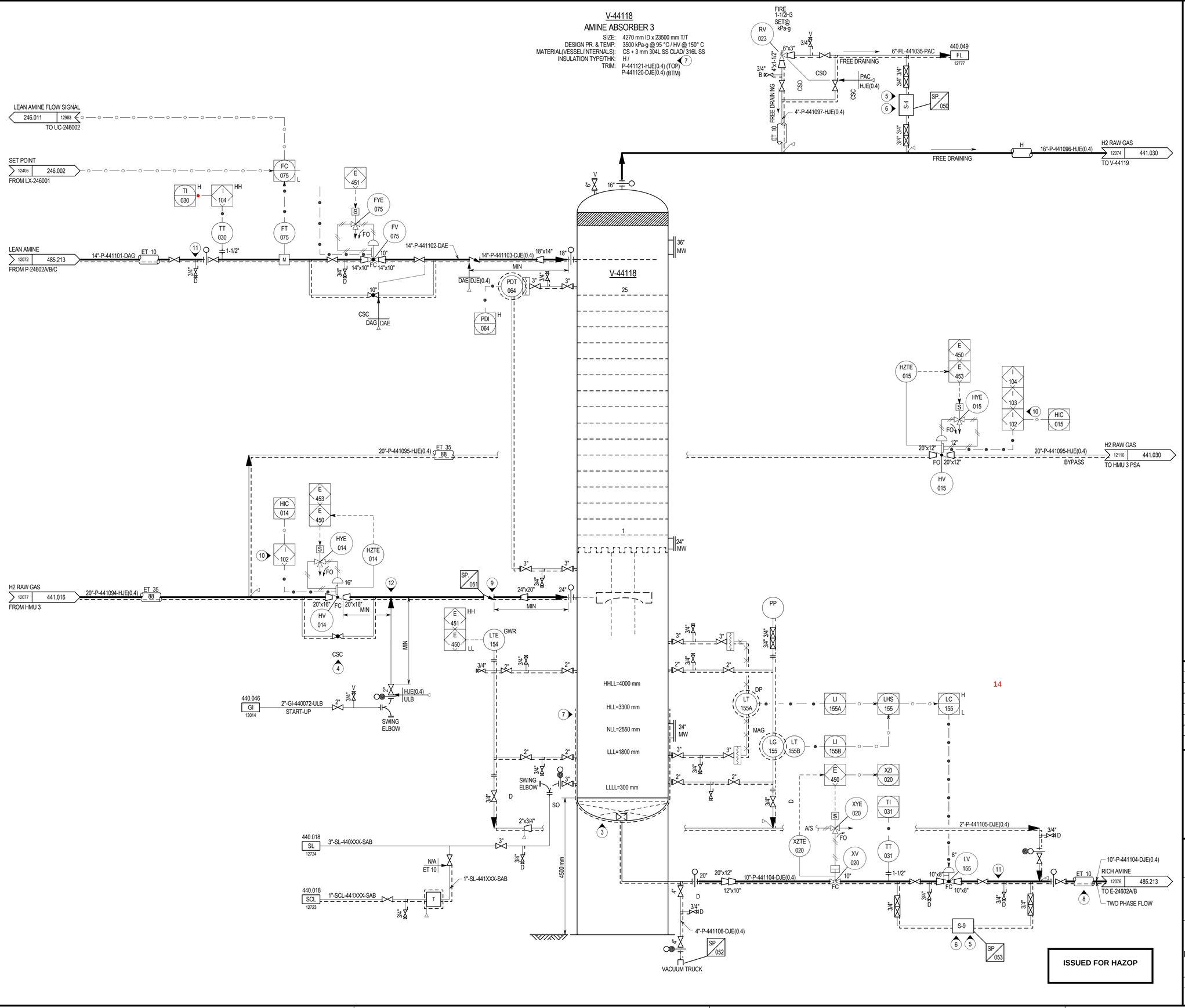
SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 440 - HYDROGEN MANUFACTURING UNIT
WATER MAKE-UP COOLER

SCALE: NONE
SHELL DWG NO.: 440.0000.000.041.048
REV. G

440.048
FILE:\\F:\1025\DRAWINGS\HMU\440\440.048.pid MODEL DATE:7/10/2011 10:26:02 PM BY:mw#22296



1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES AND CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "441" UNLESS OTHERWISE STATED.
3 . BOTTOM OF COLUMN IS PACKED WITH 600 mm OF #2 RASCHIG RINGS.
4 . H2 RAW GAS BYPASS REQUIRED FOR SYSTEM PURGE AND PRESSURIZATION AT START-UP.
5 . FOR PIPING DETAILS OF SAMPLE STATION, SEE DRAWING 200.0000.000.041.012.
6 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
7 . ELECTRIC TRACE TO HLL (ET 10).
8 . LOCALIZED DEGASSING OF CO2 MAY OCCUR AT RESTRICTIONS, BENDS, TEES, ETC. RESULTING IN LOCALIZED TWO-PHASE FLOW AND VIBRATION.
9 . 316 SS HARDFACED TRIM MATERIAL IS REQUIRED FOR THIS CHECK VALVE.
10. INADVERTANT SIMULTANEOUS CLOSING OF BOTH HV-014 AND HV-015 PREVENTED BY INTERLOCK I-102.
11. VALVES ARE FOR BATTERY LIMIT ISOLATION OF UNIT.
12. TOP CONNECTION.

HOLDS:

- NUMBER OF RVs AND SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- CONFIRM AVAILABILITY OF DCS AND SIS INTERLOCK SEQUENCE NUMBERS ADDED FOR QUEST.

REV.	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

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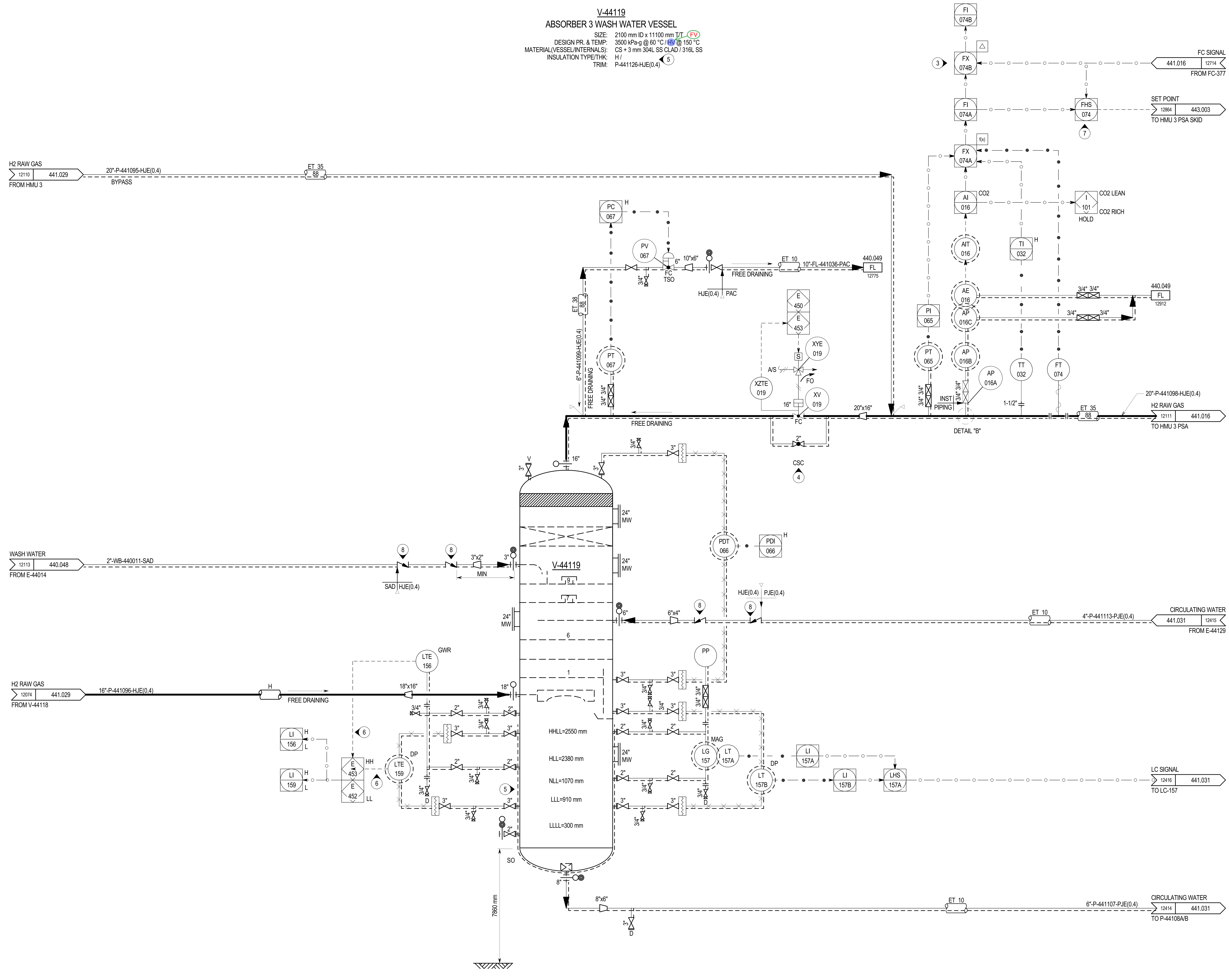
PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 441 - HYDROGEN MANUFACTURING UNIT TRAIN 3
AMINE ABSORBER 3

SCALE: NONE
SHELL DWG NO.: 441.0000.000.041.029
REV. G

441.029
FILE:\\F:\1025\DRAWINGS\HMU\441\441.029.pid MODEL DATE:6/14/2011 1:17:42 PM BY:bez29451



V-44119
ABSORBER 3 WASH WATER VESSEL
SIZE: 2100 mm ID x 11100 mm T/T
DESIGN PR. & TEMP: 3500 kPa-g @ 60 °C / HV @ 150 °C
FV
MATERIAL(VESSEL/INTERNALS): CS + 3 mm 304L SS CLAD / 316L SS
INSULATION TYPE/THK: H /
TRIM: P-441126-HJE(0.4)
H2 RAW GAS 12110 441.029 FROM HMU 3
20"-P-441095-HJE(0.4) BYPASS
WASH WATER 12113 440.048 FROM E-44014
2"-WB-440011-SAD
H2 RAW GAS 12074 441.029 FROM V-44118
16"-P-441096-HJE(0.4)
FREE DRAINING
FC SIGNAL 441.016 12714 FROM FC-377
SET POINT 12864 443.003 TO HMU 3 PSA SKID
H2 RAW GAS 12111 441.016 TO HMU 3 PSA
20"-P-441098-HJE(0.4)
10"-FL-441036-PAC 440.049 FL 12775
440.049 FL 12912
6"-P-441099-HJE(0.4)
CO2 LEAN
CO2 RICH
HOLD
DETAIL "B"
CSC
CIRCULATING WATER 441.031 12415 FROM E-44129
4"-P-441113-PJE(0.4)
LC SIGNAL 12416 441.031 TO LC-157
CIRCULATING WATER 12414 441.031 TO P-44108A/B
6"-P-441107-PJE(0.4)
HHLL=2550 mm
HLL=2380 mm
NLL=1070 mm
LLL=910 mm
LLLL=300 mm
7860 mm

ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "441" UNLESS OTHERWISE STATED.
3 . CALCULATE AMOUNT OF CO2 REMOVED FROM RAW H2 GAS.
4 . H2 RAW GAS BYPASS REQUIRED FOR SYSTEM PURGE AND PRESSURIZATION AT START-UP.
5 . ELECTRIC TRACE TO HLL (ET 10).
6 . EITHER LTE-441156 OR LTE-441159 SHALL BE SELECTABLE AS THE INPUT TO SAFETY INTERLOCKS E-452 AND E-453. A DEVIATION ALARM TO MONITOR THE TWO INSTRUMENTS SHALL BE PROVIDED AT THE DCS.
7 . HAND SWITCH TO SEND FLOW SETPOINT FROM FC-377 TO PSA WHEN QUEST IS ISOLATED.
8 . TWO CHECK VALVES IN SERIES, ONE IN THE HORIZONTAL AND ONE IN THE VERTICAL POSITION, SEPARATED BY AT LEAST 500 mm.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- SCOPE FOR SIGNAL TRANSFER TO PSA PLC TO BE DETERMINED.
- INTERLOCK I-101 ACTIONS, IF ANY, TO BE CONFIRMED.
- CONFIRM AVAILABILITY OF DCS AND SIS INTERLOCK SEQUENCE NUMBERS ADDED FOR QUEST.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 441 - HYDROGEN MANUFACTURING UNIT TRAIN 3
ABSORBER 3 WASH WATER VESSEL

SCALE: NONE
SHELL DWG NO.: 441.0000.000.041.030
REV. G

441.030
FILE:\\F:\1025\DRAWINGS\HMU\441\441.030.pid MODEL DATE:6/14/2011 2:17:59 PM BY:bes29451

E-44129
ABSORBER 3 CIRCULATING WATER COOLER

RATED DUTY:	0.3 MW	
SURFACE AREA:	49.3 m^2	
TEMA TYPE:	BEU	
	SHELL	TUBE
DESIGN PRESS:	3800 kPa-g / HV	2950 kPa-g /
DESIGN TEMP:	60 °C / 150 °C	58 °C /
MATERIAL:	CS + 3 mm 304L SS CLAD	SUPER DUPLEX 2507 + 0.38 mm CA
INSULATION TYPE/THK:	/	/
TRIM:	P-441122-PJE(0.4) (6)	CWR-441XXX-PJE(0.4) (6)

LC SIGNAL
12416 441.030
FROM LHS-157A

LC 157 H L
LHS 157B
LV 157A
LV 157B
2"x1" 1" FC 2"x1"
3/4" D
4
2"-P-441115-PJE(0.4)
3/4"
S-8
3 5
SP 054
E 452
XZI 018
XYE 018
S
A/S
FO
XZTE 018
XV 018
FC
CIRCULATING WATER
12414 441.030
6"-P-441107-PJE(0.4)
FROM V-44119
ET 10 50

PI 070
PT 070
TG 034
1-1/2"
6"x4"
3/4"
4"-P-441112-PJE(0.4)
NC
4"-P-441XXX-PJE(0.4)
3/4" D
6
E-44129
RS
UAB
PJE(0.4)
PJE(0.4)
UAB
RS

TW 035
1-1/2"
2" V
CSO
ET 10 50 6"-CWR-441045-UAB
COOLING WATER RETURN
12722 440.048
TO HEADER

8
3/4"
2"-P-441116-PJE(0.4)
PURGE WATER
441.013
TO V-44111
ET 10 38

FC 077 L
I 103 LL
TG 033
FT 077
CIRCULATING WATER
441.030 12415
TO V-44119
ET 10 38
6"x4"
1-1/2"
6"x4"
4"x3"
4"x3"
3/4" D
4"-P-441113-PJE(0.4)
4"-P-441113-PJE(0.4)
ET 10 50 6"-CWS-440076-UAB
COOLING WATER SUPPLY
440.048 12721
FROM HEADER
4" V D
BACK FLUSH

HS SEL
7
HIS 016 R/S
I 100
HS 016A HOA
E 452
I
XA 016 VFD FAULT
XL 016 LOCAL/ REMOTE
SI
VFD
3/4" V
ET 10 50
4"-P-441110-PJE(0.4)
ET 10 ET
3/4"
MIN D
TO GRADE
6"-P-441108-PJE(0.4)
6"-P-441109-PJE(0.4)
PP
3/4"
SP 055
3/4" D
3/4" VENT D
P-44108A

HIS 017 R/S
I 100
HS 017A HOA
E 452
I
XA 017 VFD FAULT
XL 017 LOCAL/ REMOTE
SI
VFD
4"-P-441111-PJE(0.4)
ET 10 ET
3/4"
MIN D
TO GRADE
PP
3/4"
SP 055
3/4" D
3/4" VENT D
P-44108B

P-44108A/B (7)
ABSORBER 3 CIRCULATING WATER WASH PUMPS

RATED FLOW:	56.5 m^3/hr	
DIFF. PR.:	233 kPa	
DRIVER:	5.6 kW	
	CASING	INTERNALS
MATERIAL:	316 SS	316 SS
INSULATION TYPE/THK:	/	(6)
TRIM:	P-441123-PJE(0.4)	

ISSUED FOR HAZOP

1 . SEE DRAWINGS 200.0000.000.041.007 THRU 016 FOR SYMBOL IDENTIFICATION GENERAL NOTES & CONNECTION DETAILS.
2 . ALL INSTRUMENT TAG NUMBERS ARE PREFIXED BY "441" UNLESS OTHERWISE STATED.
3 . FOR PIPING DETAILS OF SAMPLE STATION SEE DRAWING 200.0000.000.041.012.
4 . CV OF CONTROL VALVE TO BE MINIMUM.
5 . SAMPLE TAKE-OFF POINTS TO BE ACCESSIBLE.
6 . ELECTRIC TRACE (ET 10).
7 . AUTO-START STAND-BY PUMP ON RUN FAILURE OF PRIMARY PUMP.
8 . VALVES ARE FOR BATTERY LIMIT ISOLATION OF UNIT.

HOLDS:

- INSTRUMENT SIZING TO BE CONFIRMED DURING DETAILED ENGINEERING.
- CONFIRM AVAILABILITY OF DCS AND SIS INTERLOCK SEQUENCE NUMBERS ADDED FOR QUEST.

REV	ISSUED DATE	DESCRIPTION	BY	CKD	PRS	CS	PDP	MC	APE	PEM	CLIENT APP
G	06/13/11	ISSUED FOR PHA III									
F	04/20/11	ISSUED FOR ESTIMATE									
E	03/01/11	ISSUED FOR PHA II									
D	01/10/11	ISSUED FOR CLIENT REVIEW									
C	12/02/10	ISSUED FOR INTERNAL REVIEW									
B		ISSUED FOR PRELIMINARY REVIEW									

SHELL CANADA
QUEST CCS PROJECT

FLUOR®

PIPING AND INSTRUMENT DIAGRAM
QUEST CCS PROJECT
UNIT 441 - HYDROGEN MANUFACTURING UNIT TRAIN 3
ABSORBER 3 WASH WATER COOLER

SCALE: NONE
SHELL DWG NO.: 441.0000.000.041.031
REV. G

441.031
FILE:\\F:\1025\DRAWINGS\HMU\441\441.031.pid MODEL DATE:6/14/2011 1:17:46 PM BY:bes29451