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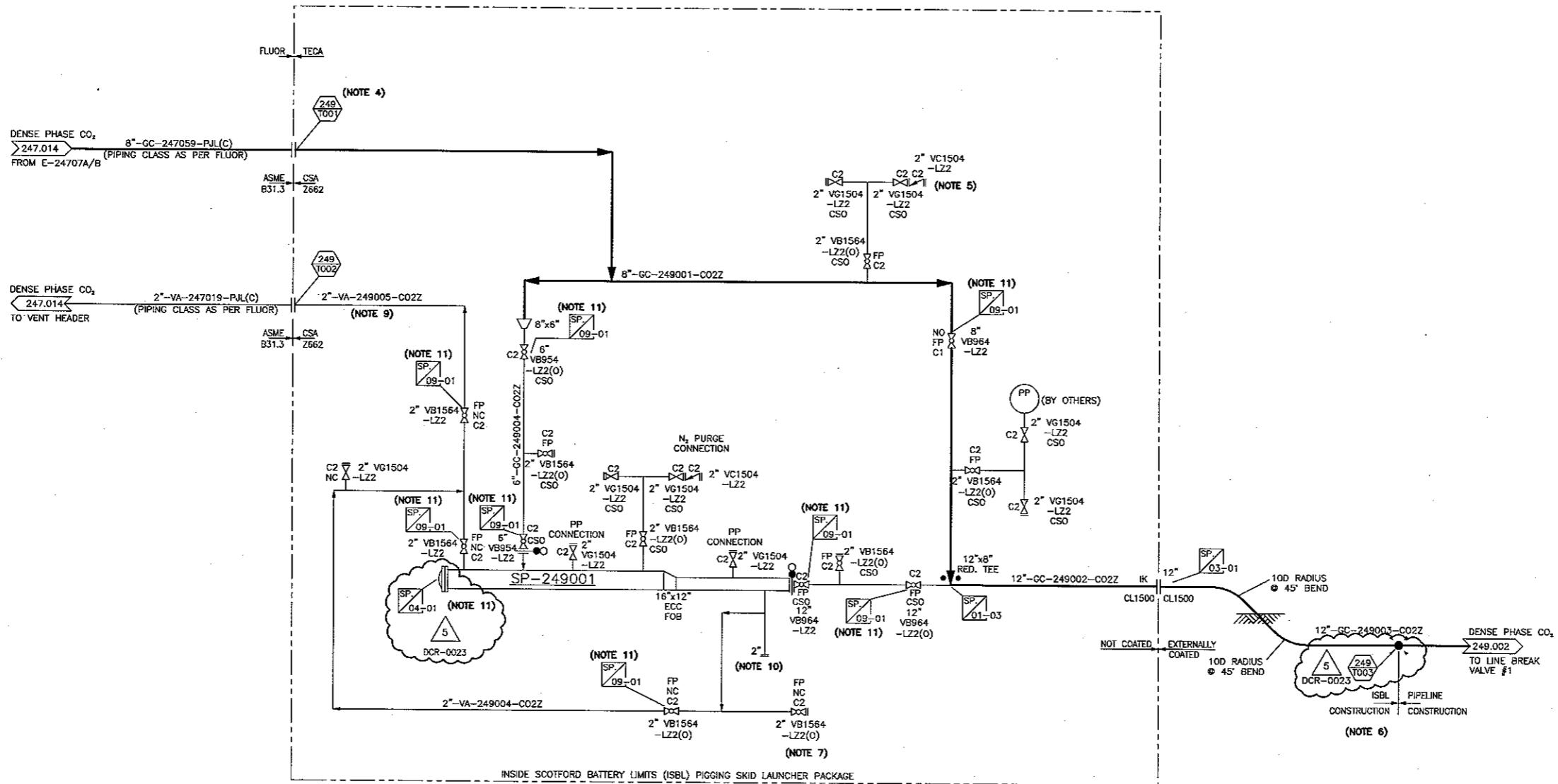
**SP-249001
PIG LAUNCHER**
 SIZE: 16" O.D. x 21'-6" (MAJOR BARREL)
 SIZE: 12" O.D. x 40' (MINOR BARREL)
 DESIGN: 14790 MPa @ 60°C

12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 MPa
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER 249. (i.e. PIT-249101)
 2. DELETED.
 3. DELETED.
 4. TIE-IN FLANGE 1500 ANSI.
 5. CHEMICAL INJECTION PORT FOR INJECTION SYSTEM SUPPLIED BY OTHERS.
 6. ISBL CONSTRUCTION TO OCCUR BEFORE PIPELINE CONSTRUCTION. PIPE TO BE CAPPED AND MARKED FOR PIPELINE TIE-IN.
 7. OPERATING PROCEDURES SHOULD COVER THAT THE DRAIN LINE IS USED IN CONJUNCTION WITH THE VENT LINE DURING VENT/PURGING OPERATIONS.
 8. DELETED.
 9. SONIC VELOCITY VIBRATION AND CARRY OVER OF SOLIDS (UP TO 50%) POSSIBLE IN THIS LINE.
 10. RODDING ACCESSIBILITY TO BE PROVIDED.
 11. VALVES AND QUICK OPEN/CLOSURE TO BE FITTED WITH INTERLOCK SYSTEM.



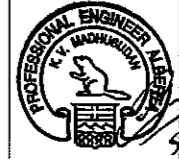
D
C
B
A



KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.		TOYO-CA DWG. No. 09223-0-DG-BC-00001.01 CAD FILE 90101-12Kp	
5	13 JUN 05	RE-ISSUED FOR CONSTR. DCR-0023	BY: [Signature]
4	13 MAR 02	RE-ISSUED FOR CONSTR. DCR-0016	CBC/JJK/KVM
3	12 NOV 06	RE-ISSUED FOR CONSTR. DCR-0016	DIM/MJM/KVM/GJU
2	12 AUG 15	RE-ISSUED FOR CONSTR. DCR-0009	DIM/MJM/KVM/GJU
1	12 JUL 23	RE-ISSUED FOR CONSTR. DCR-0005/6	RE DIM/KVM/GJU
0	12 APR 20	ISSUED FOR CONSTRUCTION	DIM/GJU/GJU/JGL
G	12 FEB 13	ISSUED FOR BID	DIM/NES/DXL
REV	ISSUED DATE	DESCRIPTION	OWN CHKO ENG APP APP QMNT APP



TOYO ENGINEERING CANADA LTD.
 APEGA PERMIT P2034



SHELL CANADA

ALBERTA - 11-32-55-21 W4M

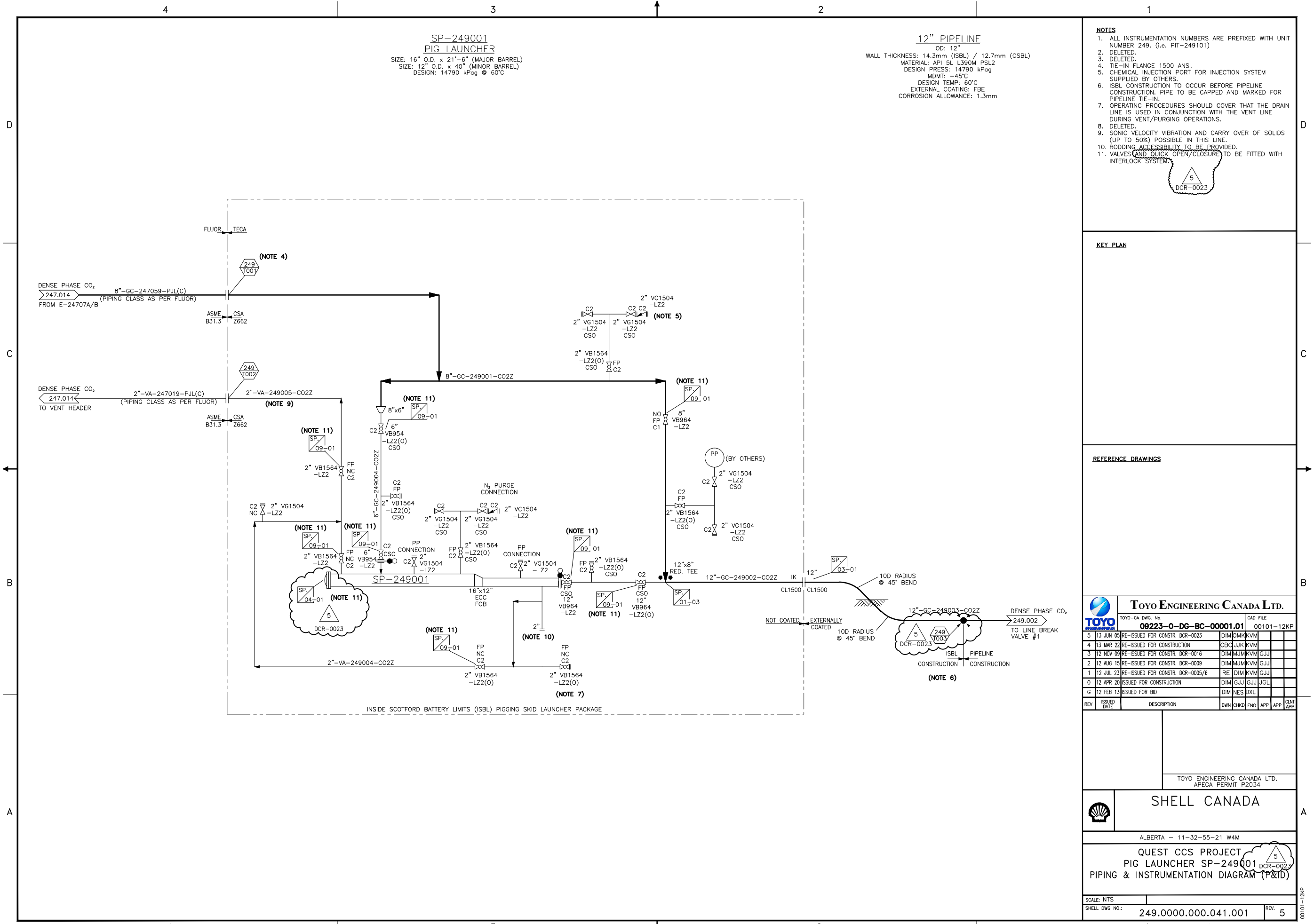
QUEST CCS PROJECT
 PIG LAUNCHER SP-249001
 PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO: 249.0000.000.041.001 REV: 5

**SP-249001
PIG LAUNCHER**
 SIZE: 16" O.D. x 21'-6" (MAJOR BARREL)
 SIZE: 12" O.D. x 40" (MINOR BARREL)
 DESIGN: 14790 kPag @ 60°C

12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER 249. (i.e. PIT-249101)
 2. DELETED.
 3. DELETED.
 4. TIE-IN FLANGE 1500 ANSI.
 5. CHEMICAL INJECTION PORT FOR INJECTION SYSTEM SUPPLIED BY OTHERS.
 6. ISBL CONSTRUCTION TO OCCUR BEFORE PIPELINE CONSTRUCTION. PIPE TO BE CAPPED AND MARKED FOR PIPELINE TIE-IN.
 7. OPERATING PROCEDURES SHOULD COVER THAT THE DRAIN LINE IS USED IN CONJUNCTION WITH THE VENT LINE DURING VENT/PURGING OPERATIONS.
 8. DELETED.
 9. SONIC VELOCITY VIBRATION AND CARRY OVER OF SOLIDS (UP TO 50%) POSSIBLE IN THIS LINE.
 10. RODDING ACCESSIBILITY TO BE PROVIDED.
 11. VALVES AND QUICK OPEN/CLOSURE TO BE FITTED WITH INTERLOCK SYSTEM.



KEY PLAN

REFERENCE DRAWINGS

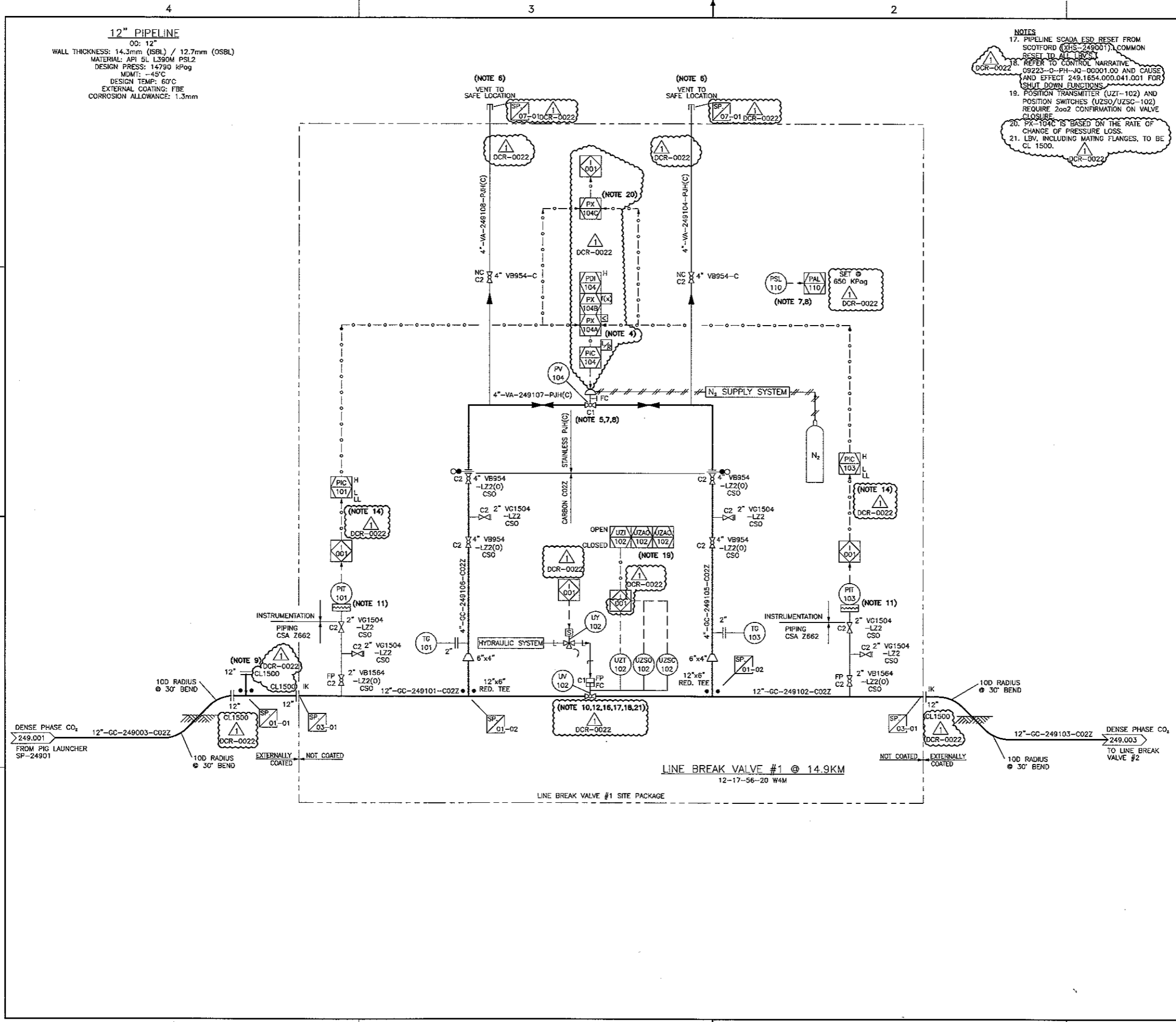
TOYO ENGINEERING CANADA LTD.		TOYO-CA DWG. No.	CAD FILE
TOYO ENGINEERING CANADA LTD.		09223-0-DG-BC-00001.01	00101-12KP
5	13 JUN 06	RE-ISSUED FOR CONSTR. DCR-0023	DIM DMK/KVM
4	13 MAR 22	RE-ISSUED FOR CONSTRUCTION	CBC JJK/KVM
3	12 NOV 09	RE-ISSUED FOR CONSTR. DCR-0016	DIM MJM/KVM GJJ
2	12 AUG 15	RE-ISSUED FOR CONSTR. DCR-0009	DIM MJM/KVM GJJ
1	12 JUL 23	RE-ISSUED FOR CONSTR. DCR-0005/6	RE DIM KVM/GJJ
0	12 APR 20	ISSUED FOR CONSTRUCTION	DIM GJJ/GJJ/JGL
G	12 FEB 13	ISSUED FOR BID	DIM NES/DXL
REV	ISSUED DATE	DESCRIPTION	DWN CHKD ENG APP CLNT APP

TOYO ENGINEERING CANADA LTD.
 APEGA PERMIT P2034



ALBERTA - 11-32-55-21 W4M
QUEST CCS PROJECT
PIG LAUNCHER SP-249001
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS	249.0000.000.041.001	REV: 5
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12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm


- NOTES**
17. PIPELINE SCADA ESD RESET FROM SCOTFORD (PIS-249001) COMMON RESET TO ALL DEVICES
 18. REFER TO CONTROL NARRATIVE 09223-0-PH-JO-00001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS
 19. POSITION TRANSMITTER (UZ1-102) AND POSITION SWITCHES (UZ20/UZ30) REQUIRE 2oo2 CONFIRMATION ON VALVE CLOSURE
 20. PX-104C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 21. LBV INCLUDING MATING FLANGES, TO BE CL 1500.

- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249101).
 2. PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 3. DELETED.
 4. DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 5. PV-104 OPERATION IS BI-DIRECTIONAL.
 6. PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME
 7. INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 8. LOW IG SUPPLY PRESSURE SWITCH.
 9. FUTURE THIRD PARTY CO₂ SUPPLY.
 10. LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 11. PRESSURE TRANSMITTERS PT-101 AND PT-103 REQUIRE 2oo2 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 12. PARTIAL STROKE REQUIRED.
 13. DELETED.
 14. TRIP VALVE XV-247001 ON CONFIRMED 2oo2 PRESSURE TRANSMITTER VOTING.
 15. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 16. LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.


KEY PLAN

REFERENCE DRAWINGS

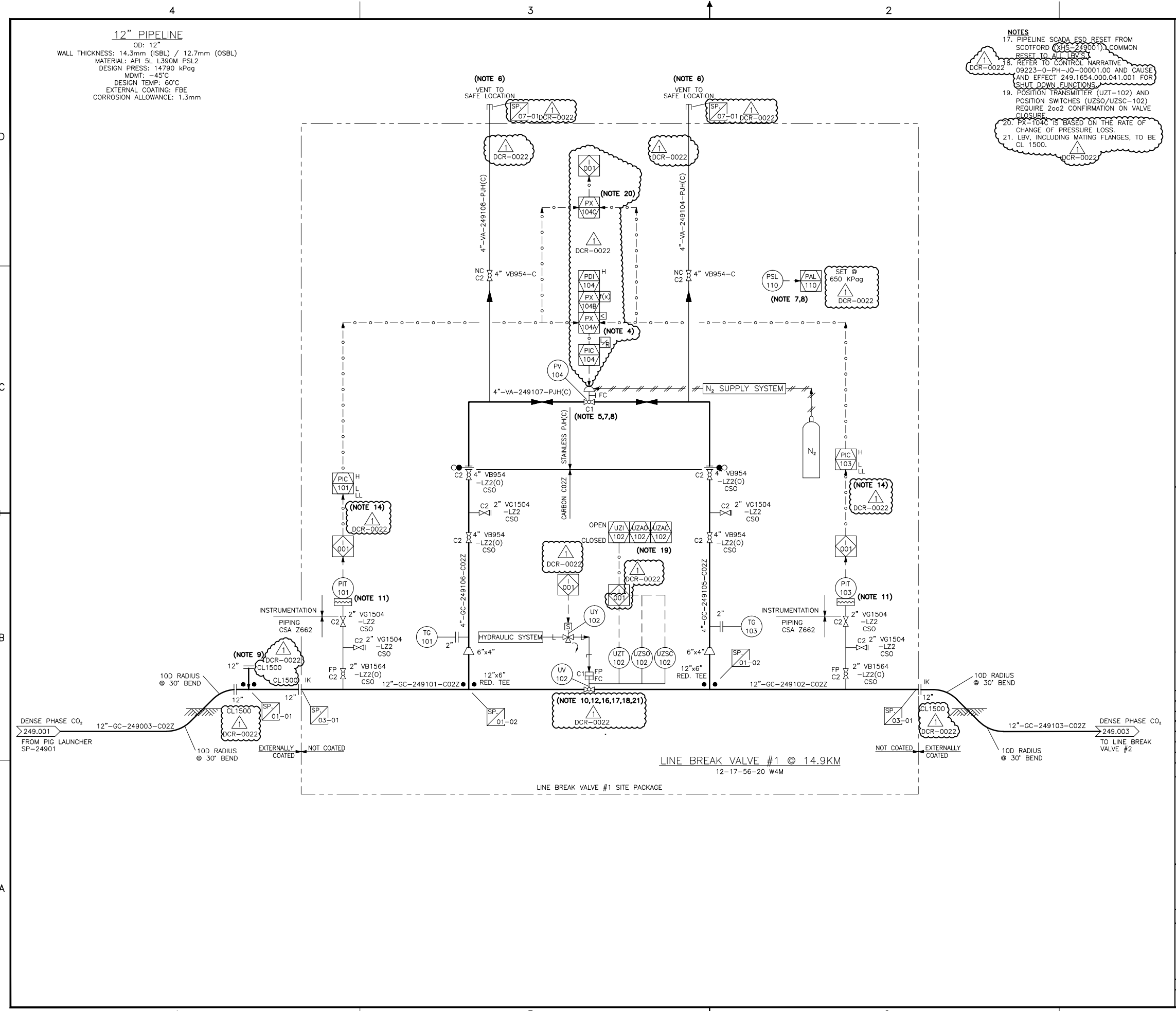
TOYO ENGINEERING CANADA LTD.			
TOYO-CA DWG. No.	09223-0-DG-BC-00002.01	CAO FILE	00201-12L4
REV	ISSUED DATE	DESCRIPTION	DWN CHKD ENG APP APP CLM APP
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION	VADW
0	12 NOV 09	ISSUED FOR CONSTRUCTION	DIM MUM KVM GJJ
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 28/12	DIM MUM KVM GJJ
C	12 JUL 23	RE-ISSUED FOR HAZOP AUG 05/12	RE DIM KVM GJJ



 TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034



SHELL CANADA
 ALBERTA -- 12-17-56-20 W4M
QUEST CCS PROJECT
LINE BREAK VALVE #1
PIPING & INSTRUMENTATION DIAGRAM (P&ID)
 SCALE: NTS
 SHELL DWG NO: 249.0000.000.041.002 REV: 1
 1 UPDATED ON 03/21/13 AT 14:36 by vajiva



12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

- NOTES**
- PIPELINE SCADA ESD RESET FROM SCOTFORD (SIS-249001) COMMON RESET TO ALL LBV'S.
 - REFER TO CONTROL NARRATIVE 09223-0-PH-JQ-00001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS.
 - POSITION TRANSMITTER (UZT-102) AND POSITION SWITCHES (UZSO/UZSC-102) REQUIRE 2002 CONFIRMATION ON VALVE CLOSURE.
 - PX-104C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 - LBV, INCLUDING MATING FLANGES, TO BE CL 1500.

- NOTES**
- ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249101).
 - PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 - DELETED.
 - DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 - BLOWDOWN RATE CONTROLLED BY PX-104A.
 - PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 - PV-104 OPERATION IS BI-DIRECTIONAL.
 - PROVIDE BLOW AWAY COVER.
 - INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 - LOW IG SUPPLY PRESSURE SWITCH.
 - FUTURE THIRD PARTY CO₂ SUPPLY.
 - LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 - PRESSURE TRANSMITTERS PT-101 AND PT-103 REQUIRE 2002 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 - PARTIAL STROKE REQUIRED.
 - TRIP VALVE XV-247001 ON CONFIRMED 2002 PRESSURE TRANSMITTER VOTING.
 - ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 - LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

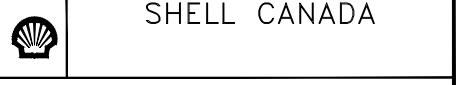
KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.
 TOYO-CA DWG. No. **09223-0-DG-BC-0002.01** CAD FILE 00201-12L4

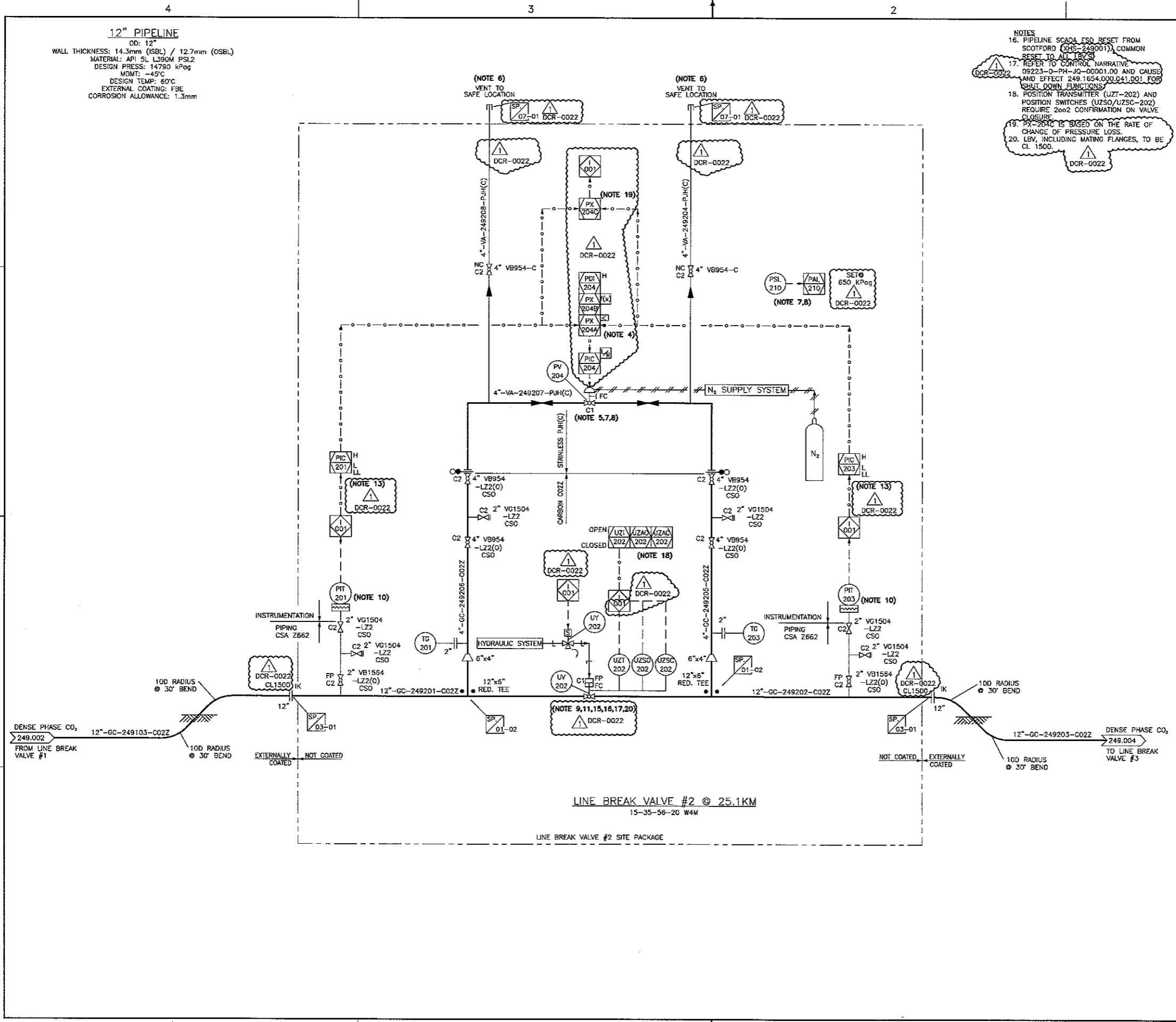
REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLNT APP
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION	VA	JJK	KVM			
0	12 NOV 09	ISSUED FOR CONSTRUCTION	DIM	MJM	KVM	GJJ		
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12	DIM	MJM	KVM	GJJ		
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12	RE	DIM	KVM	GJJ		

TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034



ALBERTA - 12-17-56-20 W4M
QUEST CCS PROJECT
LINE BREAK VALVE #1
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: **249.0000.000.041.002** REV. **1**



12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 50°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

NOTES
 16. PIPELINE SCADA FSD RESET FROM SCOTFORD (SIS-249001) COMMON RESET TO ALL TRIPS
 17. REFER TO CONTROL NARRATIVE 05223-0-PH-JQ-00001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS
 18. POSITION TRANSMITTER (UZT-202) AND POSITION SWITCHES (UZSO/UZSC-202) REQUIRE 2002 CONFIRMATION ON VALVE CLOSURE
 19. PX-204C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 20. LBV, INCLUDING MATING FLANGES, TO BE CL 1500.

NOTES
 1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249, (i.e. PIT-249201).
 2. PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 3. DELETED.
 4. DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 a. BLOWDOWN RATE CONTROLLED BY PX-204A.
 b. PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 5. PV-204 OPERATION IS BI-DIRECTIONAL.
 6. PROVIDE BLOW AWAY COVER.
 7. INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 8. LOW IG SUPPLY PRESSURE SWITCH.
 9. LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 10. PRESSURE TRANSMITTERS PT-201 AND PT-203 REQUIRE 2002 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 11. PARTIAL STROKE REQUIRED.
 12. DELETED.
 13. TRIP VALVE XV-247001 ON CONFIRMED 2002 PRESSURE TRANSMITTER VOTING.
 14. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 15. LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.	
TOYO-CA DWG. NO.	09223-0-DG-BC-00003.01
CAJ FILE	00301-12L6

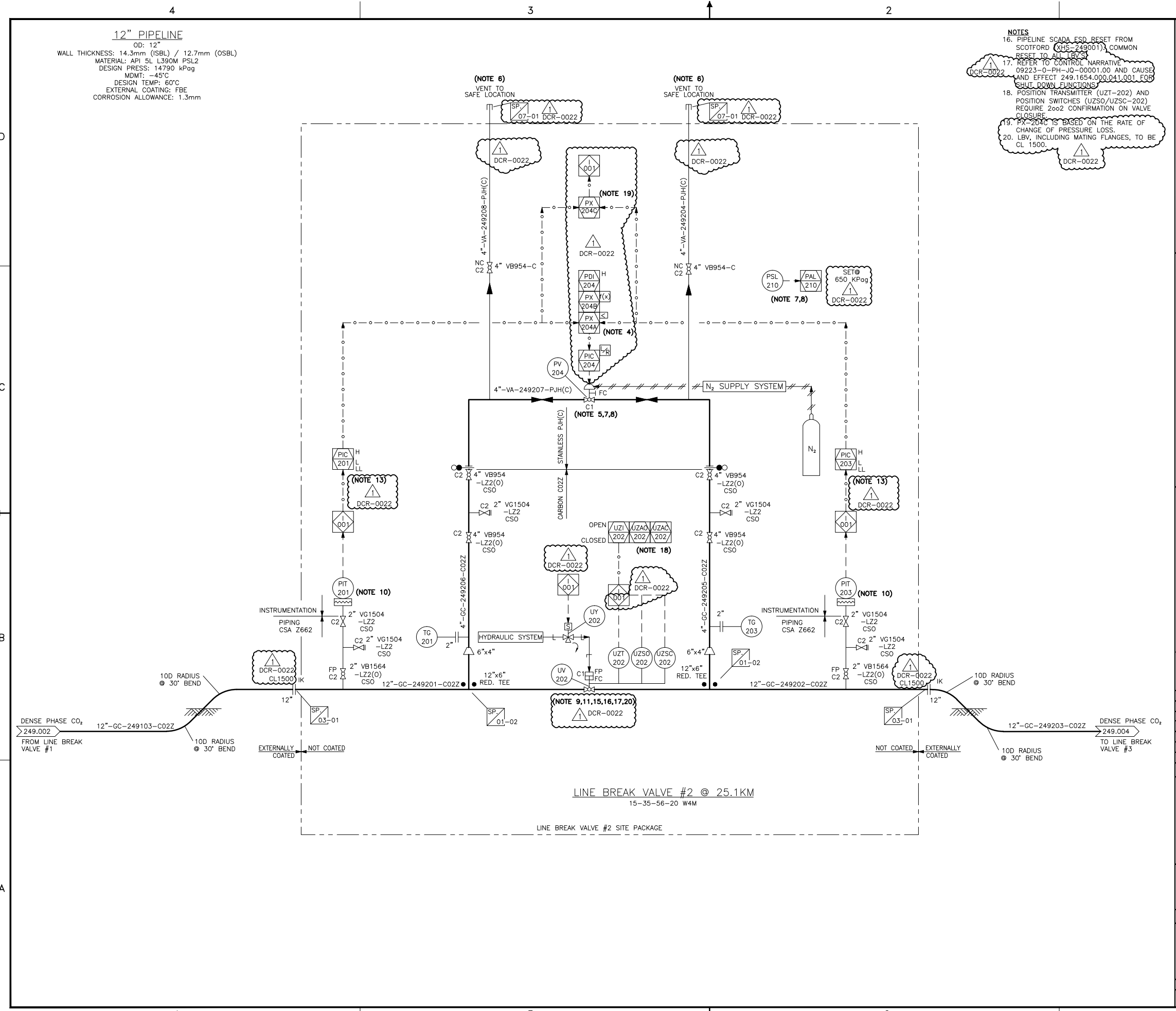
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1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION						
0	12 NOV 09	ISSUED FOR CONSTRUCTION						
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12						
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12						

PROFESSIONAL ENGINEER
 K. V. MADHUKUMAR
 TOYO ENGINEERING CANADA LTD.
 APECCA PERMIT P2034

SHELL CANADA

ALBERTA - 15-35-56-20 W4M
QUEST CCS PROJECT
LINE BREAK VALVE #2
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO: 249.0000.000.041.003
 REV: 1



12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

- NOTES**
- PIPELINE SCADA ESD RESET FROM SCOTFORD (SIS-249001), COMMON RESET TO ALL LBV'S
 - REFER TO CONTROL NARRATIVE 09223-0-PH-JQ-00001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS
 - POSITION TRANSMITTER (UZT-202) AND POSITION SWITCHES (UZSO/UZSC-202) REQUIRE 2002 CONFIRMATION ON VALVE CLOSURE
 - PX-204C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 - LBV, INCLUDING MATING FLANGES, TO BE CL 1500.

- NOTES**
- ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249201).
 - PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 - DELETED.
 - DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 - BLOWDOWN RATE CONTROLLED BY PX-204A.
 - PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 - PV-204 OPERATION IS BI-DIRECTIONAL.
 - PROVIDE BLOW AWAY COVER.
 - INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 - LOW IG SUPPLY PRESSURE SWITCH.
 - LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 - PRESSURE TRANSMITTERS PT-201 AND PT-203 REQUIRE 2002 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 - PARTIAL STROKE REQUIRED.
 - DELETED.
 - TRIP VALVE XV-247001 ON CONFIRMED 2002 PRESSURE TRANSMITTER VOTING.
 - ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 - LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.
 TOYO-CA DWG. No. **09223-0-DG-BC-00003.01** CAD FILE 00301-12LG

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLNT APP
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION						
0	12 NOV 09	ISSUED FOR CONSTRUCTION						
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12						
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12						

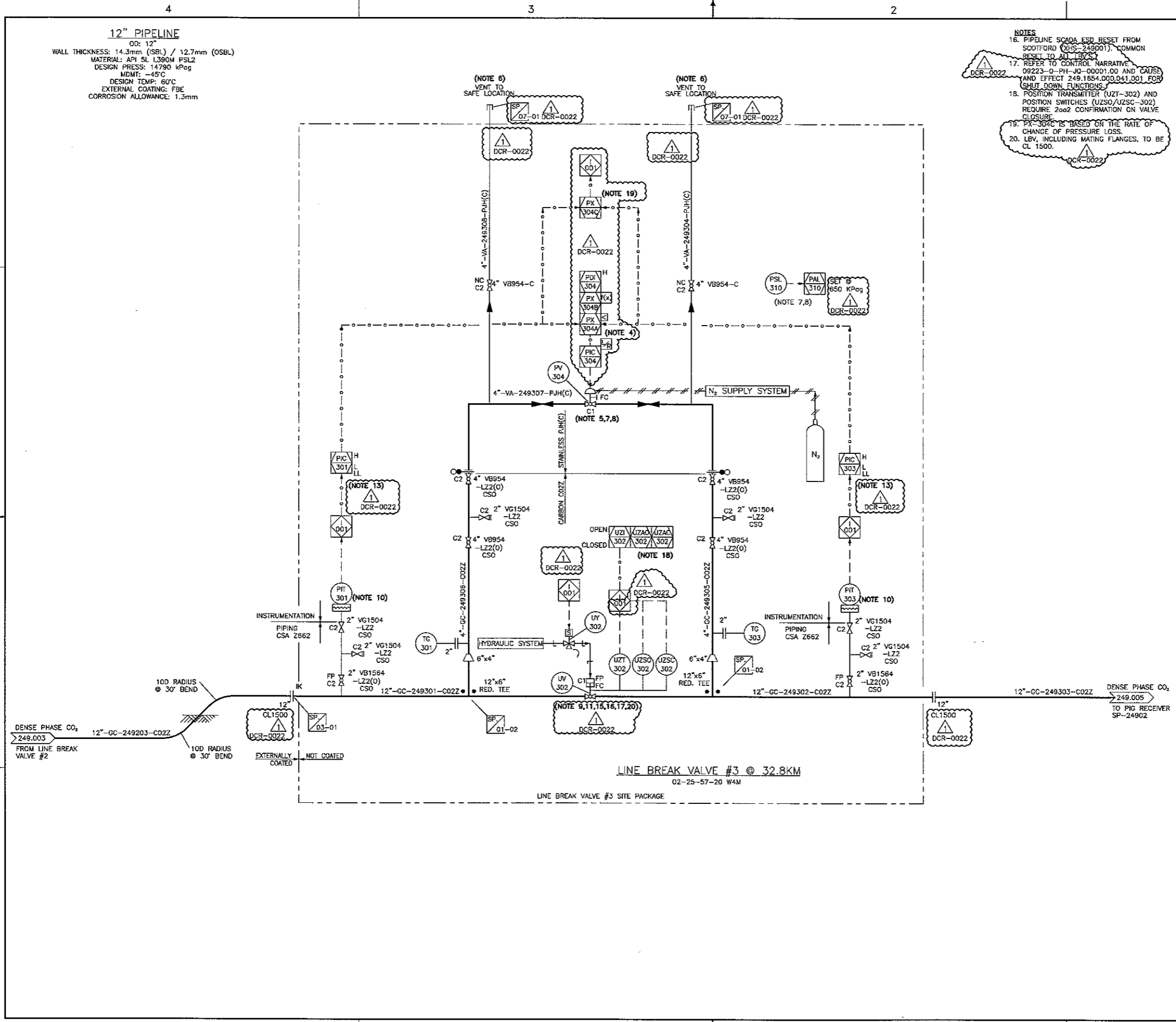
TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034



ALBERTA - 15-35-56-20 W4M

QUEST CCS PROJECT
LINE BREAK VALVE #2
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: **249.0000.000.041.003** REV. **1**



12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

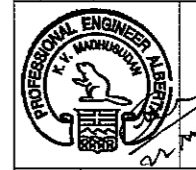
- NOTES**
16. PIPELINE SCADA ESD RESET FROM SCOTFORD (XHS-249001). COMMON RESET TO ALL LBS.
 17. REFER TO CONTROL NARRATIVE 09223-0-PH-JQ-00001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS.
 18. POSITION TRANSMITTER (UZ1-302) AND POSITION SWITCHES (UZSO/UZSC-302) REQUIRE 2oo2 CONFIRMATION ON VALVE CLOSURE.
 19. PX-304C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 20. LBV, INCLUDING MATING FLANGES, TO BE CL 1500.

- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249301).
 2. PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 3. DELETED.
 4. DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION.
 - a. BLOWDOWN RATE CONTROLLED BY PX-304A.
 - b. PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 5. PV-304 OPERATION IS BI-DIRECTIONAL.
 6. PROVIDE BLOW AWAY COVER.
 7. INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 8. LOW IG SUPPLY PRESSURE SWITCH.
 9. LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 10. PRESSURE TRANSMITTERS PT-301 AND PT-303 REQUIRE 2oo2 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 11. PARTIAL STROKE REQUIRED.
 12. DELETED.
 13. TRIP VALVE XV-247001 ON CONFIRMED 2oo2 PRESSURE TRANSMITTER VOTING.
 14. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 15. LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.		TOYO-CA DWG. No.	09223-0-DG-BC-00004.01	CAO FILE	00401-12LL
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION			
0	12 NOV 09	ISSUED FOR CONSTRUCTION			
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 23/12			
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12			
REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG



TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034

SHELL CANADA

ALBERTA - 02-25-57-20 W4M

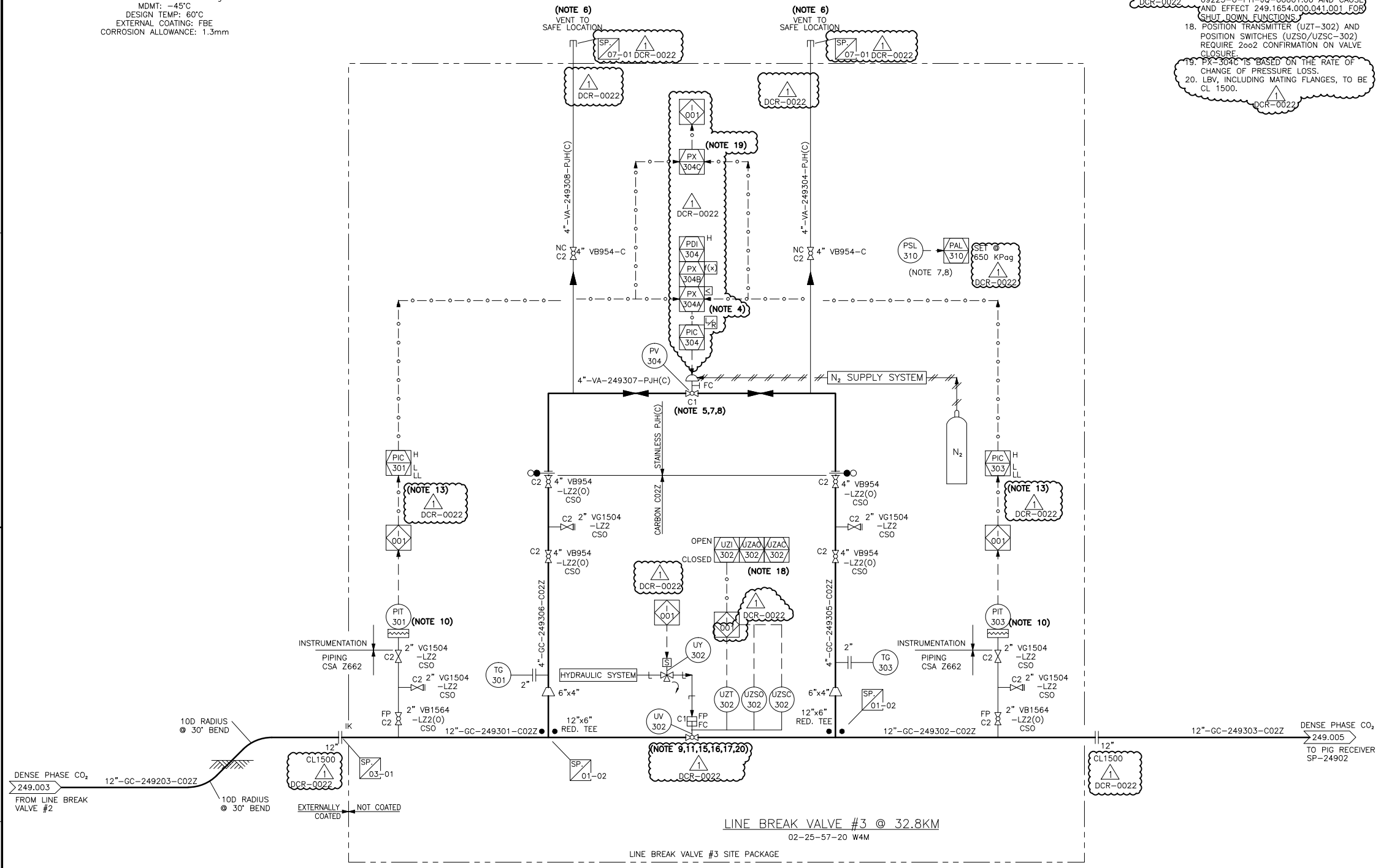
QUEST CCS PROJECT
 LINE BREAK VALVE #3
 PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: 249.0000.000.041.004
 REV. 1

12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

D
C
B
A

4 3 2 1



NOTES
 16. PIPELINE SCADA ESD RESET FROM SCOTFORD (HS-249001). COMMON RESET TO ALL LBVS.
 17. REFER TO CONTROL NARRATIVE 09223-0-PH-JQ-00001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS.
 18. POSITION TRANSMITTER (UZT-302) AND POSITION SWITCHES (UZSO/UZSC-302) REQUIRE 2002 CONFIRMATION ON VALVE CLOSURE.
 19. PX-304C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 20. LBV, INCLUDING MATING FLANGES, TO BE CL 1500.

NOTES
 1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249301).
 2. PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 3. DELETED.
 4. DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 a. BLOWDOWN RATE CONTROLLED BY PX-304A.
 b. PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 5. PV-304 OPERATION IS BI-DIRECTIONAL.
 6. PROVIDE BLOW AWAY COVER.
 7. INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 8. LOW IG SUPPLY PRESSURE SWITCH.
 9. LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 10. PRESSURE TRANSMITTERS PT-301 AND PT-303 REQUIRE 2002 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 11. PARTIAL STROKE REQUIRED.
 12. DELETED.
 13. TRIP VALVE XV-249301 ON CONFIRMED 2002 PRESSURE TRANSMITTER VOTING.
 14. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 15. LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.
 TOYO-CA DWG. No. **09223-0-DG-BC-00004.01** CAD FILE 00401-12LL

1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION	VA	JJK	KVM	
0	12 NOV 09	ISSUED FOR CONSTRUCTION	DIM	MJM	KVM	GJJ
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12	DIM	MJM	KVM	GJJ
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12	RE	DIM	KVM	GJJ

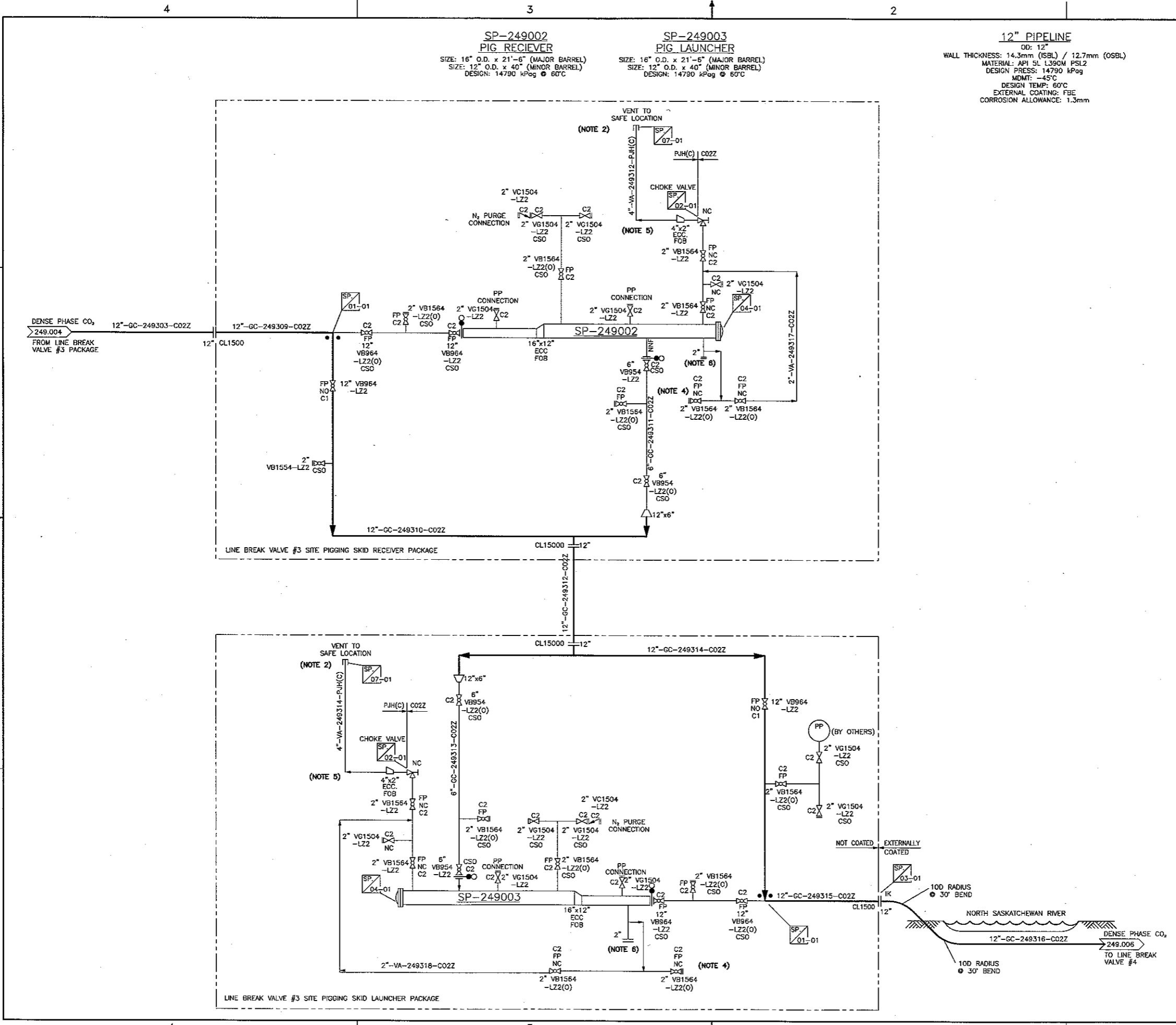
TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034

SHELL CANADA

ALBERTA - 02-25-57-20 W4M
QUEST CCS PROJECT
LINE BREAK VALVE #3
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: **249.0000.000.041.004** REV. **1**

00401-12LL



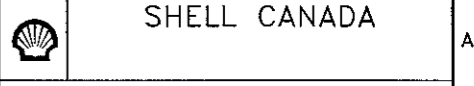
- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER 249. (i.e. PIT-249311)
 2. PROVIDE BLOW AWAY COVER.
 3. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 4. OPERATING PROCEDURES SHOULD COVER THAT THE DRAIN LINE IS USED IN CONJUNCTION WITH THE VENT LINE DURING VENT/PURGING OPERATIONS.
 5. NO POCKETS TO BE PROVIDED ON THE VENT LINE.
 6. RODDING ACCESSIBILITY TO BE PROVIDED.

KEY PLAN

REFERENCE DRAWINGS

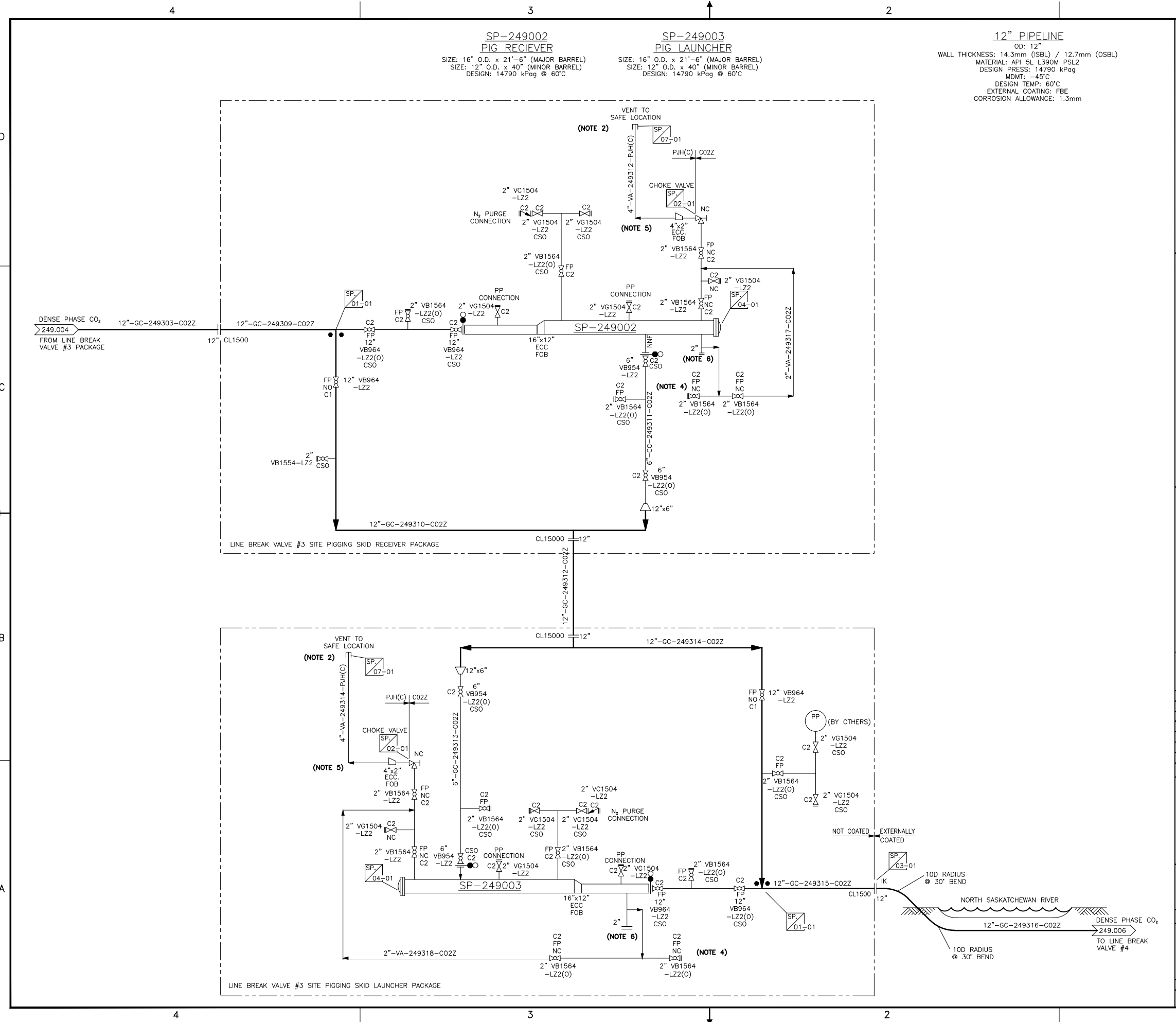
Toyo Engineering Canada Ltd.
 TOYO-CA Dwg. No. **09223-0-DG-BC-00005.01** CAD FILE 00501-12LO
 TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLAT	APP
2	13 JUN 05	RE-ISSUED FOR CONST. - DCR-0023							
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION							
0	12 NOV 09	ISSUED FOR CONSTRUCTION							
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12							
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12							



QUEST CCS PROJECT
 PIG RECEIVER SP-249002 AND PIG LAUNCHER SP-249003
 PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: 249.0000.000.041.005 REV. 2



12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

SP-249002 PIG RECIEVER
 SIZE: 16" O.D. x 21'-6" (MAJOR BARREL)
 SIZE: 12" O.D. x 40" (MINOR BARREL)
 DESIGN: 14790 kPag @ 60°C

SP-249003 PIG LAUNCHER
 SIZE: 16" O.D. x 21'-6" (MAJOR BARREL)
 SIZE: 12" O.D. x 40" (MINOR BARREL)
 DESIGN: 14790 kPag @ 60°C

- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER 249. (i.e. PIT-249311)
 2. PROVIDE BLOW AWAY COVER.
 3. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 4. OPERATING PROCEDURES SHOULD COVER THAT THE DRAIN LINE IS USED IN CONJUNCTION WITH THE VENT LINE DURING VENT/PURGING OPERATIONS.
 5. NO POCKETS TO BE PROVIDED ON THE VENT LINE.
 6. RODDING ACCESSIBILITY TO BE PROVIDED.

KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.
 TOYO-CA DWG. No. **09223-0-DG-BC-00005.01** CAD FILE 00501-12LO

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLNT APP
2	13 JUN 05	RE-ISSUED FOR CONST. - DCR-0023						
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION						
0	12 NOV 09	ISSUED FOR CONSTRUCTION						
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12						
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12						

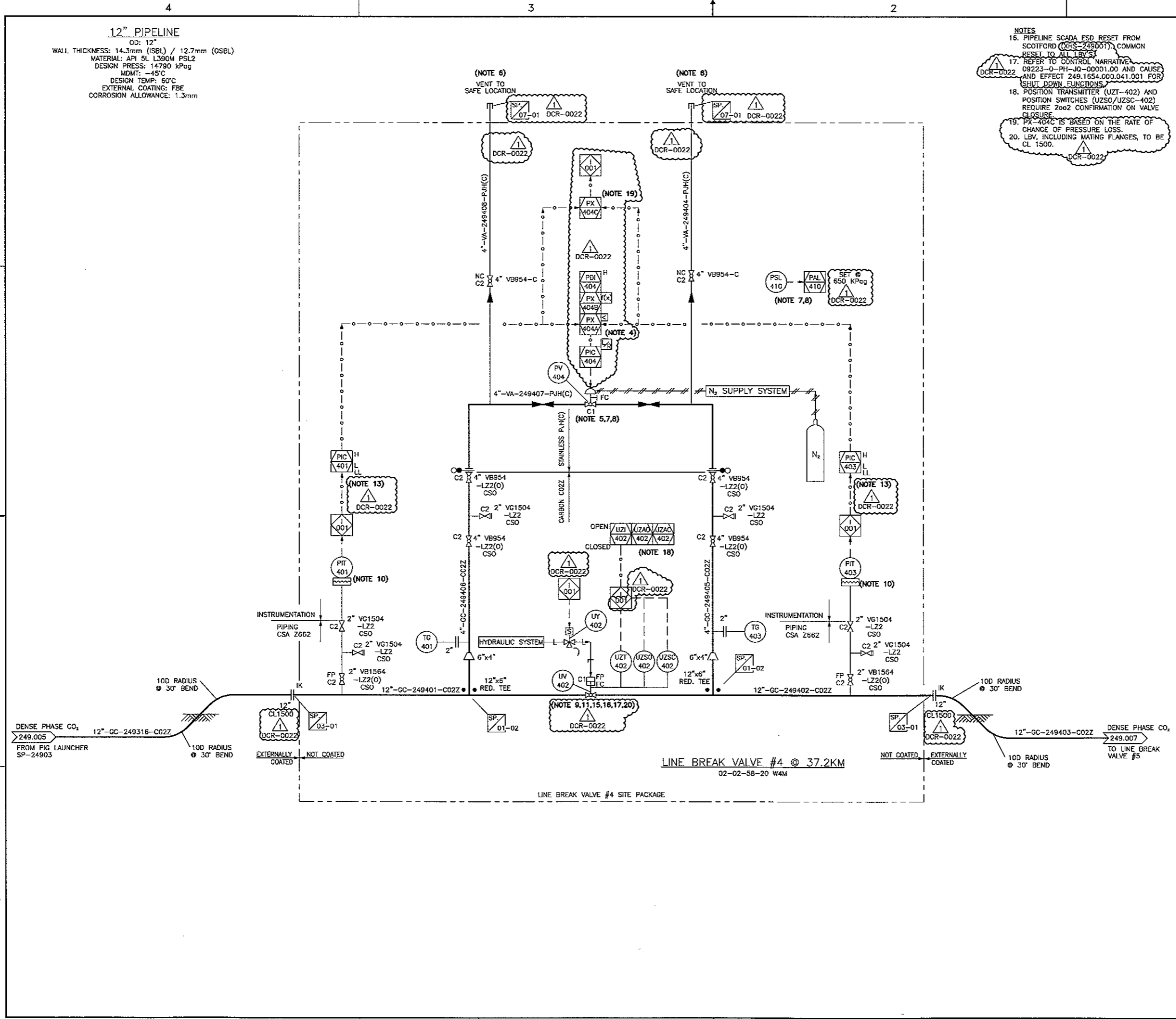
TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034



ALBERTA - 02-25-57-20 W4M

QUEST CCS PROJECT
 PIG RECEIVER SP-249002 AND
 PIG LAUNCHER SP-249003
 PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: **249.0000.000.041.005** REV. **2**



12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (SBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

- NOTES**
16. PIPELINE SCADA ESD RESET FROM SCOTFORD (CHS-249001), COMMON RESET TO ALL LBS.
 17. REFER TO CONTROL NARRATIVE: 09223-0-PH-10-0001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS.
 18. POSITION TRANSMITTER (UZ1-402) AND POSITION SWITCHES (UZ2-402) REQUIRE 2002 CONFIRMATION ON VALVE CLOSURE.
 19. PX-404C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 20. LBV, INCLUDING MATING FLANGES, TO BE CL 1500.

- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249401).
 2. PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 3. DELETED.
 4. DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION.
 - a. BLOWDOWN RATE CONTROLLED BY PX-404A.
 - b. PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 5. PV-404 OPERATION IS BI-DIRECTIONAL.
 6. PROVIDE BLOW AWAY COVER.
 7. INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 8. LOW IG SUPPLY PRESSURE SWITCH.
 9. LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 10. PRESSURE TRANSMITTERS PT-401 AND PT-403 REQUIRE 2002 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 11. PARTIAL STROKE REQUIRED.
 12. DELETED.
 13. TRIP VALVE XV-247001 ON CONFIRMED 2002 PRESSURE TRANSMITTER VOTING.
 14. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 15. LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.		TOYO-CA DWG. No. 09223-0-DG-BC-00006.01	DAO FILE 00601-12MG
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION	
0	12 NOV 09	ISSUED FOR CONSTRUCTION	DIM MUM KVM GJJ
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 28/12	DIM MUM KVM GJJ
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12	RE DIM KVM GJJ
REV	ISSUED DATE	DESCRIPTION	OWN CHKD ENG APP APP EGMT APP

PROFESSIONAL ENGINEER ALBERTA
 K. V. BATHURAI
 TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034

SHELL CANADA
 ALBERTA - 02-02-58-20 W4M
 QUEST CCS PROJECT
 LINE BREAK VALVE #4
 PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: 249.0000.000.041.006
 REV. 1
 08601-12MG

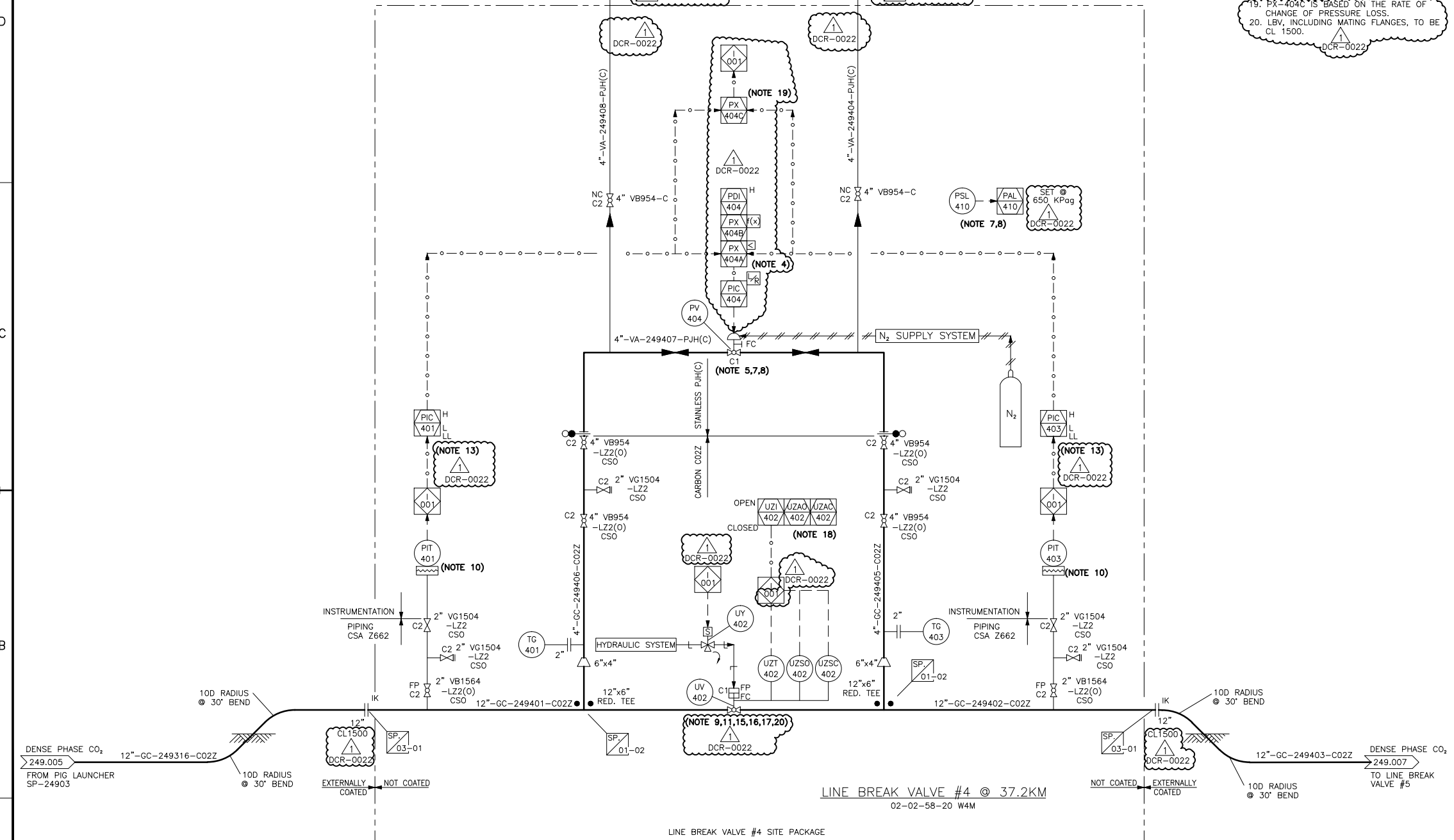
12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

NOTES
 16. PIPELINE SCADA ESD RESET FROM SCOTFORD (SIS-249001), COMMON RESET TO ALL LBV'S.
 17. REFER TO CONTROL NARRATIVE 09223-0-PH-JQ-00001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS.
 18. POSITION TRANSMITTER (UZT-402) AND POSITION SWITCHES (UZSO/UZSC-402) REQUIRE 2002 CONFIRMATION ON VALVE CLOSURE.
 19. PX-404C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 20. LBV, INCLUDING MATING FLANGES, TO BE CL 1500.

NOTES
 1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249401).
 2. PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 3. DELETED.
 4. DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 a. BLOWDOWN RATE CONTROLLED BY PX-404A.
 b. PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 5. PV-404 OPERATION IS BI-DIRECTIONAL.
 6. PROVIDE BLOW AWAY COVER.
 7. INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 8. LOW IG SUPPLY PRESSURE SWITCH.
 9. LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 10. PRESSURE TRANSMITTERS PT-401 AND PT-403 REQUIRE 2002 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 11. PARTIAL STROKE REQUIRED.
 12. DELETED.
 13. TRIP VALVE XV-247001 ON CONFIRMED 2002 PRESSURE TRANSMITTER VOTING.
 14. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 15. LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS



TOYO ENGINEERING CANADA LTD.
 TOYO-CA DWG. No. **09223-0-DG-BC-00006.01** CAD FILE 00601-12MG

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLNT APP
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION	VA	JJK	KVM			
0	12 NOV 09	ISSUED FOR CONSTRUCTION	DIM	MJM	KVM	GJJ		
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12	DIM	MJM	KVM	GJJ		
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12	RE	DIM	KVM	GJJ		

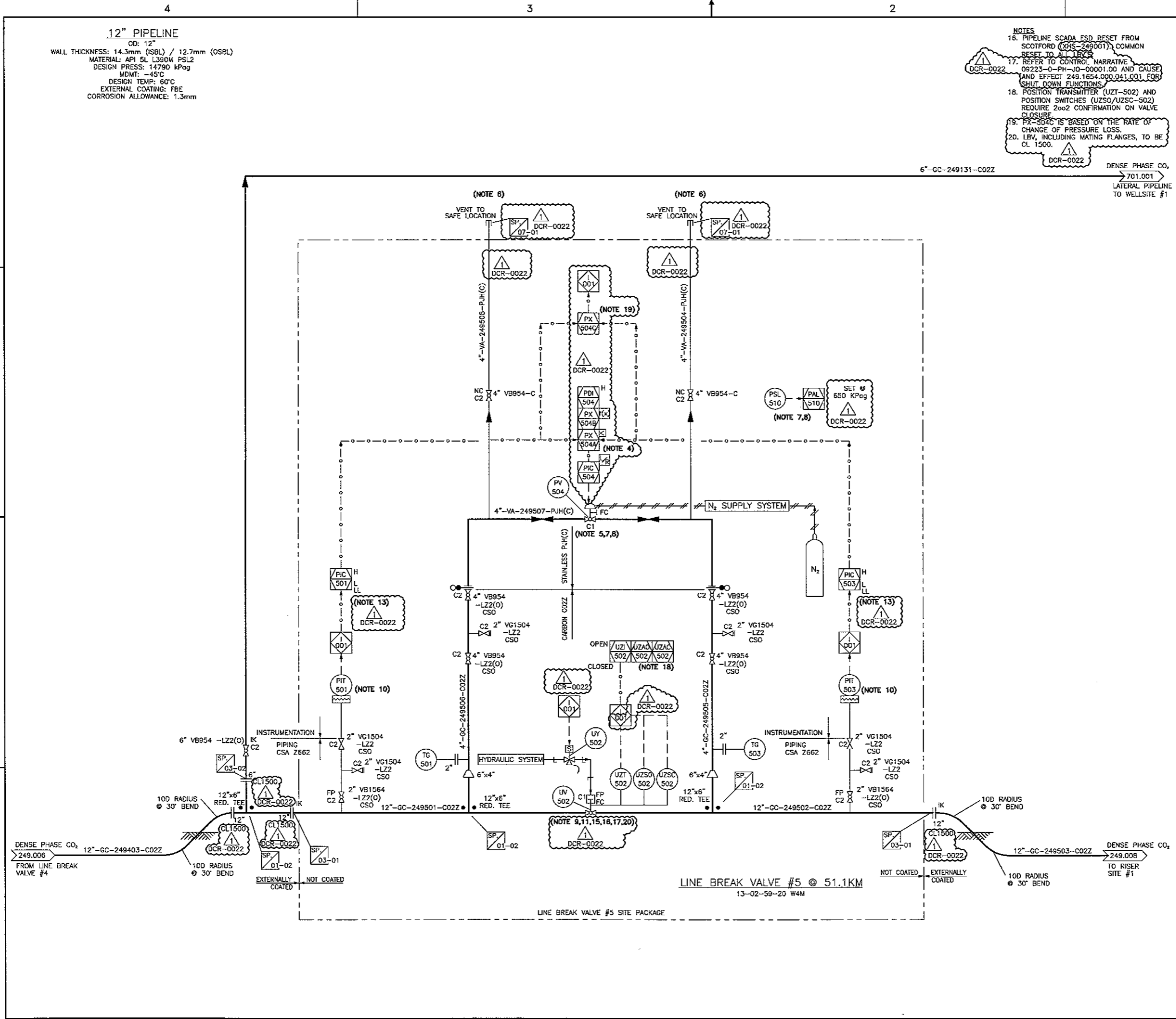
TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034



ALBERTA - 02-02-58-20 W4M

QUEST CCS PROJECT
LINE BREAK VALVE #4
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: **249.0000.000.041.006** REV. **1**



12" PIPELINE
 DD: 12"
 WALL THICKNESS: 14.3mm (OSBL) / 12.7mm (OSL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

- NOTES**
16. PIPELINE SCADA ESD RESET FROM SCOTFORD (XHS-249001), COMMON RESET TO ALL LRV'S
 17. REFER TO CONTROL NARRATIVE 09223-0-PH-10-00001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS
 18. POSITION TRANSMITTER (UZT-502) AND POSITION SWITCHES (UZSO/UZSC-502) REQUIRE 2002 CONFIRMATION ON VALVE CLOSURE
 19. PX-504C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS
 20. LRV, INCLUDING MATING FLANGES, TO BE CL 1500.

- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249501).
 2. PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 3. DELETED.
 4. DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 - a. BLOWDOWN RATE CONTROLLED BY PX-504A.
 - b. PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 5. PV-504 OPERATION IS BI-DIRECTIONAL.
 6. PROVIDE BLOW AWAY COVER.
 7. INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 8. LOW IG SUPPLY PRESSURE SWITCH.
 9. LRV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 10. PRESSURE TRANSMITTERS PT-501 AND PT-503 REQUIRE 2002 VOTING TO SHUTDOWN WELLSITE AND LRV'S ON/OFF VALVES.
 11. PARTIAL STROKE REQUIRED.
 12. DELETED.
 13. TRIP VALVE XV-247001 ON CONFIRMED 2002 PRESSURE TRANSMITTER VOTING.
 14. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 15. LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.
 TOYO-CA DWG. No. 09223-0-DG-BC-00007.01 CAD FILE 00701-12MH

REV	ISSUED DATE	DESCRIPTION	OWN	CHKD	ENG	APP	APP	QMT	APP
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION							
0	12 NOV 09	ISSUED FOR CONSTRUCTION							
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 28/12							
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12							

PROFESSIONAL ENGINEER ALBERTA
 K. V. MADHURAN
 TOYO ENGINEERING CANADA LTD.
 APEOGA PERMIT P2034

SHELL CANADA
 ALBERTA - 13-02-59-20 W4M
 QUEST CCS PROJECT
 LINE BREAK VALVE #5
 PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: 249.0000.000.041.007 REV. 1

12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

- NOTES**
- PIPELINE SCADA ESD RESET FROM SCOTFORD (XHS-249001), COMMON RESET TO ALL LBV'S
 - REFER TO CONTROL NARRATIVE 09223-0-PH-JQ-00001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS
 - POSITION TRANSMITTER (UZT-502) AND POSITION SWITCHES (UZSO/UZSC-502) REQUIRE 2002 CONFIRMATION ON VALVE CLOSURE
 - PX-504C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 - LBV, INCLUDING MATING FLANGES, TO BE CL 1500.

- NOTES**
- ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249501).
 - PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 - DELETED.
 - DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 - BLOWDOWN RATE CONTROLLED BY PX-504A.
 - PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 - PV-504 OPERATION IS BI-DIRECTIONAL.
 - PROVIDE BLOW AWAY COVER.
 - INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 - LOW IG SUPPLY PRESSURE SWITCH.
 - LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 - PRESSURE TRANSMITTERS PT-501 AND PT-503 REQUIRE 2002 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 - PARTIAL STROKE REQUIRED
 - DELETED.
 - TRIP VALVE XV-247001 ON CONFIRMED 2002 PRESSURE TRANSMITTER VOTING.
 - ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 - LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.	
TOYO-CA DWG. No.	CAD FILE
09223-0-DG-BC-00007.01	00701-12MH

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLNT APP
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION		VA	JJK	KVM		
0	12 NOV 09	ISSUED FOR CONSTRUCTION		DIM	MJM	KVM	GJJ	
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12		DIM	MJM	KVM	GJJ	
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12		RE	DIM	KVM	GJJ	

TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034

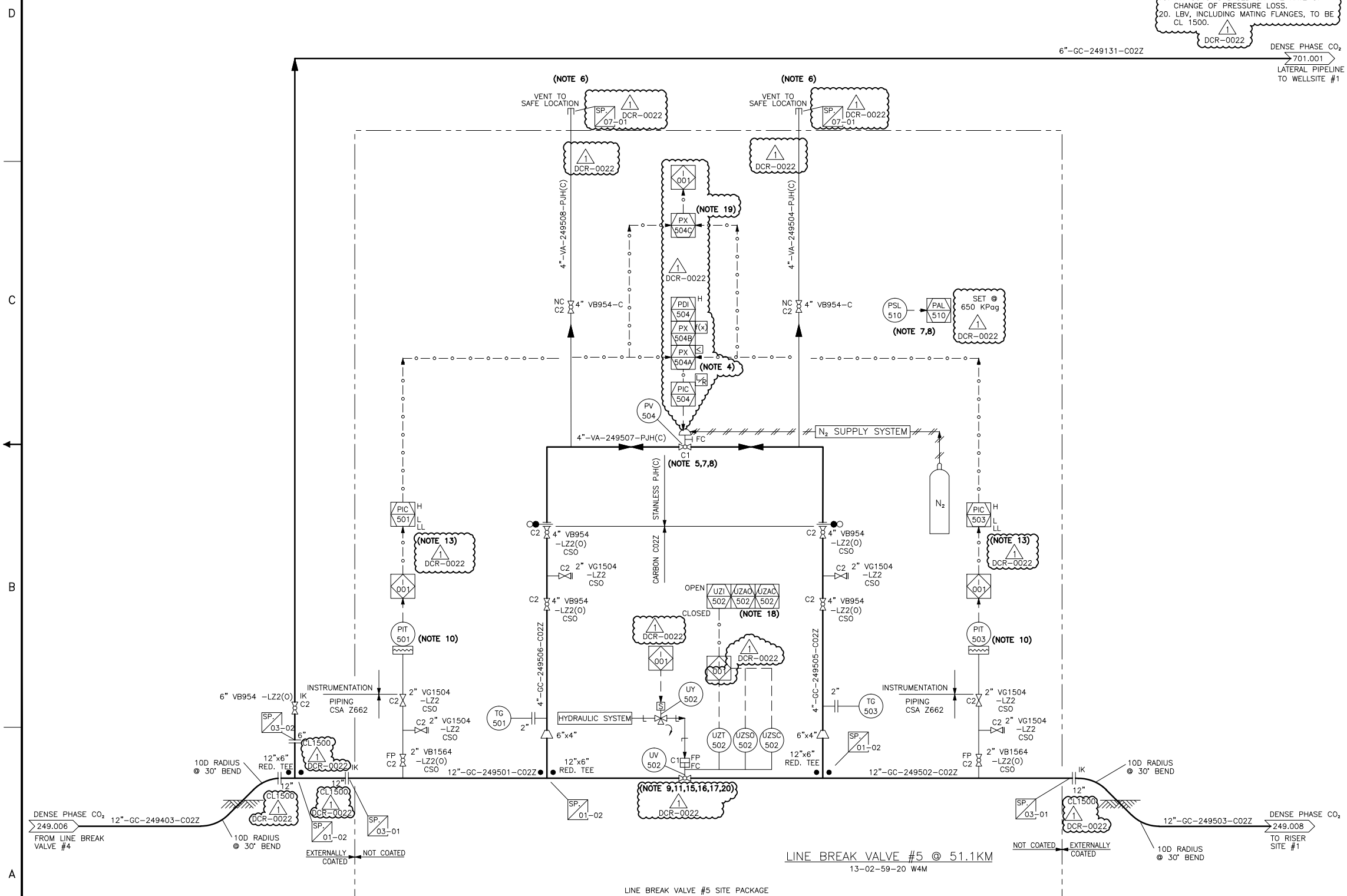
SHELL CANADA

ALBERTA - 13-02-59-20 W4M

QUEST CCS PROJECT
LINE BREAK VALVE #5
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: **249.0000.000.041.007** REV: **1**

1 UPDATED ON 11/08/12 AT 12:15 by DMerlin



LINE BREAK VALVE #5 @ 51.1KM
 13-02-59-20 W4M

LINE BREAK VALVE #5 SITE PACKAGE

6"-GC-249131-C02Z
 DENSE PHASE CO₂ 701.001
 LATERAL PIPELINE TO WELLSITE #1

4"-VA-249508-PJH(C)
 VENT TO SAFE LOCATION
 DCR-0022

4"-VA-249504-PJH(C)
 VENT TO SAFE LOCATION
 DCR-0022

4"-VA-249507-PJH(C)
 N₂ SUPPLY SYSTEM

4"-GC-249506-C02Z
 CARBON CO₂

4"-GC-249505-C02Z
 INSTRUMENTATION PIPING CSA Z662

12"-GC-249501-C02Z
 EXTERNALLY COATED

12"-GC-249502-C02Z
 EXTERNALLY COATED

12"-GC-249503-C02Z
 EXTERNALLY COATED

12"-GC-249504-C02Z
 EXTERNALLY COATED

12"-GC-249505-C02Z
 EXTERNALLY COATED

12"-GC-249506-C02Z
 EXTERNALLY COATED

12"-GC-249507-C02Z
 EXTERNALLY COATED

12"-GC-249508-C02Z
 EXTERNALLY COATED

12"-GC-249509-C02Z
 EXTERNALLY COATED

12"-GC-249510-C02Z
 EXTERNALLY COATED

12"-GC-249511-C02Z
 EXTERNALLY COATED

12"-GC-249512-C02Z
 EXTERNALLY COATED

12"-GC-249513-C02Z
 EXTERNALLY COATED

12"-GC-249514-C02Z
 EXTERNALLY COATED

12"-GC-249515-C02Z
 EXTERNALLY COATED

12"-GC-249516-C02Z
 EXTERNALLY COATED

12"-GC-249517-C02Z
 EXTERNALLY COATED

12"-GC-249518-C02Z
 EXTERNALLY COATED

12"-GC-249519-C02Z
 EXTERNALLY COATED

12"-GC-249520-C02Z
 EXTERNALLY COATED

12"-GC-249521-C02Z
 EXTERNALLY COATED

12"-GC-249522-C02Z
 EXTERNALLY COATED

12"-GC-249523-C02Z
 EXTERNALLY COATED

12"-GC-249524-C02Z
 EXTERNALLY COATED

12"-GC-249525-C02Z
 EXTERNALLY COATED

12"-GC-249526-C02Z
 EXTERNALLY COATED

12"-GC-249527-C02Z
 EXTERNALLY COATED

12"-GC-249528-C02Z
 EXTERNALLY COATED

12"-GC-249529-C02Z
 EXTERNALLY COATED

12"-GC-249530-C02Z
 EXTERNALLY COATED

12"-GC-249531-C02Z
 EXTERNALLY COATED

12"-GC-249532-C02Z
 EXTERNALLY COATED

12"-GC-249533-C02Z
 EXTERNALLY COATED

12"-GC-249534-C02Z
 EXTERNALLY COATED

12"-GC-249535-C02Z
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12"-GC-249536-C02Z
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12"-GC-249537-C02Z
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12"-GC-249538-C02Z
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12"-GC-249539-C02Z
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12"-GC-249540-C02Z
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12"-GC-249541-C02Z
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12"-GC-249542-C02Z
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 EXTERNALLY COATED

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12"-GC-249547-C02Z
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12"-GC-249558-C02Z
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12"-GC-249560-C02Z
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12"-GC-249561-C02Z
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12"-GC-249571-C02Z
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12"-GC-249573-C02Z
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 EXTERNALLY COATED

12"-GC-249582-C02Z
 EXTERNALLY COATED

12"-GC-249583-C02Z
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12"-GC-249584-C02Z
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12"-GC-249585-C02Z
 EXTERNALLY COATED

12"-GC-249586-C02Z
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12"-GC-249587-C02Z
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12"-GC-249588-C02Z
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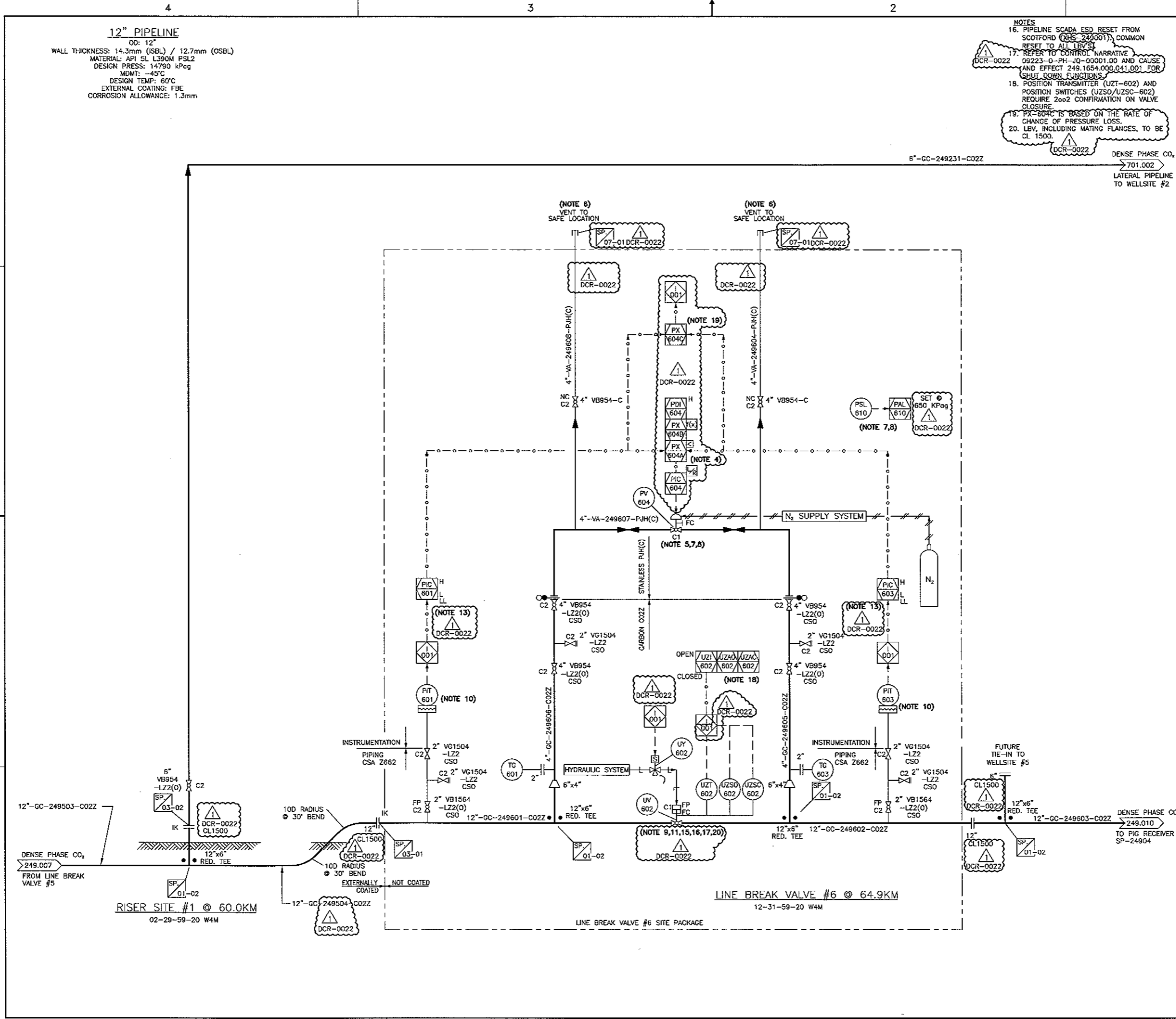
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12"-GC-249598-C02Z
 EXTERNALLY COATED

12"-GC-249599-C02Z
 EXTERNALLY COATED

12"-GC-249600-C02Z
 EXTERNALLY COATED



- NOTES**
- ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249601).
 - PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 - DELETED.
 - DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 - BLOWDOWN RATE CONTROLLED BY PX-604A.
 - PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 - PV-604 OPERATION IS BI-DIRECTIONAL.
 - PROVIDE BLOW AWAY COVER.
 - INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 - LOW IG SUPPLY PRESSURE SWITCH.
 - LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 - PRESSURE TRANSMITTERS PT-601 AND PT-603 REQUIRE 2002 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 - PARTIAL STROKE REQUIRED.
 - TRIP VALVE XV-247001 ON CONFIRMED 2002 PRESSURE TRANSMITTER VOTING.
 - ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 - LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS

NO.	DATE	DESCRIPTION	BY	CHKD	APP	APP	CLIP
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION	NA	SK			
0	12 NOV 09	ISSUED FOR CONSTRUCTION	DIM	MJM	KVM	GJJ	
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 23/12	DIM	MJM	KVM	GJJ	
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12	RE	DIM	KVM	GJJ	

TOYO ENGINEERING CANADA LTD.

TOYO-CA DWG. No. **09223-0-DG-BC-00008.01** CAD FILE: 00801-12MI

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENC	APP	APP	CLIP
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION						
0	12 NOV 09	ISSUED FOR CONSTRUCTION						
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 23/12						
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12						

PROFESSIONAL ENGINEER ALBERTA
 K. V. MADHURAN
 TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034

SHELL CANADA

ALBERTA - 12-31-59-20 W4M

QUEST CCS PROJECT
LINE BREAK VALVE #6
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

12" PIPELINE
 OD: 12"
 WALL THICKNESS: 14.3mm (ISBL) / 12.7mm (OSBL)
 MATERIAL: API 5L L390M PSL2
 DESIGN PRESS: 14790 kPag
 MDMT: -45°C
 DESIGN TEMP: 60°C
 EXTERNAL COATING: FBE
 CORROSION ALLOWANCE: 1.3mm

- NOTES**
- PIPELINE SCADA ESD RESET FROM SCOTFORD (DCR-249001), COMMON RESET TO ALL LBV'S
 - REFER TO CONTROL NARRATIVE 09223-0-PH-JQ-0001.00 AND CAUSE AND EFFECT 249.1654.000.041.001 FOR SHUT DOWN FUNCTIONS
 - POSITION SWITCHER (UZT-602) AND POSITION SWITCHES (UZSO/UZSC-602) REQUIRE 2oo2 CONFIRMATION ON VALVE CLOSURE
 - PX-604C IS BASED ON THE RATE OF CHANGE OF PRESSURE LOSS.
 - LBV, INCLUDING MATING FLANGES, TO BE CL 1500.

- NOTES**
- ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT #249. (i.e. PIT-249601).
 - PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 - DELETED.
 - DUAL FUNCTION VALVE CONTROL DETERMINED BY OPERATOR SELECTION
 - BLOWDOWN RATE CONTROLLED BY PX-604A.
 - PRESSURIZATION RATE CONTROLLED BY PRESSURE REGULATED OVER TIME.
 - PV-604 OPERATION IS BI-DIRECTIONAL.
 - PROVIDE BLOW AWAY COVER.
 - INSTR. GAS SUPPLY PROVIDED BY BOTTLED GAS (NITROGEN).
 - LBV ACTUATION IS DESIGNED TO CLOSE IN 30 SECONDS TO CONTROL PRESSURE SURGE (WATER HAMMER).
 - PRESSURE TRANSMITTERS PT-601 AND PT-603 REQUIRE 2oo2 VOTING TO SHUTDOWN WELLSITE AND LBV'S ON/OFF VALVES.
 - PARTIAL STROKE REQUIRED.
 - TRIP VALVE XV-247001 ON CONFIRMED 2oo2 PRESSURE TRANSMITTER VOTING.
 - ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 - LOCAL HYDRAULIC RESET ON HYDRAULIC PACK. LOCAL ONLY TO RESERVOIR RETURN LINE.

KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.
 TOYO-CA DWG. No. **09223-0-DG-BC-00008.01** CAD FILE 00801-12MI

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLNT APP
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION						VA JJK KVM
0	12 NOV 09	ISSUED FOR CONSTRUCTION						DIM MJM KVM GJJ
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12						DIM MJM KVM GJJ
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12						RE DIM KVM GJJ

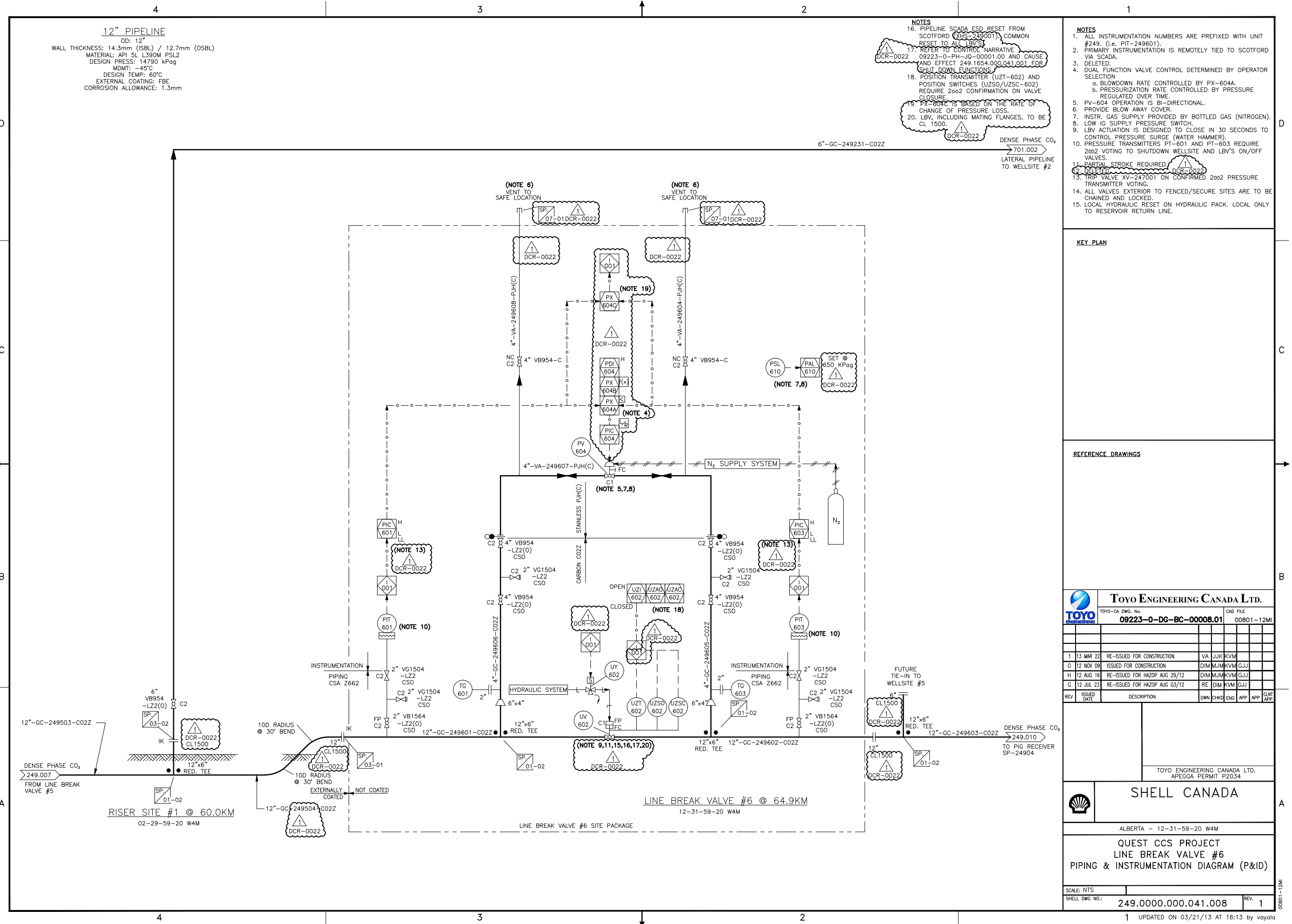
TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034

SHELL CANADA

ALBERTA - 12-31-59-20 W4M

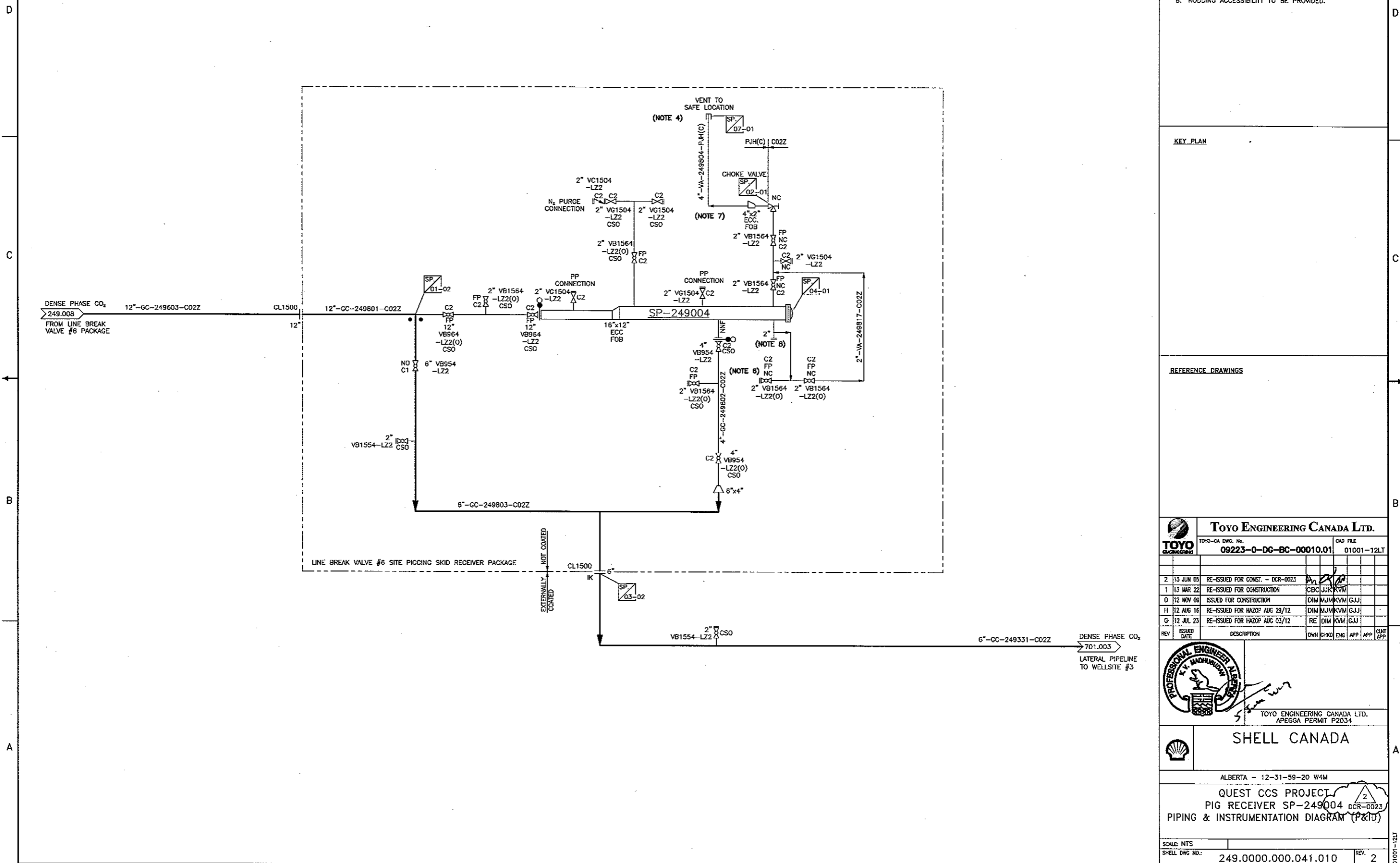
QUEST CCS PROJECT
LINE BREAK VALVE #6
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: **249.0000.000.041.008** REV. **1**



SP-249004
 PIG RECEIVER
 SIZE: 16" O.D. x 21'-6" (MAJOR BARREL)
 SIZE: 12" O.D. x 40" (MINOR BARREL)
 DESIGN: 14790 kPog @ 60°C

- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER 249. (i.e. PIT-249611)
 2. DELETED.
 3. DELETED.
 4. PROVIDE BLOW AWAY COVER.
 5. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 6. OPERATING PROCEDURES SHOULD COVER THAT THE DRAIN LINE IS USED IN CONJUNCTION WITH THE VENT LINE DURING VENT/PURGING OPERATIONS.
 7. NO POCKETS TO BE PROVIDED ON THE VENT LINE.
 8. RODDING ACCESSIBILITY TO BE PROVIDED.



KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.
 TOYO-CA ENG. NO. 09223-0-06-BC-00010.01 CAD FILE 01001-12LT

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CHK	APP
2	13 JUN 09	RE-ISSUED FOR CONST. - DCR-0023							
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION							
0	12 NOV 06	ISSUED FOR CONSTRUCTION							
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12							
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12							

PROFESSIONAL ENGINEER
 K. MADHUKUMAR
 TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034

SHELL CANADA

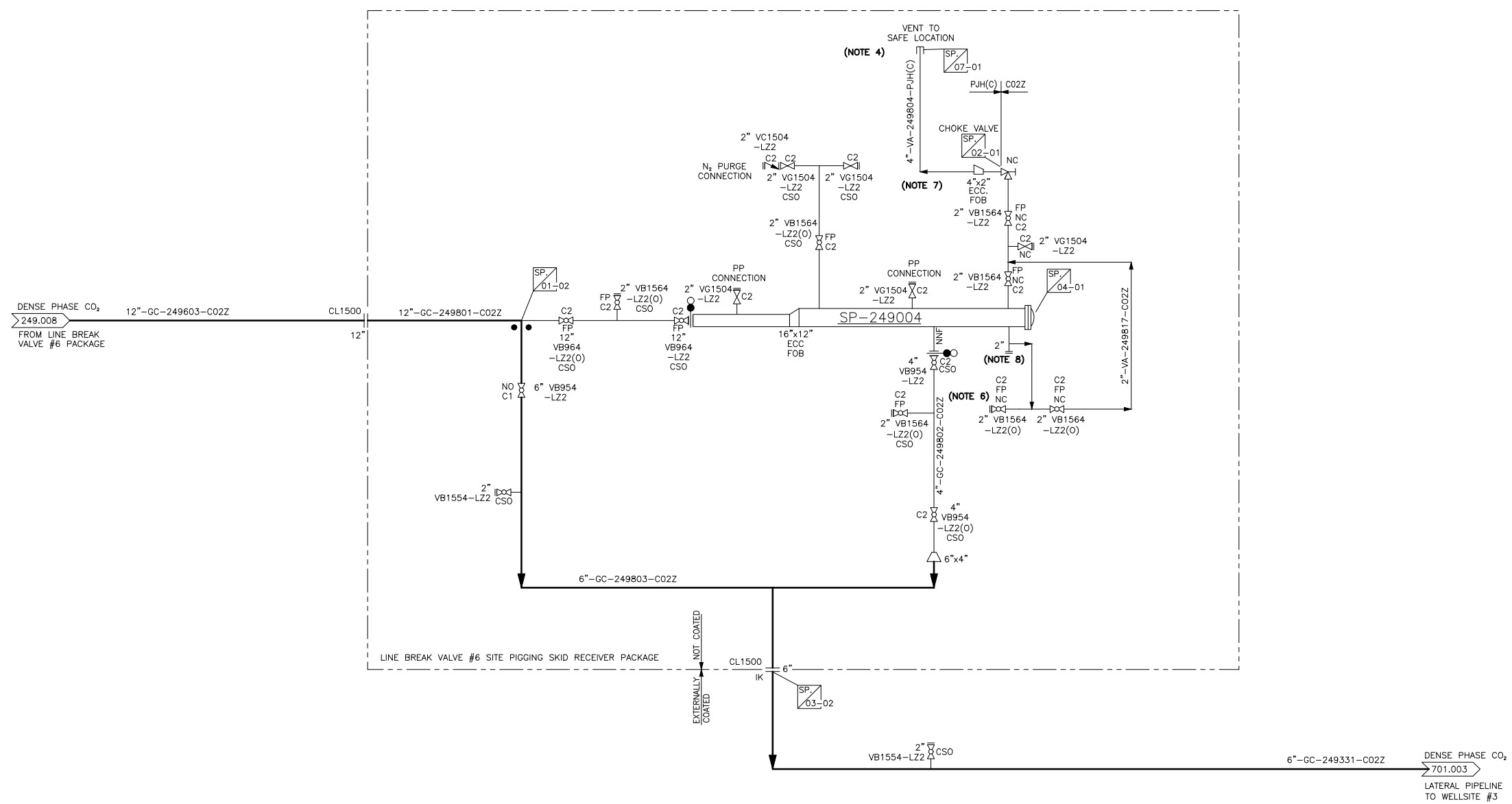
ALBERTA - 12-31-59-20 W4M
 QUEST CCS PROJECT
 PIG RECEIVER SP-249004 DCR-0023
 PIPING & INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: 249.0000.000.041.010 REV: 2

SP-249004
 PIG RECEIVER
 SIZE: 16" O.D. x 21'-6" (MAJOR BARREL)
 SIZE: 12" O.D. x 40" (MINOR BARREL)
 DESIGN: 14790 kPag @ 60°C

- NOTES**
1. ALL INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER 249. (i.e. PIT-249611)
 2. DELETED.
 3. DELETED.
 4. PROVIDE BLOW AWAY COVER.
 5. ALL VALVES EXTERIOR TO FENCED/SECURE SITES ARE TO BE CHAINED AND LOCKED.
 6. OPERATING PROCEDURES SHOULD COVER THAT THE DRAIN LINE IS USED IN CONJUNCTION WITH THE VENT LINE DURING VENT/PURGING OPERATIONS.
 7. NO POCKETS TO BE PROVIDED ON THE VENT LINE.
 8. RODDING ACCESSIBILITY TO BE PROVIDED.

D
C
B
A



KEY PLAN

REFERENCE DRAWINGS

TOYO ENGINEERING CANADA LTD.
 TOYO-CA DWG. No. 09223-0-DG-BC-00010.01
 CAD FILE 01001-12LT

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLNT APP
2	13 JUN 05	RE-ISSUED FOR CONST. - DCR-0023						
1	13 MAR 22	RE-ISSUED FOR CONSTRUCTION						
0	12 NOV 09	ISSUED FOR CONSTRUCTION						
H	12 AUG 16	RE-ISSUED FOR HAZOP AUG 29/12						
G	12 JUL 23	RE-ISSUED FOR HAZOP AUG 03/12						

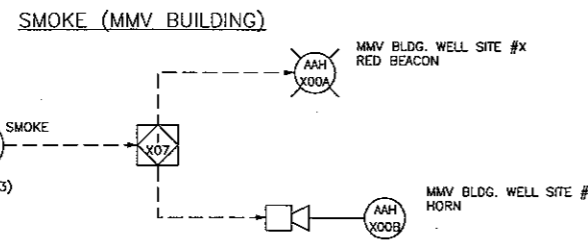
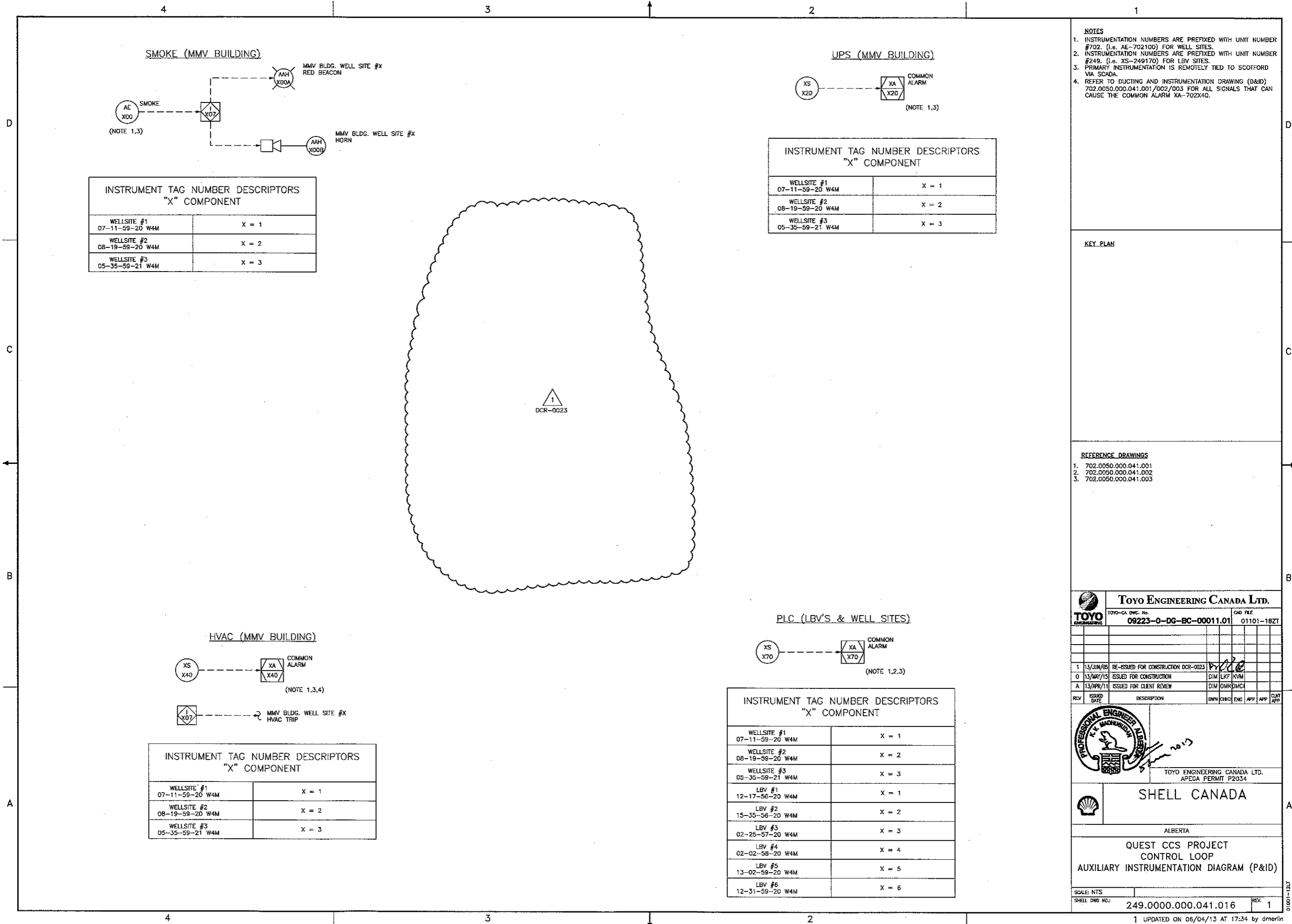
TOYO ENGINEERING CANADA LTD.
 APEGGA PERMIT P2034



ALBERTA - 12-31-59-20 W4M
 QUEST CCS PROJECT
 PIG RECEIVER SP-249004 DCR-0023
 PIPING & INSTRUMENTATION DIAGRAM (P&ID)

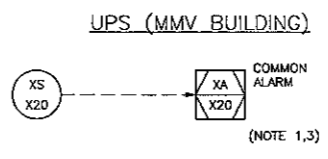
SCALE: NTS
 SHELL DWG NO.: 249.0000.000.041.010
 REV. 2

01001-12LT



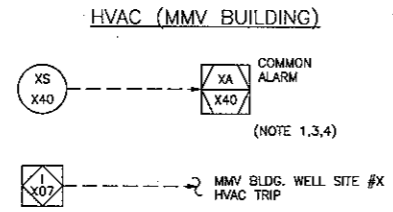
**INSTRUMENT TAG NUMBER DESCRIPTORS
"X" COMPONENT**

WELLSITE #1 07-11-59-20 W4M	X = 1
WELLSITE #2 08-19-59-20 W4M	X = 2
WELLSITE #3 05-35-59-21 W4M	X = 3



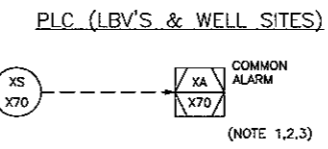
**INSTRUMENT TAG NUMBER DESCRIPTORS
"X" COMPONENT**

WELLSITE #1 07-11-59-20 W4M	X = 1
WELLSITE #2 08-19-59-20 W4M	X = 2
WELLSITE #3 05-35-59-21 W4M	X = 3



**INSTRUMENT TAG NUMBER DESCRIPTORS
"X" COMPONENT**

WELLSITE #1 07-11-59-20 W4M	X = 1
WELLSITE #2 08-19-59-20 W4M	X = 2
WELLSITE #3 05-35-59-21 W4M	X = 3



**INSTRUMENT TAG NUMBER DESCRIPTORS
"X" COMPONENT**

WELLSITE #1 07-11-59-20 W4M	X = 1
WELLSITE #2 08-19-59-20 W4M	X = 2
WELLSITE #3 05-35-59-21 W4M	X = 3
LBV #1 12-17-56-20 W4M	X = 1
LBV #2 15-35-56-20 W4M	X = 2
LBV #3 02-25-57-20 W4M	X = 3
LBV #4 02-02-58-20 W4M	X = 4
LBV #5 13-02-59-20 W4M	X = 5
LBV #6 12-31-59-20 W4M	X = 6

- NOTES**
- INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER #702. (i.e. AE-702100) FOR WELL SITES.
 - INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER #249. (i.e. XS-249170) FOR LBV SITES.
 - PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 - REFER TO DUCTING AND INSTRUMENTATION DRAWING (D&ID) 702.0050.000.041.001/002/003 FOR ALL SIGNALS THAT CAN CAUSE THE COMMON ALARM XA-702X40.

KEY PLAN

- REFERENCE DRAWINGS**
- 702.0050.000.041.001
 - 702.0050.000.041.002
 - 702.0050.000.041.003

TOYO ENGINEERING CANADA LTD.

TOYO-CA Dwg. No. **09223-0-DG-BC-00011.01** CAD FILE 01101-182T

REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLRT	APP
1	13/JUN/05	RE-ISSUED FOR CONSTRUCTION DCR-0023							
0	13/MAY/15	ISSUED FOR CONSTRUCTION							
A	13/APR/11	ISSUED FOR CLIENT REVIEW							

PROFESSIONAL ENGINEER

K. S. MACHIRAJU

TOYO ENGINEERING CANADA LTD.
APEGA PERMIT P2034

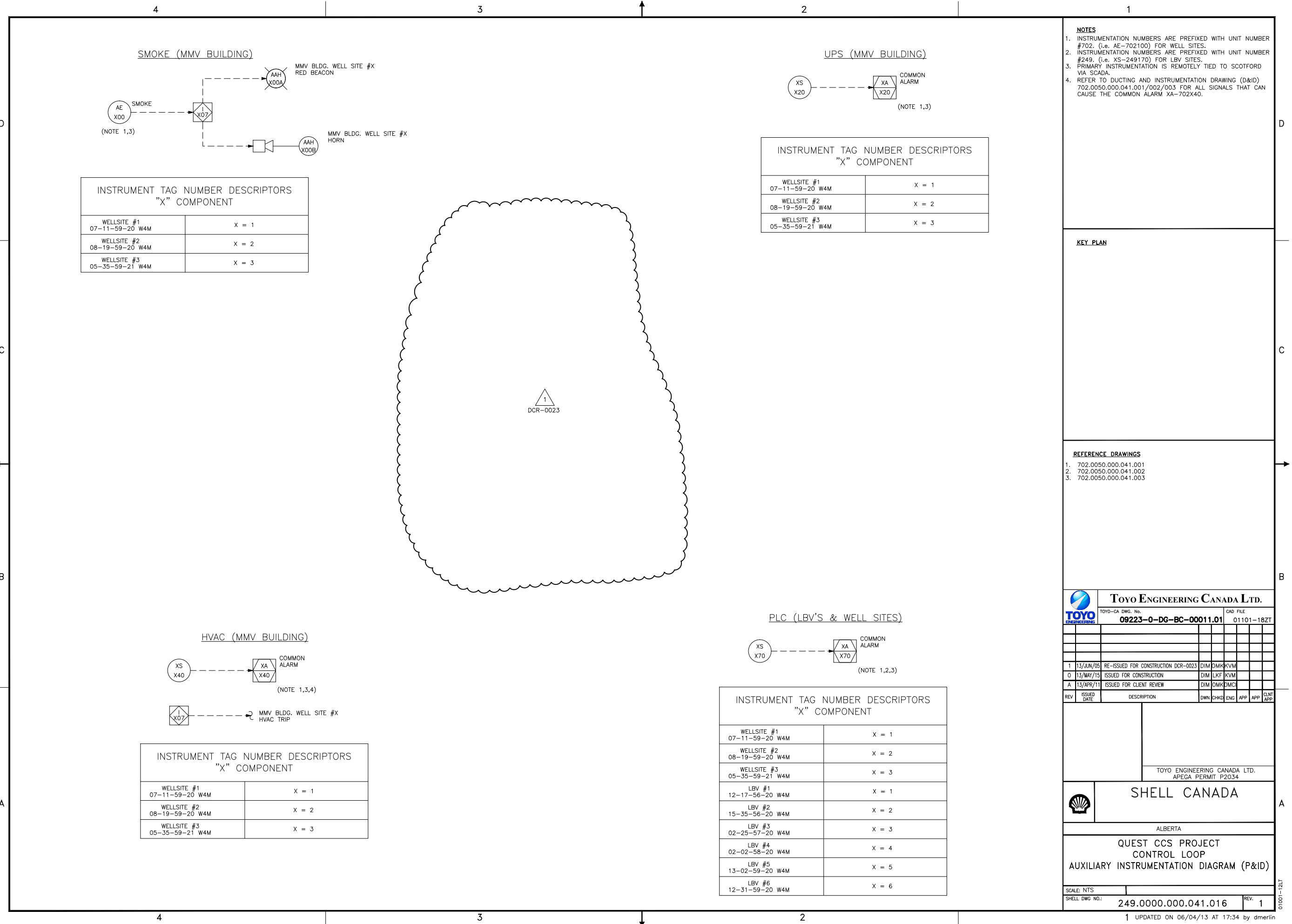
SHELL CANADA

ALBERTA

**QUEST CCS PROJECT
CONTROL LOOP
AUXILIARY INSTRUMENTATION DIAGRAM (P&ID)**

SCALE: NTS

SHELL DWD NO.: **249.0000.000.041.016** REV. **1**



INSTRUMENT TAG NUMBER DESCRIPTORS
"X" COMPONENT

WELLSITE #1 07-11-59-20 W4M	X = 1
WELLSITE #2 08-19-59-20 W4M	X = 2
WELLSITE #3 05-35-59-21 W4M	X = 3

INSTRUMENT TAG NUMBER DESCRIPTORS
"X" COMPONENT

WELLSITE #1 07-11-59-20 W4M	X = 1
WELLSITE #2 08-19-59-20 W4M	X = 2
WELLSITE #3 05-35-59-21 W4M	X = 3

INSTRUMENT TAG NUMBER DESCRIPTORS
"X" COMPONENT

WELLSITE #1 07-11-59-20 W4M	X = 1
WELLSITE #2 08-19-59-20 W4M	X = 2
WELLSITE #3 05-35-59-21 W4M	X = 3

INSTRUMENT TAG NUMBER DESCRIPTORS
"X" COMPONENT

WELLSITE #1 07-11-59-20 W4M	X = 1
WELLSITE #2 08-19-59-20 W4M	X = 2
WELLSITE #3 05-35-59-21 W4M	X = 3
LBV #1 12-17-56-20 W4M	X = 1
LBV #2 15-35-56-20 W4M	X = 2
LBV #3 02-25-57-20 W4M	X = 3
LBV #4 02-02-58-20 W4M	X = 4
LBV #5 13-02-59-20 W4M	X = 5
LBV #6 12-31-59-20 W4M	X = 6

- NOTES**
1. INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER #702. (i.e. AE-702100) FOR WELL SITES.
 2. INSTRUMENTATION NUMBERS ARE PREFIXED WITH UNIT NUMBER #249. (i.e. XS-249170) FOR LBV SITES.
 3. PRIMARY INSTRUMENTATION IS REMOTELY TIED TO SCOTFORD VIA SCADA.
 4. REFER TO DUCTING AND INSTRUMENTATION DRAWING (D&ID) 702.0050.000.041.001/002/003 FOR ALL SIGNALS THAT CAN CAUSE THE COMMON ALARM XA-702X40.

KEY PLAN

- REFERENCE DRAWINGS**
1. 702.0050.000.041.001
 2. 702.0050.000.041.002
 3. 702.0050.000.041.003

TOYO ENGINEERING CANADA LTD.
 TOYO-CA DWG. No. **09223-0-DG-BC-00011.01** CAD FILE 01101-18ZT

1	13/JUN/05	RE-ISSUED FOR CONSTRUCTION DCR-0023	DIM	DMK	KVM				
0	13/MAY/15	ISSUED FOR CONSTRUCTION	DIM	LKF	KVM				
A	13/APR/11	ISSUED FOR CLIENT REVIEW	DIM	DMK	DMC				
REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLNT	APP

TOYO ENGINEERING CANADA LTD.
 APEGA PERMIT P2034

SHELL CANADA

ALBERTA
QUEST CCS PROJECT
 CONTROL LOOP
 AUXILIARY INSTRUMENTATION DIAGRAM (P&ID)

SCALE: NTS
 SHELL DWG NO.: **249.0000.000.041.016** REV. **1**

01001-18ZT