

OIL & DILUENT METERING

LABEL	TAG	P&ID#	DESCRIPTION
1P	FQI032		LACT DILBIT SALES FLOW TOTALIZER
2P	L3130S	30MF02	DILBIT STORAGE TANK VOLUME
3P	L3131S	30MF03	DILBIT STORAGE TANK VOLUME
1D	FQI031	30MF01	DILUENT TO PLANT FLOW TOTALIZER
2D			DILUENT FLASH VOLUME LOSS (CALCULATED)
3D			DILUENT SHRINKAGE VOLUME (CALCULATED)

OIL PRODUCTION TOTAL = (PIPELINE METER ± INVENTORY CHANGE)–NET DILUENT VOLUME ADDED+(SHRINKAGE AND FLASH VOLUME LOSS)
(1P*(1–(A1–095/100)))+(2P+3P)–1D+(2D+3D)

NOTE: OIL VOLUMES REPORTED TO THE AER ARE CORRECTED FOR SHRINKAGE AND FLASH IN ACCORDANCE WITH DIRECTIVE 17 SECTION 14.3

BY PRODUCTION ACCOUNTING

NOTE: A1–095 MEASURES SALES BS&W

GAS METERING

LABEL	TAG	P&ID#	DESCRIPTION
1G	FQI8000	80MF16	TCPL PURCHASED GAS FLOW TOTALIZER
2G	FQI2111B	20MF01	GAS FROM FIELD FLOW TOTALIZER
3G	FQI8310A	80MF18	FMKO/TREATER/STVR GAS FLOW TOTALIZER
4G	FQI8300A	80MF16	GAS TO FIELD FACILITIES, LIFT GAS, TEST SEPARATORS, (CFF SEPARATOR) FLOW TOTALIZER
5G	FQI8300F	80MF21	TANKAGE BLANKET GAS, VESSEL FUEL GAS FLOW TOTALIZER
6G	FQI8477A	80MF26	LP FLARE METER FLOW TOTALIZER
7G	FQI8440	80MF26	HP FLARE METER FLOW TOTALIZER
10G			PURGE GAS TO FLARE SYSTEM MEASURED BY 6G AND 7G

PRODUCED GAS = GAS FROM FIELD–GAS TO FIELD+ FMKO/TREATER/STVR GAS– TANKAGE BLANKET GAS, VESSEL FUEL GAS+ LP FLARE GAS
= 2G–4G+3G–5G+6G

FLARED GAS = FLARE STACK METER TOTAL–FLARE SYSTEM PURGE GAS
= (6G+7G)–10G

FUEL GAS = PURCHASED GAS+PRODUCED GAS–FLARED GAS
= 1G+PRODUCED GAS–FLARED GAS

VENT GAS – THE TUCKER FACILITY WAS DESIGNED TO CAPTURE ALL GAS SOURCES FOR USE AS FUEL
IN THE EVENT GAS IS VENTED TO ATMOSPHERE THE VOLUME WILL BE ESTIMATED USING GENERALLY ACCEPTED
ENGINEERING PRACTICE

NOTE: IF THE STVR COMPRESSOR IS NOT OPERATIONAL, TANKAGE PRODUCED GAS IS METERED BY 6G

STEAM METERING

LABEL	TAG	P&ID#	DESCRIPTION
1S	FQI7225B	70MF03	HIGH PRESSURE BRW PUMPS TO OTSG FLOW TOTALIZER
2S	FQI7810C	70MF09	HIGH PRESSURE STEAM CONDENSATE FLOW TOTALIZER
6S			BLOWDOWN WATER TO LAGOONS DURING GENERATOR START UP AND SHUT DOWN
7S	FQI7441	70MF04A	GENERATOR B–7400 FEED WATER FLOW TOTALIZER
8S	FQI7541	70MF05A	GENERATOR B–7500 FEED WATER FLOW TOTALIZER
9S	FQI7641	70MF06A	GENERATOR B–7600 FEED WATER FLOW TOTALIZER
10S	FQI7741	70MF07A	GENERATOR B–7700 FEED WATER FLOW TOTALIZER
11S	FQI7841	70MF08A	GENERATOR B–7800 FEED WATER FLOW TOTALIZER
12S	PADA_STM_INU		STEAM TO PAD A FLOW TOTALIZER
13S	PADB_STM_INU		STEAM TO PAD B FLOW TOTALIZER
14S	PADC_STM_INU		STEAM TO PAD C FLOW TOTALIZER
15S	PADGA_STM_INU		STEAM TO PAD GRAND RAPIDS FLOW TOTALIZER
16S	FQI7341	70–A–0031–2	GENERATOR B–7300 FEED WATER FLOW TOTALIZER
17S	PADD_STM_INU		STEAM TO PAD D FLOW TOTALIZER
18S	PADCN_STM_INU		STEAM TO PAD CN FLOW TOTALIZER

STEAM TO FIELD

METHOD 1 – PRIMARY STEAM TO FIELD

= BOILER FEED WATER–STEAM SEPARATOR CONDENSATE–BLOW DOWN TO LAGOON
= 1S–2S–6S

METHOD 2 – SECONDARY STEAM TO FIELD

= Σ (BOILER FEED TO GENERATORS – STEAM SEPARATOR CONDENSATE – BLOWDOWN TO LAGOON)
= (7S + 8S + 9S + 10S + 11S + 16S) – 2S – 6S

NOTE 1: BLOWDOWN TO THE LAGOON DURING START UP AND SHUT DOWN IS ESTIMATED USING METERS 7S, 8S, 9S, 10S, 11S AND 16S

NOTE 2: THE WELL TOE AND HEEL STEAM METERS ON EACH PAD ARE IDENTIFIED ON MEASUREMENT SCHEMATICS MS–0007–01

NOTE 1: LABELLED METERS ARE USED FOR AER AND ALBERTA ENVIRONMENT REPORTING

WATER METERING

LABEL	TAG	P&ID#	DESCRIPTION
1W	FQI5650A	50MF01	PRODUCED WATER TO WLS
2W	FQI4420B	40MF11	PRODUCED WATER TO DISPOSAL
3W	LI4430S	40MF10	DE–OILED PRODUCED WATER TANK INVENTORY
4W	FQI12	A1–3319–B–101	08–25–064–05W4 BASCAL MCMURRAY WATER SOURCE FLOW TOTALIZER
5W	FQI11	A1–3319–B–102	12–30–064–04W4 BASCAL MCMURRAY WATER SOURCE FLOW TOTALIZER
6W	FQI10	A1–3319–B–103	11–30–064–05W4 BASCAL MCMURRAY WATER SOURCE FLOW TOTALIZER
7W	FQI21	A1–3319–B–001	14–29–064–04W4 DISPOSAL WELL FLOW TOTALIZER
8W	FQI22	A1–3319–B–001	12–21–064–04W4 DISPOSAL WELL FLOW TOTALIZER
9W	FQI20	A1–3319–B–001	11–28–064–04W4 DISPOSAL WELL FLOW TOTALIZER
10W	FQI9001S	N/A	DOMESTIC WATER FLOW TOTALIZER
11W	LI8001S	N/A	DOMESTIC WATER TANK INVENTORY
12W	LI5050S	80MF33	BRACKISH WATER TANK INVENTORY
13W	LI5430S	50MF06	BOILER FEED WATER TANK INVENTORY
14W	LI5530S	50MF17	REGEN DISPOSAL WATER INVENTORY
15W	LI4130S	40MF01	SKIM TANK INVENTORY
16W	LI4131S	40MF02	SKIM TANK INVENTORY
17W	LI7930S	70MF09	DISPOSAL WATER TANK INVENTORY
18W	FQI2210C	20MF04	FREE WATER KNOCKOUT TO SKIM TANK FLOW TOTALIZER
19W	FQI2310C	20MF06	OIL TREATER V–2310 TO SKIM TANK FLOW TOTALIZER
20W	FQI2312C	20MF07	OIL TREATER V–2312 TO SKIM TANK FLOW TOTALIZER
21W	LI4330S	40MF12	OIL RECOVERY TANK INVENTORY
22W		40MF04	TRUCKED VOLUMES REMOVED OR ADDED TO THE PROCESS (DESAND TANK)
23W	FQI4360	40MF08	PRODUCED WATER TO ORF V–4360
24W	FQI4361	40MF09	PRODUCED WATER TO ORF V–4361
25W	FQI4430A	40MF09	PRODUCED WATER TO ORF BYPASS
26W		30MF05	TRUCKED VOLUMES REMOVED OR ADDED TO THE PROCESS (SLOP TANK)

PRODUCED WATER

METHOD 1 – PRIMARY PRODUCED WATER MEASUREMENT

=FREE WATER KNOCKOUT WATER + OIL TREATER PRODUCED WATER + WATER PIPELINED OUT = 18W + 19W+ 20W + (1P * (A1–095/100))

* THE METHOD 1 – PRIMARY PRODUCED WATER SHOULD BE LISTED FIRST UNDER THE TITLE PRODUCED WATER. THE EXISTING PRIMARY
PRODUCED WATER MEASUREMENT WILL NOW BECOME THE SECONDARY PRODUCED WATER MEASUREMENT. THE EXISTING SECONDARY PRODUCED
WATER MEASUREMENT WILL BE REMOVED.

METHOD 2 – SECONDARY PRODUCED WATER MEASUREMENT

=PRODUCED WATER TO ORF ± CHANGE IN PRODUCED WATER INVENTORY + WATER TRUCKED OUT + WATER PIPELINED OUT
=(23W+24W+25W) ± CHANGE IN PRODUCED WATER INVENTORY (15W+16W+21W) + 22W + 26W + (1P*(A1–095/100))

NOTE 1: SLUDGE RECYCLE FLUSH COMES OFF UPSTREAM 1W THAT WILL NOT BE ACCOUNTED WHEN FLUSHING

NOTE 2: PUMP SEAL FLUSH ESTIMATED AS 24m³/DAY/PUMP. TOTAL ESTIMATED VOLUME OF SERVICE WATER ADDED TO PRODUCED
WATER 100m³/DAY

NOTE 3: TESTING OF LIQUID VOLUME IN V–2111 WAS CONDUCTED AND FOUND TO BE NEGLIGIBLE.

WATER USE

BRACKISH WATER DRAW = 4W+5W+6W

WATER DISPOSAL

TOTAL INJECTION WELL WATER DISPOSAL = 7W+8W+9W

PRODUCED WATER INVENTORY (BT)

BATTERY FACILITY WATER INVENTORY= 3W+15W+16W+21W

PRODUCED WATER INVENTORY (IF)

INJECTION FACILITY WATER INVENTORY= 12W+13W+14W+17W

ALBERTA ENVIRONMENT

DOMESTIC WATER DRAW = 10W

DOMESTIC WATER INVENTORY = 11W

REF. DWG. NO.	REFERENCE DRAWING DESCRIPTION	NO.	REVISION HISTORY	REV. AUTHOR	REV. DATE	ISSUED FOR	NO.	CURRENT REVISION	ISSUED FOR	AS BUILT
MS–0000–01	AREA OVERVIEW	8	UPDATED PER MARK–UPS FROM ALYSON HOLLAND	DMM	2013/06/07	AS BUILT	13	UPDATED PER MARK UPS FROM ALYSON HOLLAND	DOC DATE	2016/06/12
MS–0001–01	FACILITY DRAWING	9	NO UPDATES FOR THIS REVISION FROM ALYSON HOLLAND	SK	2014/06/20	AS BUILT			DOC AUTHOR	PC
MS–0002–01 TO 05	GATHERING SYSTEM	10	UPDATED FROM MARK UPS SUPPLIED BY ALYSON HOLLAND	BMH	2016/02/24	AS BUILT			SCALE	NTS
MS–0007–01	STEAM INJECTION SYSTEM	11	NO UPDATES FOR THIS REVISION FROM ALYSON HOLLAND	BMH	2016/10/29	AS BUILT			ALTERNATE IDENTIFIER	
MS–0010–01	LACT UNIT	12	UPDATED PER FIELD SUPPLIED MARK UPS	SK	2016/02/24	AS BUILT			SHEET NO. 130	12–20–064–04W4
		6	UPDATED PER FIELD MARK UPS BY JAMIE BETTS – PG–7810C	WDA	2012/01/06	AS BUILT			DOCUMENT NUMBER	MS–0001–02
		7	UPDATED PER FIELD MARK UPS SUPPLIED BY JAMIE BETTS	BMH	2012/06/04	AS BUILT				

22206

Husky Oil Operations Limited

TUCKER CENTRAL PLANT 12–28–064–04W4

FACILITY DRAWING

MEASUREMENT SCHEMATIC