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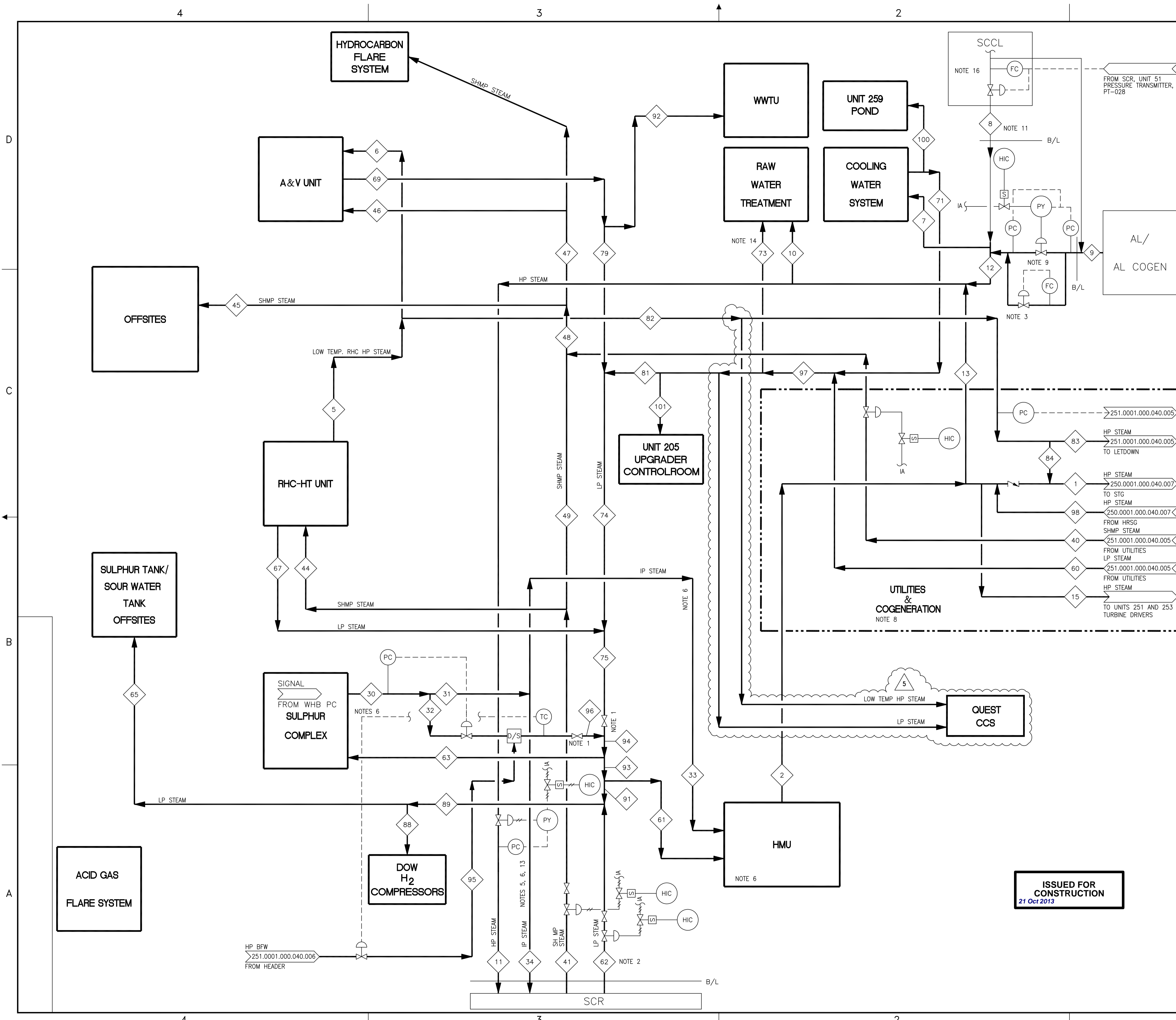
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- NOTES**
- VALVES ARE CLOSED FOR EARLY SCOTFORD MODS.
 - DURING EARLY SCOTFORD MODS THE PRESSURE IN THE LP HDR IS CONTROLLED BY PCV-85006 LOCATED OUTSIDE THE HCU BATTERY LIMIT.
 - A MINIMUM FLOW IS MAINTAINED TO KEEP THE LINE WARM.
 - SCR DESUPERHEATING WATER (FLASHED RCC FROM THE CLEAN CONDENSATE FLASH DRUM V-2120) IS SUPPLIED TO DESUPERHEATER FOR EARLY SCOTFORD MODS AND FOR WHEN THE UPGRADER IS DOWN. THIS DESUPERHEATING FACILITY IS NOW LOCATED IN THE HCU AND ON THE 85 PIPERACK.
 - DURING EARLY SCOTFORD MODS, ALL IP STEAM FROM THE SULPHUR COMPLEX SRUs IS EXPORTED TO THE REFINERY 2500 kPa(g) STEAM SYSTEM WHICH FEEDS THE SMR. DURING UPGRADER OPERATION, THE BALANCE OF THE IP STEAM NOT USED IN THE HMU AS FEED STEAM IS EXPORTED TO THE REFINERY SMR.
 - IN THE EVENT THE PRESSURE IN THE IP STEAM HEADER DROPS BELOW 4200 kPa(g) DURING UPGRADER OPERATION, THE SHORTFALL IN IP STEAM TO THE HMUs WILL BE MADE UP THROUGH LETDOWN FROM THE HP STEAM SYSTEM LOCATED INSIDE HMU B/L. ANY EXCESS IN THE IP STEAM SYSTEM WILL BE REMOVED VIA EITHER IP/UPGRADER-TO IP/REFINERY OR THE IP-TO-LP LETDOWN ADJACENT TO THE SULPHUR COMPLEX.
 - FOR CORRESPONDING MATERIAL BALANCE REFER TO DS-251-B-0107.
 - THE HP-TO-SHMP AND SHMP-TO-LP LETDOWN FACILITIES ARE LOCATED IN THE UTILITIES (PLANT 251) AREA.
 - BOTTLING VALVES ARE PROVIDED TO ENABLE ISOLATION OF THE UPGRADER FROM SCR/SCCL/AL AND PROCESS UNIT WITH HIGH LOADS.
 - DELETED.
 - LINE ISOLATED DURING NORMAL OPERATION.
 - MOST LINES ARE BIDIRECTIONAL; PREDOMINANT FLOW DIRECTIONS ARE INDICATED ON THIS DRAWING.
 - THE IP/UPGRADER - IP/REFINERY LETDOWN CONTROL VALVE, PV-85009 IS LOCATED ON 85 PIPERACK NEAR SMR BATTERY LIMIT.
 - LP STEAM FROM DEAERATOR MAKE-UP WATER PUMP TURBINE EXHAUST JOINS INSIDE RAW WATER TREATMENT PLANT.
 - THIS DRAWING IS UPDATED BASED ON UNITS 251/250 ISSUED (IFD) P&IDs AND UNIT 285 ISSUED (IFC) INTERCONNECTING P&IDs.
 - CURRENTLY THE FLOW OF STEAM FROM SCCL TO SCR IS CONTROLLED BY FLOW AND IS RESET BY PRESSURE FLUCTUATIONS AT SCR, UNIT 51. DURING UPGRADER OPERATION, UPGRADER PRIMARY CONTROL/ADVANT CONTROL WILL RECEIVE A REMOTE SIGNAL FROM SCR, UNIT 51 AND RESPONDS ACCORDINGLY.

LEGEND:

— NEW FACILITY

— EXISTING FACILITY

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REV	ISSUED DATE	DESCRIPTION	DWN	CHKD	ENG	APP	APP	CLNT APP
5	2013-09-30	RE-ISSUED IFC ON NEXT HARD REV	GB	CC	LMF	KH	CV	
4B	2013-01-10	ISSUED FOR CONSTRUCTION	GB	KB	KH	CV		
4A	2011-03-01	RE-ISSUED FOR QUEST DESIGN	GB	SM	MB	JJ	CV	WJ/SB
4	2010-11-03	ISSUED FOR QUEST DESIGN	JH	SM	MB	JJ	CV	WJ/SB
3A	2010-08-10	ISSUED FOR QUEST COARSE HAZOP						
3	2001-11-29	ISSUED FOR AS-BUILT	HC	BY	-	SB	-	
2	2001-06-11	ISSUED FOR CONSTRUCTION	DC	JM	MRAB	JM	BJK	
1	2001-02-05	RE-ISSUED FOR DESIGN	DC	SL	ADR	JM	BJK	JS
0	2000-04-19	ISSUED FOR DESIGN	ADR	SL		AKG	BJK	
D	2000-02-03	RE-ISSUED FOR APPROVAL	ADR	SL		AKG	BJK	
C	2000-01-05	RE-ISSUED FOR APPROVAL	ADR	SL		AKG	BJK	
B	1999-05-31	ISSUED FOR APPROVAL	HEM	AKG	AKG	BJK		
A	1999-03-29	ISSUED FOR REVIEW	HEM	AKG	AKG	BJK		

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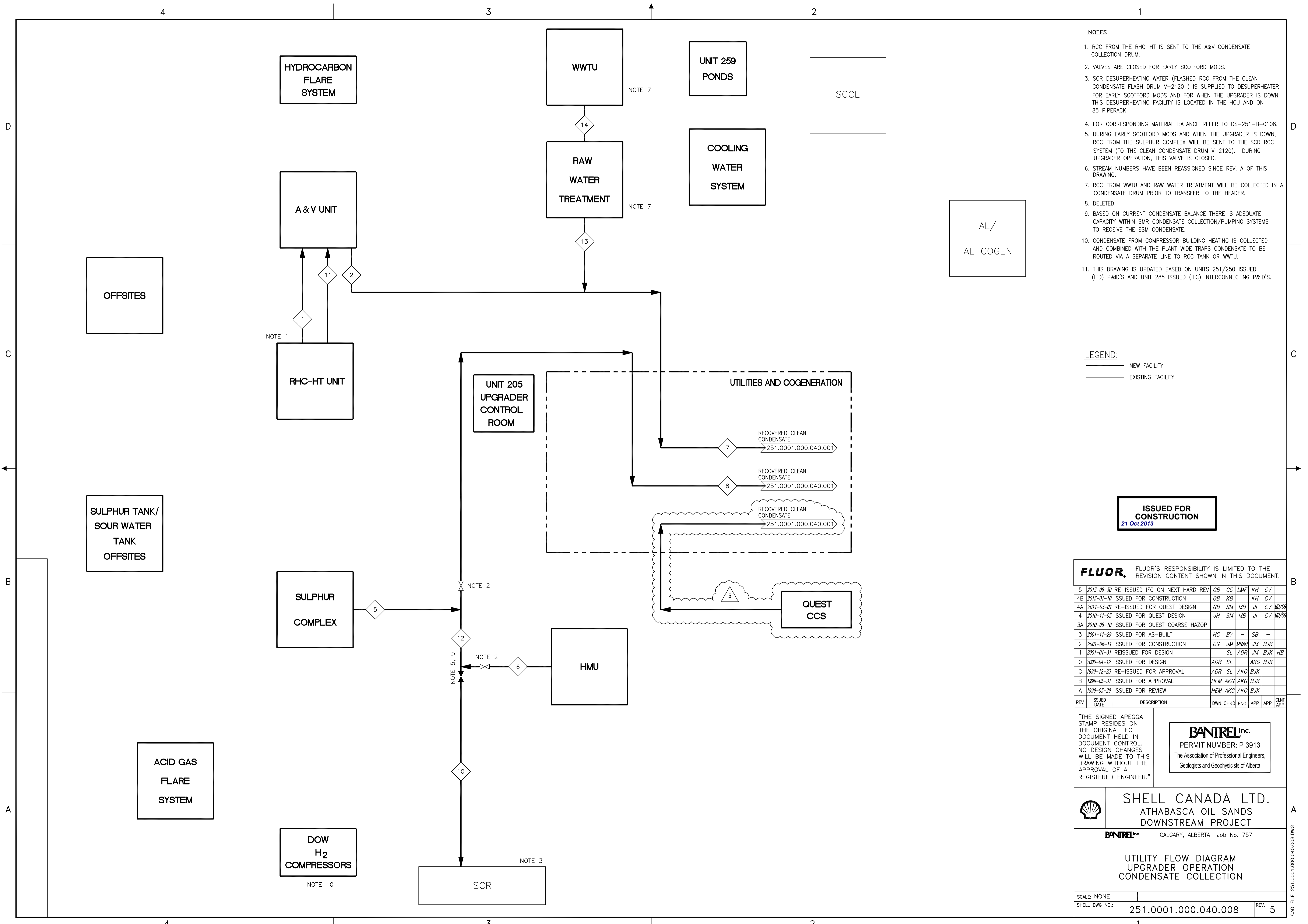
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 ATHABASCA OIL SANDS
 DOWNSTREAM PROJECT

BANTREL Inc. CALGARY, ALBERTA Job No. 757

UTILITY FLOW DIAGRAM
 UPGRADER OPERATION
 HP, IP, SHMP AND LP
 STEAM DISTRIBUTION

CAD FILE: 251.0001.000.040.007.REV.DWG - BANTREL 757



- NOTES**
- RCC FROM THE RHC-HT IS SENT TO THE A&V CONDENSATE COLLECTION DRUM.
 - VALVES ARE CLOSED FOR EARLY SCOTFORD MODS.
 - SCR DESUPERHEATING WATER (FLASHED RCC FROM THE CLEAN CONDENSATE FLASH DRUM V-2120) IS SUPPLIED TO DESUPERHEATER FOR EARLY SCOTFORD MODS AND FOR WHEN THE UPGRADER IS DOWN. THIS DESUPERHEATING FACILITY IS LOCATED IN THE HCU AND ON 85 PIPERACK.
 - FOR CORRESPONDING MATERIAL BALANCE REFER TO DS-251-B-0108.
 - DURING EARLY SCOTFORD MODS AND WHEN THE UPGRADER IS DOWN, RCC FROM THE SULPHUR COMPLEX WILL BE SENT TO THE SCR RCC SYSTEM (TO THE CLEAN CONDENSATE DRUM V-2120). DURING UPGRADER OPERATION, THIS VALVE IS CLOSED.
 - STREAM NUMBERS HAVE BEEN REASSIGNED SINCE REV. A OF THIS DRAWING.
 - RCC FROM WWTU AND RAW WATER TREATMENT WILL BE COLLECTED IN A CONDENSATE DRUM PRIOR TO TRANSFER TO THE HEADER.
 - DELETED.
 - BASED ON CURRENT CONDENSATE BALANCE THERE IS ADEQUATE CAPACITY WITHIN SMR CONDENSATE COLLECTION/PUMPING SYSTEMS TO RECEIVE THE ESM CONDENSATE.
 - CONDENSATE FROM COMPRESSOR BUILDING HEATING IS COLLECTED AND COMBINED WITH THE PLANT WIDE TRAPS CONDENSATE TO BE ROUTED VIA A SEPARATE LINE TO RCC TANK OR WWTU.
 - THIS DRAWING IS UPDATED BASED ON UNITS 251/250 ISSUED (IFD) P&ID'S AND UNIT 285 ISSUED (IFC) INTERCONNECTING P&ID'S.

LEGEND:
 ——— NEW FACILITY
 ——— EXISTING FACILITY

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5	2013-09-30	RE-ISSUED IFC ON NEXT HARD REV	GB	CC	LMF	KH	CV
4B	2013-01-10	ISSUED FOR CONSTRUCTION	GB	KB		KH	CV
4A	2011-03-01	RE-ISSUED FOR QUEST DESIGN	GB	SM	MB	JJ	CV
4	2010-11-03	ISSUED FOR QUEST DESIGN	JH	SM	MB	JJ	CV
3A	2010-08-10	ISSUED FOR QUEST COARSE HAZOP					
3	2001-11-29	ISSUED FOR AS-BUILT	HC	BY		SB	
2	2001-06-11	ISSUED FOR CONSTRUCTION	DC	JM	MRAB	JM	BJK
1	2001-01-31	REISSUED FOR DESIGN		SL	ADR	JM	BJK
0	2000-04-12	ISSUED FOR DESIGN	ADR	SL		AKG	BJK
C	1999-12-23	RE-ISSUED FOR APPROVAL	ADR	SL		AKG	BJK
B	1999-05-31	ISSUED FOR APPROVAL	HEM	AKG		AKG	BJK
A	1999-03-29	ISSUED FOR REVIEW	HEM	AKG		AKG	BJK

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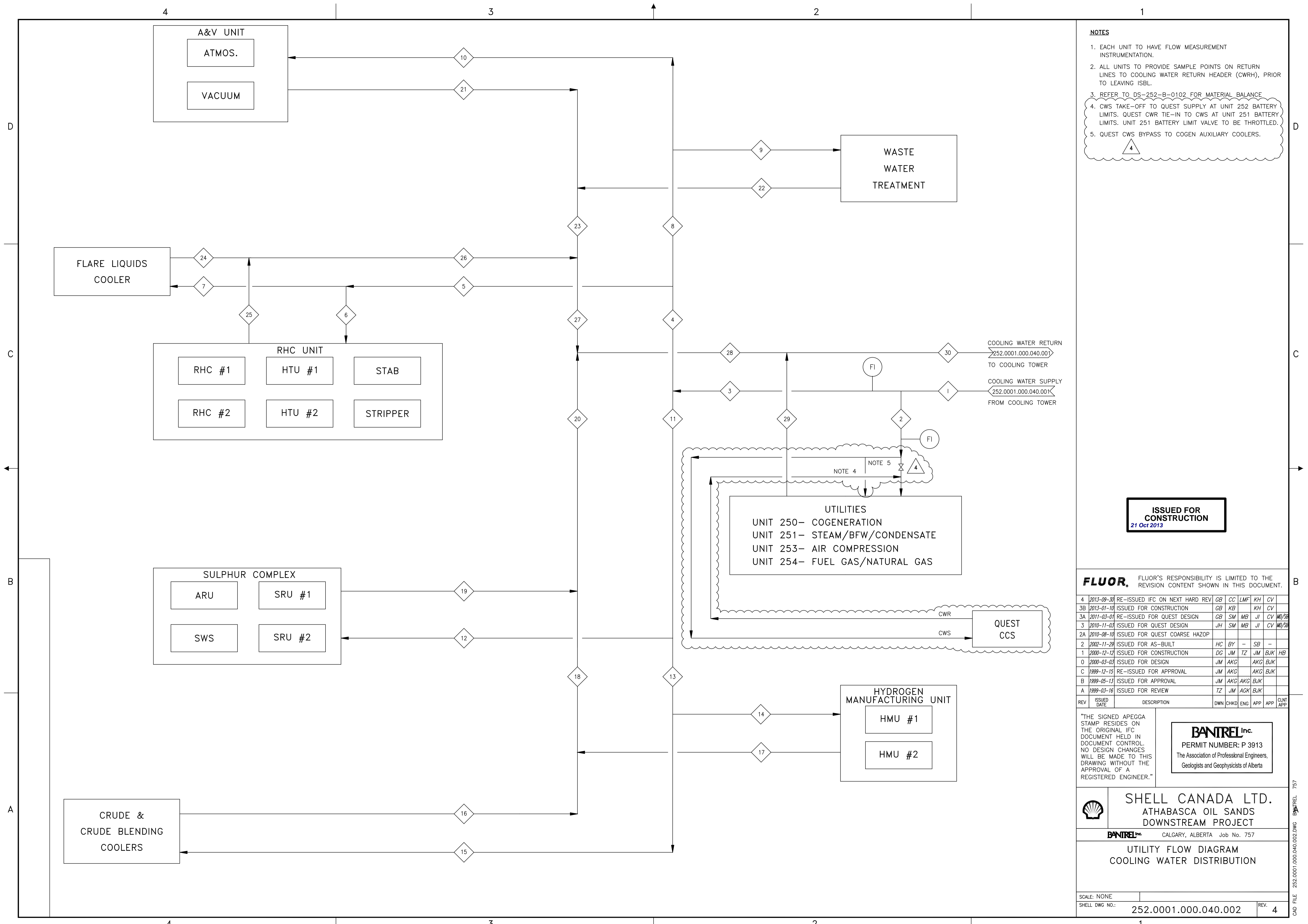
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BANIREL Inc. CALGARY, ALBERTA Job No. 757

UTILITY FLOW DIAGRAM
 UPGRADER OPERATION
 CONDENSATE COLLECTION



- NOTES**
- EACH UNIT TO HAVE FLOW MEASUREMENT INSTRUMENTATION.
 - ALL UNITS TO PROVIDE SAMPLE POINTS ON RETURN LINES TO COOLING WATER RETURN HEADER (CWRH), PRIOR TO LEAVING ISBL.
 - REFER TO DS-252-B-0102 FOR MATERIAL BALANCE.
 - CWS TAKE-OFF TO QUEST SUPPLY AT UNIT 252 BATTERY LIMITS. QUEST CWR TIE-IN TO CWS AT UNIT 251 BATTERY LIMITS. UNIT 251 BATTERY LIMIT VALVE TO BE THROTTLED.
 - QUEST CWS BYPASS TO COGEN AUXILIARY COOLERS.

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4	2013-09-30	RE-ISSUED IFC ON NEXT HARD REV	GB	CC	LMF	KH	CV	
3B	2013-01-10	ISSUED FOR CONSTRUCTION	GB	KB		KH	CV	
3A	2011-03-01	RE-ISSUED FOR QUEST DESIGN	GB	SM	MB	JL	CV	10/08
3	2010-11-03	ISSUED FOR QUEST DESIGN	JH	SM	MB	JL	CV	10/08
2A	2010-08-10	ISSUED FOR QUEST COARSE HAZOP						
2	2002-11-29	ISSUED FOR AS-BUILT	HC	BY		SB		
1	2000-12-12	ISSUED FOR CONSTRUCTION	DG	JM	TZ	JM	BJK	HB
0	2000-03-03	ISSUED FOR DESIGN	JM	AKG		AKG	BJK	
C	1999-12-15	RE-ISSUED FOR APPROVAL	JM	AKG		AKG	BJK	
B	1999-05-13	ISSUED FOR APPROVAL	JM	AKG		AKG	BJK	
A	1999-03-16	ISSUED FOR REVIEW	TZ	JM	ACK	BJK		

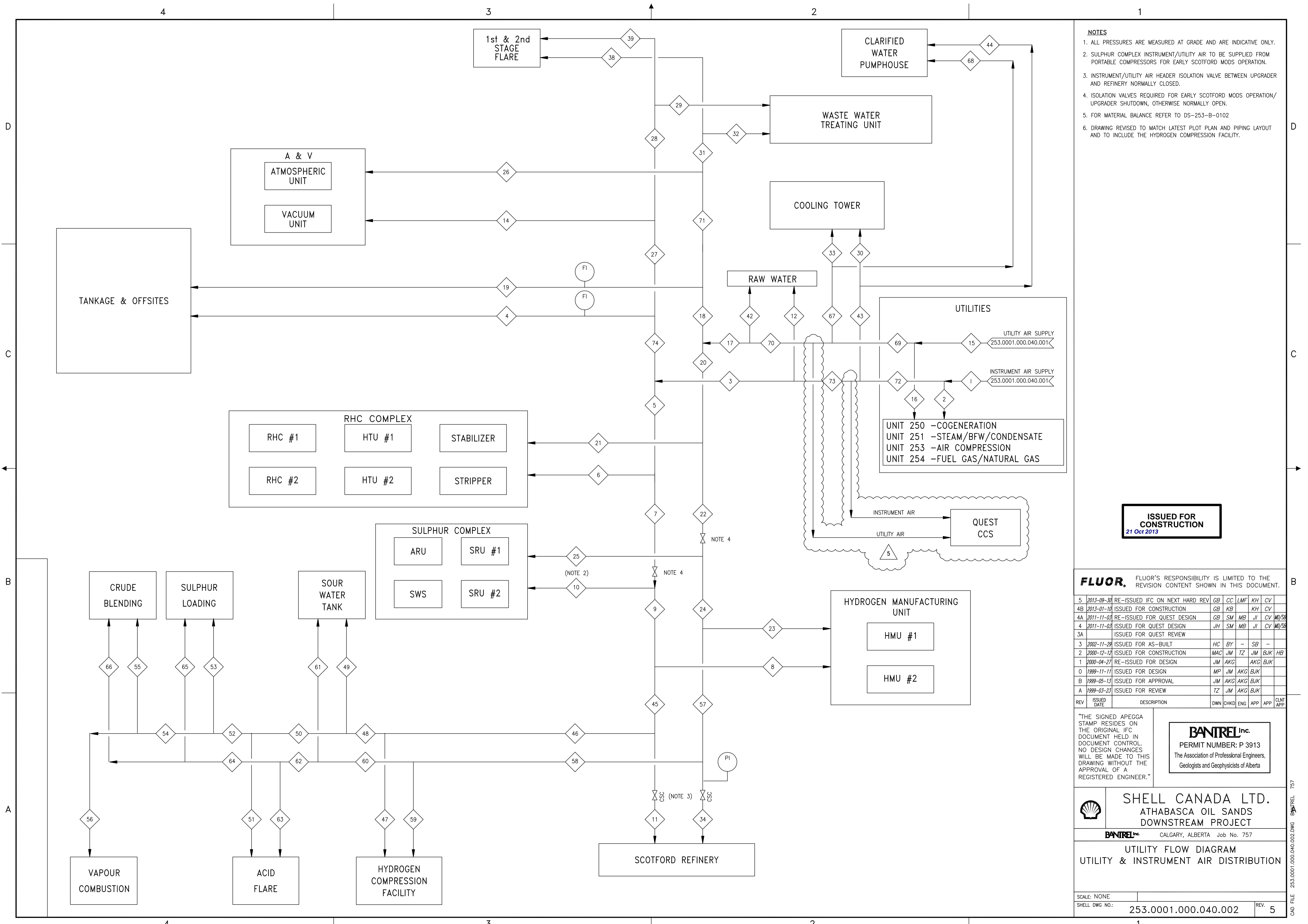
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CALGARY, ALBERTA Job No. 757

UTILITY FLOW DIAGRAM
COOLING WATER DISTRIBUTION

CAD FILE 252.0001.000.040.002.DWG BANTREL 757



- NOTES**
1. ALL PRESSURES ARE MEASURED AT GRADE AND ARE INDICATIVE ONLY.
 2. SULPHUR COMPLEX INSTRUMENT/UTILITY AIR TO BE SUPPLIED FROM PORTABLE COMPRESSORS FOR EARLY SCOTFORD MODS OPERATION.
 3. INSTRUMENT/UTILITY AIR HEADER ISOLATION VALVE BETWEEN UPGRADER AND REFINERY NORMALLY CLOSED.
 4. ISOLATION VALVES REQUIRED FOR EARLY SCOTFORD MODS OPERATION/UPGRADER SHUTDOWN, OTHERWISE NORMALLY OPEN.
 5. FOR MATERIAL BALANCE REFER TO DS-253-B-0102
 6. DRAWING REVISED TO MATCH LATEST PLOT PLAN AND PIPING LAYOUT AND TO INCLUDE THE HYDROGEN COMPRESSION FACILITY.

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4	2011-11-03	ISSUED FOR QUEST DESIGN	JH	SM	MB	JJ	CV	MJ/SB
3A		ISSUED FOR QUEST REVIEW						
3	2002-11-29	ISSUED FOR AS-BUILT	HC	BY		SB		
2	2000-12-12	ISSUED FOR CONSTRUCTION	MAC	JM	TZ	JM	BJK	HB
1	2000-04-27	RE-ISSUED FOR DESIGN	JM	AKG		AKG	BJK	
0	1999-11-11	ISSUED FOR DESIGN	MP	JM	AKG	BJK		
B	1999-05-13	ISSUED FOR APPROVAL	JM	AKG	AKG	BJK		
A	1999-03-23	ISSUED FOR REVIEW	TZ	JM	AKG	BJK		

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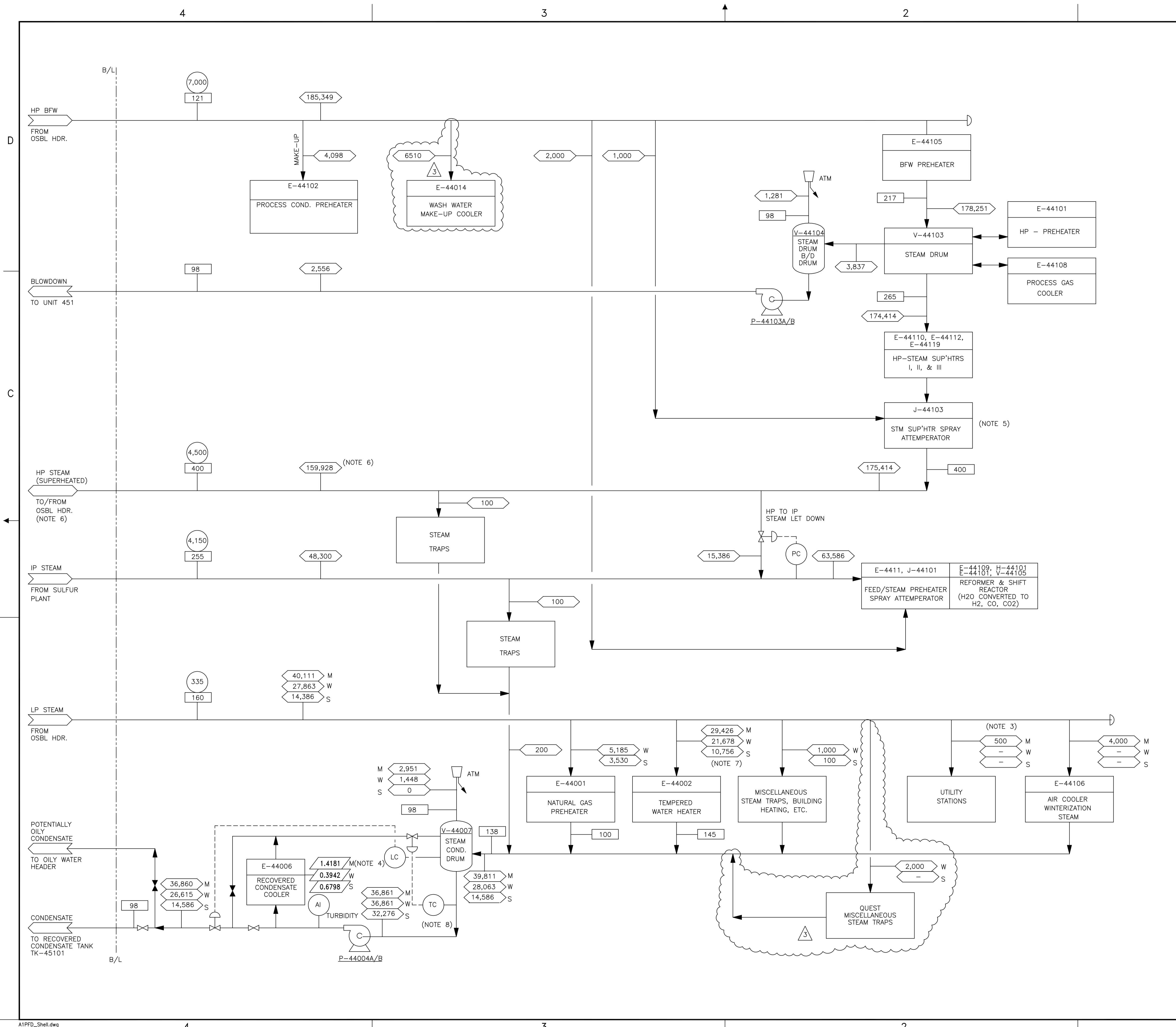
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BANTREL Inc. CALGARY, ALBERTA Job No. 757

UTILITY FLOW DIAGRAM
UTILITY & INSTRUMENT AIR DISTRIBUTION

SCALE: NONE
SHELL DWG NO.: 253.0001.000.040.002 REV. 5

CAD FILE 253.0001.000.040.002.DWG BANTREL 757



- NOTES:**
1. THE CONFIGURATION OF THE DRAWING DOES NOT REPRESENT GEOGRAPHICAL LAYOUT.
 2. DELETED.
 3. NOT MORE THAN TWO UTILITY STATIONS ARE OPERATING AT ANY TIME IN THE HMU AREA. NORMALLY NO FLOW.
 4. MAXIMUM EXCHANGER DUTY IS BASED ON COOLING ALL THE CONDENSATE FROM V-44007 TO 65°C AND ROUTING IT TO OILY WATER HEADER.
 5. J-44102 AND J-44104, NORMALLY NO FLOW. NEEDED ONLY FOR THE 200 T/H HP STEAM PRODUCTION CASE (ELIMINATED FROM THE DESIGN SCOPE).
 6. NORMAL EXPORT FLOW. AT START-UP HP STEAM IS IMPORTED.
 7. WINTER STEAM CONSUMPTION RATE IS BASED ON HEATING AIR FROM -43°C TO 80°C. SUMMER STEAM CONSUMPTION RATE IS BASED ON HEATING AIR FROM 19°C TO 80°C.
 8. HI LEVEL IN V-44007 OVERRIDES TC.
 9. MATERIAL BALANCE TO BE UPDATED FOR UHDE INPUT FOR QUEST OPERATION.

LEGEND

- TEMPERATURE, °C.
- PRESSURE, kPag.
- FLOW, Kg/hr
- DUTY, MW
- W - WINTER
- S - SUMMER
- M - MAXIMUM

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3	09/30/13	RE-ISSUED IFC ON NEXT HARD REV	GB	CC			LMF			KH	CV
2B	01/10/13	ISSUED FOR CONSTRUCTION	GB	KB						KH	CV
2A	03/01/11	RE-ISSUED FOR QUEST DESIGN	GB	SM	MB					JL	CV MD/SB
2	11/03/10	REISSUED FOR DESIGN	GB	SM	MB					JL	CV MD/SB
1	05/10/06	REISSUED FOR DESIGN	HG	RCD	CJK					JT	RSN
0	11/21/05	ISSUED FOR DESIGN	RAT	PAN	CJK					JT	RSN
A	9/30/05	ISSUED FOR APPROVAL	GM	PAN	CJK					JT	RN

SHELL CANADA LTD.
AOSP - DOWNSTREAM EXPANSION PROJECT

BECHTEL Job No. 25183-C10

UTILITY FLOW DIAGRAM
AOSP DOWNSTREAM EXPANSION PROJECT
HYDROGEN MANUFACTURING UNIT
STEAM/CONDENSATE/BFW

SCALE: NONE
SHELL DWG NO.: 440.0001.000.040.011 REV. 3