

STREAM CHARACTERISTICS COMPOSITION (% MOLAL) AND FLOW RATES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
WATER H <sub>2</sub> O	29.66	29.66	29.66	29.66	51.81	51.81	18.99	18.99	5.51	5.51	5.51	4.39	15.43	15.43	72.08																		
NITROGEN N <sub>2</sub>	0.21	0.21	0.21	0.21	0	0	0	0	0	0	0	0.45	0.23	0.23	0.02																		
CARBON DIOXIDE CO <sub>2</sub>	2.47	2.47	2.47	2.47	0.2	0.2	0.26	0.26	0.01	0.01	0.01	5.06	5.59	5.59	1.56																		
METHANE C1	39.63	39.63	39.63	39.63	1.48	1.48	1.68	1.68	0.05	0.05	0.05	83.09	67.82	67.82	12.12																		
ETHANE C2	1.94	1.94	1.94	1.94	0.28	0.28	0.41	0.41	0.04	0.04	0.04	3.83	4.9	4.9	2.16																		
PROPANE C3	0.71	0.71	0.71	0.71	0.24	0.24	0.38	0.38	0.07	0.07	0.07	1.25	1.96	1.96	1.71																		
I-BUTANE I-C4	0.21	0.21	0.21	0.21	0.12	0.12	0.19	0.19	0.06	0.06	0.06	0.31	0.54	0.54	0.75																		
N-BUTANE N-C4	0.53	0.53	0.53	0.53	0.36	0.36	0.59	0.59	0.21	0.21	0.21	0.72	1.32	1.32	2.15																		
I-PENTANE I-C5	0.19	0.19	0.19	0.19	0.2	0.2	0.33	0.33	0.18	0.18	0.18	0.19	0.39	0.39	0.93																		
N-PENTANE N-C5	0.27	0.27	0.27	0.27	0.3	0.3	0.5	0.5	0.3	0.3	0.3	0.24	0.5	0.5	1.3																		
HEXANE C6	0.34	0.34	0.34	0.34	0.5	0.5	0.85	0.85	0.72	0.72	0.72	0.16	0.38	0.38	1.34																		
HEPTANE C7	0.71	0.71	0.71	0.71	1.19	1.19	2.02	2.02	2.08	2.08	2.08	0.16	0.42	0.42	1.7																		
OCTANE C8	0.96	0.96	0.96	0.96	1.73	1.73	2.94	2.94	3.34	3.34	3.34	0.09	0.28	0.28	1.19																		
NONANE C9	0.97	0.97	0.97	0.97	1.79	1.79	3.04	3.04	3.62	3.62	3.62	0.04	0.13	0.13	0.56																		
DECANE C10	1.08	1.08	1.08	1.08	2.01	2.01	3.42	3.42	4.16	4.16	4.16	0.02	0.08	0.08	0.31																		
UNDECANE C11	1	1	1	1	1.87	1.87	3.19	3.19	3.91	3.91	3.91	0.01	0.03	0.03	0.13																		
C12+ (NOTE 5) 3-RJS-360A	C12+	12.97	12.97	12.97	24.37	24.37	41.5	41.5	51.36	51.36	51.36	0	0	0	0																		
C12+ (NOTE 5) 4-RJS-367	C12+	6.16	6.16	6.16	11.57	11.57	19.7	19.7	24.38	24.38	24.38	0	0	0	0																		
TOTAL		100	100	100	100	100	100	100	100	100	100	100	100	100	100																		
MOLAR FLOW RATE (kgmol/h)		11397.48	11397.48	11397.48	6066.81	6066.81	3562.17	3562.17	2878.29	2878.29	2878.29	5327.52	44.39	44.39	728.26																		
MASS FLOW RATE (kg/h)		215962.8	215962.8	215962.8	111618.57	111618.57	1066314.95	1066314.95	1048416.43	1048416.43	1048416.43	104287.01	961.07	961.07	18659.59																		
OIL VOLUMETRIC FLOW RATE (NOTE 5) (m <sup>3</sup> /h)		1170.57	1172.06	1190.31	1199.67	1224.65	1201.7	1200.24	1200.07	1165.41	0	17252.25	0	175.51	1174.73	18777.33																	
GAS VOLUMETRIC FLOW RATE (NOTE 4) (m <sup>3</sup> /h)		10755.44	11789.63	14750.35	17252.25	0	175.51	0	16323.22	0	0	17252.25	0	175.51	1174.73	18777.33																	
WATER VOLUMETRIC FLOW RATE (NOTE 6) (m <sup>3</sup> /h)		60.78	60.78	60.78	57.73	58.29	11.89	3.21	2.33	2.33	2.73	0	0	0	0																		
MOLECULAR WEIGHT (kg/kmol)		106.69	106.69	106.69	106.69	183.23	183.23	299.34	299.34	364.25	364.25	364.25	19.58	21.65	25.9																		
PRESSURE (kPa abs)		1078.73	1010.09	941.44	882.6	784.53	784.53	117.68	117.68	294.2	225.55	882.6	784.53	117.68	117.68																		
TEMPERATURE (°C)		19	23.63	57.32	75	75	105	105	96.58	95.71	95.67	55	75	105	102.2																		
OIL DENSITY (kg/m <sup>3</sup> )		909.18	907.11	889.15	879.69	879.69	861.44	870.94	871.64	871.76	897.31	0	0	0	0																		

REFERENCE DOCUMENTS			
ET SYMBOLS AND ABBREVIATIONS			
EQUIPMENT			
TAG	DESCRIPTION	TYPE	CAPACITY
P-122301A/B (2x50%)	OIL/WATER PRE-HEATER	PLATE	14.6 x 10 <sup>4</sup> W
P-122302A/B (2x50%)	OIL/OIL PRE-HEATER	PLATE	12.8 x 10 <sup>4</sup> W
P-122303A/B (2x50%)	PRODUCTION HEATER	SHELL AND TUBE	11.5 x 10 <sup>4</sup> W
P-122304A/B (2x50%)	OIL HEATER	SHELL AND TUBE	12.3 x 10 <sup>4</sup> W
SG-122301A/B (2x50%)	PRODUCTION SEPARATOR	HORIZONTAL	14308 m <sup>3</sup> /d (NOTE 1)
SG-122302A/B (2x50%)	ATMOSPHERIC SEPARATOR	HORIZONTAL	14308 m <sup>3</sup> /d (NOTE 1)
TO-122301A/B (2x50%)	OIL DEHYDRATOR	ELECTROSTATIC	14308 m <sup>3</sup> /d (NOTE 1)
LP-122301A/V (20x100%)	PIG LAUNCHER 10"	-	-
RP-122301A/V (20x100%)	PIG RECEIVER 12" / 8"	-	-
(NOTE 8)	CARGO OIL PUMP	CENTRIFUGAL	1200 m <sup>3</sup> /h
B-122302A/F (6x20%)	CRUDE OIL TRANSFER PUMP	CENTRIFUGAL	300 m <sup>3</sup> /h
SG-121201 (1x100%)	TEST SEPARATOR	HORIZONTAL	3000 m <sup>3</sup> /d (NOTE 1)
P-121201 (1x100%)	TEST HEATER	SHELL AND TUBE	6.3 x 10 <sup>4</sup> W

- GENERAL NOTES**
- LIQUID FLOW RATE SPECIFIED AT STANDARD CONDITIONS.
  - THE PERFORMANCE CHARACTERISTICS OF EQUIPMENT AND SYSTEMS, AS SHOWN ON THE UPPER PART OF THIS DRAWING, ARE DESIGN DATA AND MAY NOT AGREE WITH THE BALANCE INFORMATION HEREUNDER, WHICH ARE ACTUAL EQUILIBRIUM VALUES.
  - OIL VOLUMETRIC FLOW RATE AND OIL DENSITY ARE THE ACTUAL VALUES.
  - GAS FLOW RATE AT PRESSURE AND TEMPERATURE OPERATION CONDITIONS.
  - CHARACTERISTICS OF C<sub>12+</sub> FRACTIONS:
    - FROM 4-RJS-367: PM=533; \*API=17.45
    - FROM 3-RJS-360A: PM=408; \*API=19.84
  - THIS FLOW SHOWS THE WATER PRESENT ONLY IN THE LIQUID PHASE. THIS VALUE MUST BE CORRECTED TO SEA WATER DENSITY OF 1030 kg/m<sup>3</sup>.
  - FOR FUTURE SATELLITE PRODUCTION WELLS CONNECTIONS, FREE AREA SHALL BE FORESEEN FOR PIG LAUNCHER AND PIG RECEIVER INSTALLATION.
  - CARGO PUMPS TAG NUMBERS ARE AS FOLLOWS:
    - B-122301-01/08P
    - B-122301-01/08S
    - B-122301-01/05CA
    - B-122301-01/05CB
  - FOR THE PLACEMENT OF ALL, EQUIPMENT SHOWN IN THIS DRAWING, SEE EQUIPMENT LAY-OUT PLANS OF THE MODULES P03A/B AND P04A/B.

REV.	DESCRIPTION	DATE	EXEC.	CHECK	APPROV.
D	REVISED WHERE INDICATED BY UTC. FOR QUOTATION	16AUG01	SOLANGE	ZARATTI	ZARATTI
C	REVISED WHERE INDICATED BY UTC. FOR QUOTATION	06AUG01	SOLANGE	ZARATTI	ZARATTI
B	GENERAL REVISION DUE TO CONSISTENCY VERIFICATION	09FEB01	EBP	NICODEMOS	NICODEMOS
A	WHERE INDICATED-APPROVED BY E&P-BC	05JAN01	EBP	NICODEMOS	NICODEMOS
0	ORIGINAL	20NOV00	CENPES	R.BORGES	NICODEMOS

THE DATA OR PART THEREOF ARE PETROBRAS PROPERTY AND THIS MUST NOT BE USED IN ANY WAY WITHOUT PERMISSION

**PETROBRAS** **PETROBRAS S.A.** **CENPES**

CLIENT OR USER: **E & P BACIA DE CAMPOS**

JOB OR PROJECT: **ALBACORA LESTE FIELD DEVELOPMENT**

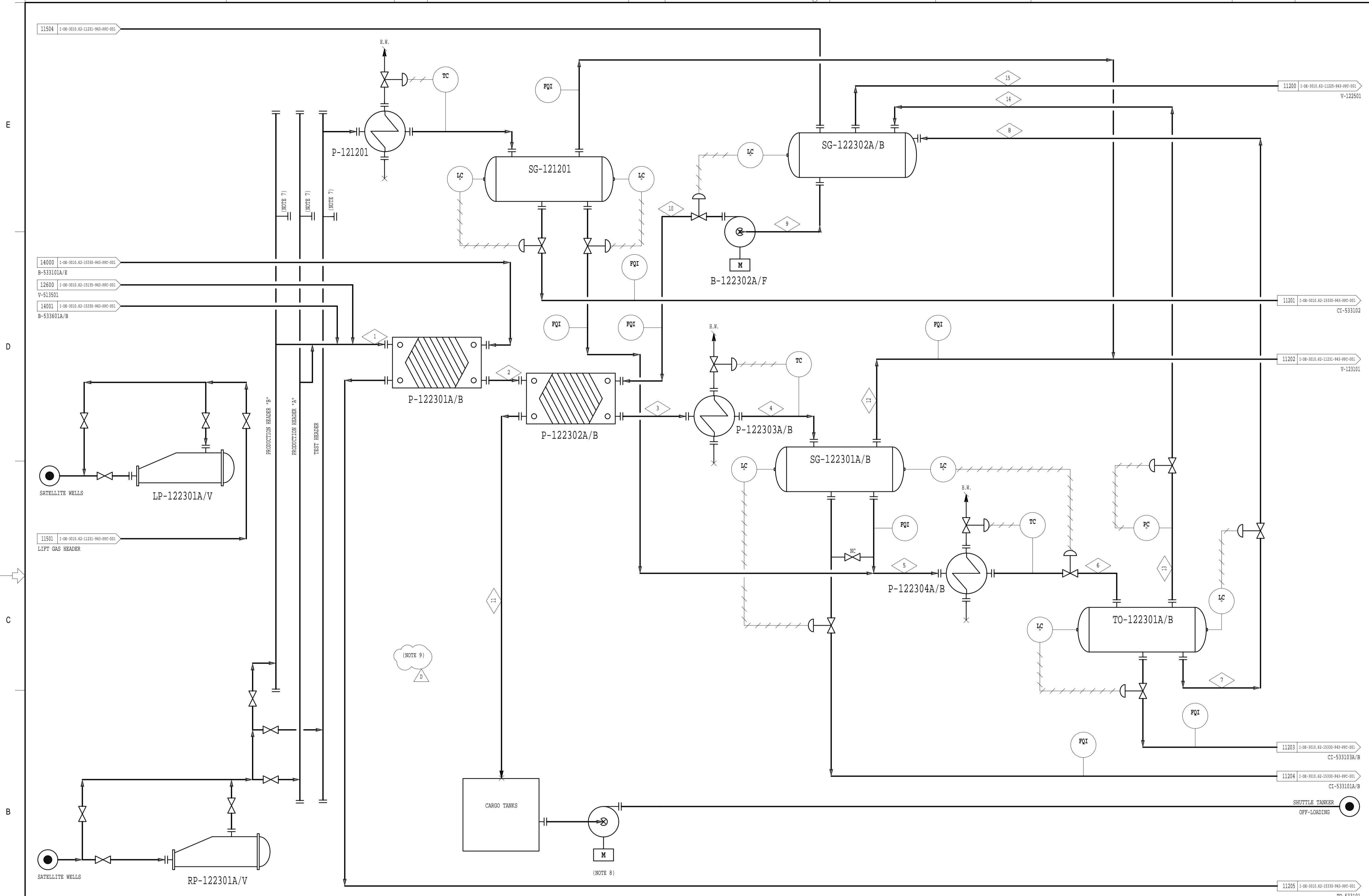
AREA OR UNIT: **FPSO UNIT - P-50**

TITLE: **Figura 3.2.3-c DIAGRAMA DE FLUXO DE PROCESSO PROCESSAMENTO DE ÓLEO (PICO DE PRODUÇÃO DE ÓLEO)**

DESIGN: CENPES DRAWN: EBP CHECK: R.BORGES APPROVAL: NICODEMOS

SCALE: NO SCALE SIZE: A1: 841x594mm GC: 600430 SHEET: 01 of 03

DATE: 20NOV00 No.: **I-DE-3010.62-11223-943-PPC-001**



REFERENCE DOCUMENTS			
ET SYMBOLS AND ABBREVIATIONS			
EQUIPMENT			
TAG	DESCRIPTION	TYPE	CAPACITY
P-122301A/B (2x50%)	OIL/WATER PRE-HEATER	PLATE	14.6 x 10 <sup>6</sup> W
P-122302A/B (2x50%)	OIL/OIL PRE-HEATER	PLATE	12.8 x 10 <sup>6</sup> W
P-122303A/B (2x50%)	PRODUCTION HEATER	SHELL AND TUBE	11.5 x 10 <sup>6</sup> W
P-122304A/B (2x50%)	OIL HEATER	SHELL AND TUBE	12.3 x 10 <sup>6</sup> W
SG-122301A/B (2x50%)	PRODUCTION SEPARATOR	HORIZONTAL	14308 m <sup>3</sup> /d (NOTE 1)
SG-122302A/B (2x50%)	ATMOSPHERIC SEPARATOR	HORIZONTAL	14308 m <sup>3</sup> /d (NOTE 1)
TO-122301A/B (2x50%)	OIL DEHYDRATOR	ELECTROSTATIC	14308 m <sup>3</sup> /d (NOTE 1)
LP-122301A/V (20x100%)	PIG LAUNCHER	-	-
RP-122301A/V (20x100%)	PIG RECEIVER	-	-
(NOTE 8)	CARGO OIL PUMP	CENTRIFUGAL	1200 m <sup>3</sup> /h
B-122302A/F (6x20%)	CRUDE OIL TRANSFER PUMP	CENTRIFUGAL	300 m <sup>3</sup> /h
SG-121201 (1x100%)	TEST SEPARATOR	HORIZONTAL	3000 m <sup>3</sup> /d (NOTE 1)
P-121201 (1x100%)	TEST HEATER	SHELL AND TUBE	6.3 x 10 <sup>6</sup> W

- GENERAL NOTES**
- LIQUID FLOW RATE SPECIFIED AT STANDARD CONDITIONS.
  - THE PERFORMANCE CHARACTERISTICS OF EQUIPMENT AND SYSTEMS, AS SHOWN ON THE UPPER PART OF THIS DRAWING, ARE DESIGN DATA AND MAY NOT AGREE WITH THE BALANCE INFORMATION HEREUNDER, WHICH ARE ACTUAL EQUILIBRIUM VALUES.
  - OIL VOLUMETRIC FLOW RATE AND OIL DENSITY ARE THE ACTUAL VALUES.
  - GAS FLOW RATE AT PRESSURE AND TEMPERATURE OPERATION CONDITIONS.
  - CHARACTERISTICS OF C<sub>1+</sub> FRACTIONS:  
- FROM 4-RJS-367: PM=533; \*API=17.45  
- FROM 3-RJS-360A: PM=408; \*API=19.84
  - THIS FLOW SHOWS THE WATER PRESENT ONLY IN THE LIQUID PHASE. THIS VALUE MUST BE CORRECTED TO SEA WATER DENSITY OF 1030 kg/m<sup>3</sup>.
  - FOR FUTURE SATELLITE PRODUCTION WELLS CONNECTIONS, FREE AREA SHALL BE FORESEEN FOR PIG LAUNCHER AND PIG RECEIVER INSTALLATION.
  - CARGO PUMPS TAG NUMBERS ARE AS FOLLOWS:  
B-122301-01/08P  
B-122301-01/08S  
B-122301-01/05CA  
B-122301-01/05CB
  - FOR THE PLACEMENT OF ALL, EQUIPMENT SHOWN IN THIS DRAWING, SEE EQUIPMENT LAY-OUT PLANS OF THE MODULES P03A/B AND P04A/B.

STREAM CHARACTERISTICS COMPOSITION (% MOLAL) AND FLOW RATES		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
WATER	H <sub>2</sub> O	92.48	92.48	92.48	92.48	80.24	80.24	19.02	19.02	6.02	6.02	6.02	4.38	15.39	15.39	72.93																
NITROGEN	N <sub>2</sub>	0.03	0.03	0.03	0.03	0	0	0	0	0	0	0	0.45	0	0	0																
CARBON DIOXIDE	CO <sub>2</sub>	0.2	0.2	0.2	0.2	0.02	0.02	0.06	0.06	0	0	0	2.96	1.44	1.44	0.37																
METHANE	C1	5.65	5.65	5.65	5.65	0.6	0.6	1.79	1.79	0.06	0.06	0.06	84.7	72.7	72.7	12.4																
ETHANE	C2	0.27	0.27	0.27	0.27	0.1	0.1	0.38	0.38	0.03	0.03	0.03	3.99	4.53	4.53	2																
PROPANE	C3	0.1	0.1	0.1	0.1	0.09	0.09	0.35	0.35	0.06	0.06	0.06	1.36	1.82	1.82	1.61																
I-BUTANE	I-C4	0.03	0.03	0.03	0.03	0.04	0.04	0.15	0.15	0.05	0.05	0.05	0.33	0.43	0.43	0.61																
N-BUTANE	N-C4	0.07	0.07	0.07	0.07	0.16	0.16	0.64	0.64	0.23	0.23	0.23	0.84	1.42	1.42	2.37																
I-PENTANE	I-C5	0.02	0.02	0.02	0.02	0.08	0.08	0.33	0.33	0.18	0.18	0.18	0.22	0.39	0.39	0.95																
N-PENTANE	N-C5	0.03	0.03	0.03	0.03	0.13	0.13	0.54	0.54	0.32	0.32	0.32	0.28	0.53	0.53	1.41																
HEXANE	C6	0.03	0.03	0.03	0.03	0.22	0.22	0.9	0.9	0.76	0.76	0.76	0.18	0.41	0.41	1.44																
HEPTANE	C7	0.04	0.04	0.04	0.04	0.5	0.5	2.06	2.06	2.12	2.12	2.12	0.16	0.43	0.43	1.75																
OCTANE	C8	0.05	0.05	0.05	0.05	0.69	0.69	2.85	2.85	3.23	3.23	3.23	0.09	0.27	0.27	1.17																
NONANE	C9	0.04	0.04	0.04	0.04	0.71	0.71	2.93	2.93	3.46	3.46	3.46	0.04	0.13	0.13	0.55																
DECANE	C10	0.05	0.05	0.05	0.05	0.81	0.81	3.35	3.35	4.05	4.05	4.05	0.02	0.07	0.07	0.3																
UNDECANE	C11	0.05	0.05	0.05	0.05	0.76	0.76	3.15	3.15	3.84	3.84	3.84	0.01	0.03	0.03	0.13																
C12+ (NOTE 5)	3-RJS-360A	C12+	0.6	0.6	0.6	10.07	10.07	41.71	41.71	51.25	51.25	51.25	0	0	0	0																
C12+ (NOTE 5)	4-RJS-367	C12+	0.28	0.28	0.28	4.78	4.78	19.8	19.8	24.33	24.33	24.33	0	0	0	0																
TOTAL			100	100	100	100	100	100	100	100	100	100	100	100	100	100																
MOLAR FLOW RATE	(kgmol/h)	41758.09	41758.09	41758.09	41758.09	2465.92	2465.92	595.56	595.56	178862.39	178862.39	175980.5	53036.57	113.11	113.11	2995																
MASS FLOW RATE	(kg/h)	232890.54	232890.54	232890.54	232890.54	212585.59	212585.59	178862.39	178862.39	175980.5	175980.5	175980.5	53036.57	113.11	113.11	2995																
OIL VOLUMETRIC FLOW RATE	(NOTE 5) (m <sup>3</sup> /h)	199.76	200.99	200.99	201.73	201.11	205.39	205.36	201.58	201.39	201.36	195.5	0	0	0	0																
GAS VOLUMETRIC FLOW RATE	(NOTE 4) (m <sup>3</sup> /h)	5696.83	6939.59	7612.45	8967.6	0	21.94	0	2690.44	0	0	0	8967.6	21.94	146.85	3004.98																
WATER VOLUMETRIC FLOW RATE	(NOTE 6) (m <sup>3</sup> /h)	696.97	703.59	704.83	711.3	36.5	37.17	1.99	0.55	0.44	0.44	0.51	0	0	0	0																
MOLECULAR WEIGHT	(kg/kmol)	22.12	22.12	22.12	22.12	86.21	86.21	300.33	300.33	363.11	363.11	363.11	19.15	20.39	20.39	25.72																
PRESSURE	(kPa abs)	1078.73	1010.09	941.44	882.6	784.53	784.53	117.68	117.68	294.2	225.55	882.6	784.53	117.68	117.68	117.68																
TEMPERATURE	(°C)	19	49.96	54.41	75	75	105	105	96.71	96.03	95.99	55	75	105	102.34	96.03																
OIL DENSITY	(kg/m <sup>3</sup> )	904.59	890.6	888.95	879.35	880.1	861.67	861.71	871.18	871.73	871.85	897.6	0	0	0	0																

STANDARDISED FORM BY E&P-26-0001 - FIGURE A2Z

REV.	DESCRIPTION	DATE	EXEC.	CHECK	APPROV.
D	REVISED WHERE INDICATED BY UTC. FOR QUOTATION	16AUG01	SOLANGE	ZARATTI	ZARATTI
C	REVISED WHERE INDICATED BY UTC. FOR QUOTATION	06AUG01	SOLANGE	ZARATTI	ZARATTI
B	GENERAL REVISION DUE TO CONSISTENCY VERIFICATION	09FEB01	EBP	NICODEMOS	NICODEMOS
A	WHERE INDICATED-APPROVED BY E&P-BC	05JAN01	EBP	NICODEMOS	NICODEMOS
0	ORIGINAL	20NOV00	CENPES	R. BORGES	NICODEMOS

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CLIENT OR USER  
**E & P BACIA DE CAMPOS**

JOB OR PROJECT  
**ALBACORA LESTE FIELD DEVELOPMENT**

AREA OR UNIT  
**FPSO UNIT - P-50**

TITLE  
**PROCESS FLOW DIAGRAM OIL COLLECTING, SEPARATION AND PUMPING (MAXIMUM WATER)**

DESIGN: CENPES  
DRAWN: EBP  
CHECK: R. BORGES  
APPROVAL: NICODEMOS

SCALE: NO SCALE  
SIZE: A1: 841x594mm  
GC: 600430  
SHEET: 02 of 03

DATE: 20NOV00  
No.: **I-DE-3010.62-11223-943-PPC-001**

