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**Parte 2**  
**Página de Certificado da Amostragem**

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## 2.0 PÁGINA DE CERTIFICADO DA AMOSTRAGEM

Os dados e cálculos para esta amostragem foram obtidos e atuados por mim de acordo com padrões e procedimentos da Gyrodata do Brasil LTDA, são verdadeiros e corretos pelo meu melhor conhecimento.

Leonardo Gomes

Data: 19 de Abril de 2019

Os dados e cálculos para esta amostragem foram checados por mim e conforme os padrões e procedimentos da Gyrodata do Brasil LTDA.

Este relatório representa uma amostragem direcional do poço baseado nos dados originais obtidos na localização do poço.

Checado por :

Operations Manager

Lucas Assad  
Abril de 2019

Data: 19 de

**Parte 3**  
**Detalhes da Amostragem**

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3.0     DETALHES DA AMOSTRAGEM

Cliente	:	Braskem
Sonda	:	N/A
Campo	:	Sal Gema
Poço	:	Mina 28
Latitude	:	9.632600 deg. S
Longitude	:	35.746900 deg. W
Data da amostragem	:	18 de Abril de 2019
Tipo de amostragem	:	Gyro Multishot Contínuo
Referência de profundidade	:	Ground
Max. Profundidade da amostragem	:	695.00 metros
Origem da seção vertical	:	-
Azimute da seção vertical	:	-
Referência Norte	:	Norte Verdadeiro
Grid Correction	:	-
Método de cálculo	:	Mínima Curvatura
Surveyors	:	Leonardo Gomes



**Parte 4**  
**Listagem Definitiva da Amostragem**

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#### 4.0 LISTAGEM DEFINITIVA DA AMOSTRAGEM

### A Gyrodata Directional Survey

for

BRASKEM

Well: MINA 28,  
Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

Run Date: 18 Apr 2019

Report Generated: 19 Apr 2019 07:53

Surveyor: Leonardo Gomes

Calculation Method: MINIMUM CURVATURE

Survey surface coordinates obtained from: Company Man

Survey Latitude: 9.632600 deg. S

Longitude: 35.746900 deg. W

Azimuth Correction:

**Gyro: Bearings are Relative to True North**

Depth Reference: Ground

Vertical Section Calculated from Well Head Location

Closure Calculated from Well Head Location

Horizontal Coordinates Calculated from Well Head Location

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# A Gyrodata Directional Survey

BRASKEM  
 Well: Mina 28  
 Location: RIGLESS, SAL GEMA  
 Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
0.00	0.00	0.00	0.00	0.00	0.00 N	0.00 E
10.00	0.32	118.23	10.00	0.96	0.01 S	0.02 E
12.00	0.28	123.61	12.00	0.73	0.02 S	0.03 E
14.02	0.19	112.53	14.02	1.49	0.02 S	0.04 E
15.98	0.24	95.24	15.98	1.25	0.02 S	0.05 E
17.97	0.25	90.03	17.97	0.37	0.02 S	0.06 E
20.04	0.25	69.96	20.04	1.26	0.02 S	0.07 E
22.00	0.17	66.18	22.00	1.24	0.02 S	0.07 E
24.04	0.10	110.77	24.04	1.78	0.02 S	0.08 E
26.00	0.09	137.52	26.00	0.69	0.02 S	0.08 E
28.02	0.07	107.90	28.02	0.67	0.02 S	0.08 E
30.02	0.15	77.38	30.02	1.45	0.02 S	0.08 E
32.60	0.15	71.56	32.60	0.18	0.02 S	0.09 E
33.00	0.17	56.61	33.00	3.34	0.02 S	0.09 E
34.00	0.20	44.07	34.00	1.49	0.02 S	0.09 E
35.00	0.23	37.49	35.00	1.21	0.02 S	0.10 E
36.00	0.17	27.73	36.00	2.01	0.01 S	0.10 E
37.00	0.11	5.72	37.00	2.34	0.01 S	0.10 E
38.00	0.07	358.10	38.00	1.37	0.01 S	0.10 E
39.00	0.06	36.64	39.00	1.33	0.01 S	0.10 E
40.00	0.07	30.11	40.00	0.33	0.01 S	0.10 E
41.00	0.08	28.04	41.00	0.37	0.01 S	0.10 E
42.00	0.09	30.15	42.00	0.15	0.00 S	0.10 E
43.00	0.08	33.46	43.00	0.23	0.00 S	0.10 E
44.00	0.07	42.34	44.00	0.50	0.00 S	0.10 E
45.00	0.06	58.14	45.00	0.60	0.00 S	0.10 E
46.00	0.06	73.97	46.00	0.47	0.00 S	0.11 E
47.00	0.06	80.73	47.00	0.21	0.00 S	0.11 E
48.00	0.06	85.92	48.00	0.20	0.00 S	0.11 E
49.00	0.07	87.08	49.00	0.16	0.00 S	0.11 E
50.00	0.08	82.39	50.00	0.32	0.00 S	0.11 E
51.00	0.09	79.38	51.00	0.30	0.00 S	0.11 E
52.00	0.10	78.29	52.00	0.36	0.00 S	0.11 E
53.00	0.11	71.69	53.00	0.53	0.00 N	0.11 E
54.00	0.14	65.90	54.00	0.86	0.00 N	0.12 E
55.00	0.16	52.73	55.00	1.17	0.00 N	0.12 E



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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
56.00	0.16	47.50	56.00	0.47	0.00 N	0.12 E
57.00	0.15	45.93	57.00	0.41	0.01 N	0.12 E
58.00	0.13	47.51	58.00	0.67	0.01 N	0.12 E
59.00	0.11	41.21	59.00	0.69	0.01 N	0.13 E
60.00	0.10	20.09	60.00	1.17	0.01 N	0.13 E
61.00	0.10	12.11	61.00	0.43	0.01 N	0.13 E
62.00	0.11	351.34	62.00	1.17	0.01 N	0.13 E
63.00	0.12	341.76	63.00	0.65	0.02 N	0.13 E
64.00	0.13	338.30	64.00	0.40	0.02 N	0.13 E
65.00	0.14	9.88	65.00	2.25	0.02 N	0.13 E
66.00	0.15	3.31	66.00	0.54	0.02 N	0.13 E
67.00	0.15	16.42	67.00	1.04	0.03 N	0.13 E
68.00	0.16	18.12	68.00	0.16	0.03 N	0.13 E
69.00	0.17	21.23	69.00	0.47	0.03 N	0.13 E
70.00	0.20	4.67	70.00	1.79	0.03 N	0.13 E
71.00	0.22	45.00	71.00	4.42	0.04 N	0.13 E
72.00	0.22	40.90	72.00	0.50	0.04 N	0.13 E
73.00	0.19	35.86	73.00	0.95	0.04 N	0.14 E
74.00	0.17	32.15	74.00	0.80	0.05 N	0.14 E
75.00	0.18	34.52	75.00	0.39	0.05 N	0.14 E
76.00	0.19	43.53	76.00	0.95	0.05 N	0.14 E
77.00	0.20	52.40	77.00	0.97	0.05 N	0.14 E
78.00	0.20	55.84	78.00	0.38	0.05 N	0.15 E
79.00	0.20	51.79	79.00	0.42	0.06 N	0.15 E
80.00	0.20	45.57	80.00	0.64	0.06 N	0.15 E
81.00	0.18	39.94	81.00	0.65	0.06 N	0.15 E
82.00	0.17	38.11	82.00	0.43	0.06 N	0.16 E
83.00	0.16	34.79	83.00	0.38	0.07 N	0.16 E
84.00	0.16	28.84	84.00	0.53	0.07 N	0.16 E
85.00	0.15	26.98	85.00	0.26	0.07 N	0.16 E
86.00	0.16	11.97	86.00	1.21	0.07 N	0.16 E
87.00	0.17	346.31	87.00	2.19	0.08 N	0.16 E
88.00	0.18	345.07	88.00	0.38	0.08 N	0.16 E
89.00	0.19	340.47	89.00	0.52	0.08 N	0.16 E
90.00	0.18	336.35	90.00	0.43	0.09 N	0.16 E
91.00	0.18	339.29	91.00	0.39	0.09 N	0.16 E
92.00	0.16	353.43	92.00	1.34	0.09 N	0.16 E

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A Gyrodata Directional Survey

BRASKEM  
Well: Mina 28  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
93.00	0.16	35.88	93.00	3.47	0.09 N	0.16 E
94.00	0.17	27.35	94.00	0.76	0.10 N	0.16 E
95.00	0.18	40.78	95.00	1.32	0.10 N	0.16 E
96.00	0.20	51.36	96.00	1.20	0.10 N	0.16 E
97.00	0.23	62.60	97.00	1.58	0.10 N	0.17 E
98.00	0.29	63.29	98.00	1.77	0.10 N	0.17 E
99.00	0.35	62.83	99.00	1.86	0.11 N	0.18 E
100.00	0.42	59.47	100.00	2.15	0.11 N	0.18 E
101.00	0.46	60.66	101.00	1.26	0.11 N	0.19 E
102.00	0.52	56.67	102.00	1.92	0.12 N	0.20 E
103.00	0.56	56.98	103.00	1.20	0.12 N	0.20 E
104.00	0.62	52.90	104.00	2.35	0.13 N	0.21 E
105.00	0.69	52.50	105.00	2.10	0.14 N	0.22 E
106.00	0.79	54.41	106.00	3.03	0.14 N	0.23 E
107.00	0.90	57.08	107.00	3.39	0.15 N	0.24 E
108.00	0.99	59.23	108.00	2.87	0.16 N	0.26 E
109.00	1.08	60.94	109.00	3.00	0.17 N	0.27 E
110.00	1.19	62.12	110.00	3.32	0.18 N	0.29 E
111.00	1.33	62.61	111.00	4.30	0.19 N	0.31 E
112.00	1.49	62.51	112.00	4.71	0.20 N	0.33 E
113.00	1.67	61.50	113.00	5.46	0.21 N	0.36 E
114.00	1.79	60.74	114.00	3.72	0.23 N	0.38 E
115.00	1.90	59.81	115.00	3.51	0.25 N	0.41 E
116.00	2.01	59.04	116.00	3.13	0.26 N	0.44 E
117.00	2.09	58.45	117.00	2.60	0.28 N	0.47 E
118.00	2.18	57.97	117.99	2.75	0.30 N	0.50 E
119.00	2.25	57.51	118.99	2.28	0.32 N	0.53 E
120.00	2.33	56.79	119.99	2.44	0.34 N	0.57 E
121.00	2.42	55.88	120.99	2.90	0.37 N	0.60 E
122.00	2.52	55.27	121.99	3.19	0.39 N	0.64 E
123.00	2.64	55.42	122.99	3.43	0.42 N	0.67 E
124.00	2.75	56.40	123.99	3.74	0.44 N	0.71 E
125.00	2.86	57.67	124.99	3.71	0.47 N	0.75 E
126.00	2.95	58.55	125.99	3.12	0.50 N	0.80 E
127.00	3.03	58.70	126.99	2.44	0.52 N	0.84 E
128.00	3.12	58.37	127.98	2.52	0.55 N	0.89 E
129.00	3.21	58.08	128.98	2.80	0.58 N	0.94 E



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# A Gyrodata Directional Survey

BRASKEM  
Well: Mina 28  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
130.00	3.31	58.14	129.98	3.12	0.61 N	0.98 E
131.00	3.42	58.45	130.98	3.20	0.64 N	1.03 E
132.00	3.51	58.70	131.98	2.80	0.67 N	1.08 E
133.00	3.58	58.74	132.98	2.28	0.70 N	1.14 E
134.00	3.65	58.59	133.97	1.97	0.74 N	1.19 E
135.00	3.71	58.50	134.97	1.90	0.77 N	1.25 E
136.00	3.78	58.49	135.97	1.89	0.80 N	1.30 E
137.00	3.84	58.65	136.97	1.86	0.84 N	1.36 E
138.00	3.89	58.74	137.96	1.72	0.87 N	1.42 E
139.00	3.95	58.72	138.96	1.68	0.91 N	1.47 E
140.00	4.01	58.56	139.96	1.71	0.95 N	1.53 E
141.00	4.07	58.39	140.96	1.86	0.98 N	1.59 E
142.00	4.13	58.15	141.96	2.05	1.02 N	1.65 E
143.00	4.21	57.94	142.95	2.27	1.06 N	1.72 E
144.00	4.28	58.00	143.95	2.31	1.10 N	1.78 E
145.00	4.36	58.32	144.95	2.51	1.14 N	1.84 E
146.00	4.44	58.79	145.94	2.52	1.18 N	1.91 E
147.00	4.51	59.10	146.94	2.28	1.22 N	1.98 E
148.00	4.58	59.19	147.94	2.14	1.26 N	2.04 E
149.00	4.65	59.21	148.93	2.16	1.30 N	2.11 E
150.00	4.73	59.20	149.93	2.19	1.34 N	2.18 E
151.00	4.80	59.22	150.93	2.16	1.38 N	2.25 E
152.00	4.87	59.21	151.92	2.10	1.43 N	2.33 E
153.00	4.94	59.23	152.92	2.13	1.47 N	2.40 E
154.00	5.01	59.28	153.92	2.07	1.52 N	2.47 E
155.00	5.08	59.35	154.91	2.20	1.56 N	2.55 E
156.00	5.15	59.43	155.91	2.14	1.61 N	2.63 E
157.00	5.23	59.49	156.90	2.26	1.65 N	2.70 E
158.00	5.30	59.51	157.90	2.07	1.70 N	2.78 E
159.00	5.36	59.50	158.90	2.01	1.75 N	2.86 E
160.00	5.42	59.59	159.89	1.79	1.79 N	2.94 E
161.00	5.48	59.82	160.89	1.81	1.84 N	3.03 E
162.00	5.53	60.13	161.88	1.87	1.89 N	3.11 E
163.00	5.59	60.42	162.88	1.94	1.94 N	3.19 E
164.00	5.66	60.53	163.87	2.00	1.99 N	3.28 E
165.00	5.74	60.43	164.87	2.39	2.03 N	3.37 E

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# A Gyrodata Directional Survey

BRASKEM  
Well: Mina 28  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
166.00	5.83	60.24	165.86	2.73	2.08 N	3.45 E
167.00	5.92	60.11	166.86	2.82	2.14 N	3.54 E
168.00	6.01	60.19	167.85	2.80	2.19 N	3.63 E
169.00	6.10	60.46	168.85	2.77	2.24 N	3.72 E
170.00	6.19	60.75	169.84	2.77	2.29 N	3.82 E
171.00	6.28	61.05	170.84	2.90	2.34 N	3.91 E
172.00	6.38	61.18	171.83	3.06	2.40 N	4.01 E
173.00	6.48	61.25	172.82	2.89	2.45 N	4.11 E
174.00	6.53	61.26	173.82	1.74	2.51 N	4.21 E
175.00	6.64	61.27	174.81	3.30	2.56 N	4.31 E
176.00	6.75	61.32	175.80	3.27	2.62 N	4.41 E
177.00	6.87	61.33	176.80	3.39	2.67 N	4.51 E
178.00	6.98	61.34	177.79	3.51	2.73 N	4.62 E
179.00	7.10	61.39	178.78	3.48	2.79 N	4.73 E
180.00	7.21	61.53	179.77	3.25	2.85 N	4.84 E
181.00	7.30	61.66	180.77	3.02	2.91 N	4.95 E
182.00	7.39	61.76	181.76	2.72	2.97 N	5.06 E
183.00	7.48	61.89	182.75	2.69	3.03 N	5.17 E
184.00	7.57	62.10	183.74	2.74	3.09 N	5.29 E
185.00	7.66	62.41	184.73	3.02	3.16 N	5.41 E
186.00	7.76	62.76	185.72	3.24	3.22 N	5.53 E
187.00	7.86	63.01	186.71	3.19	3.28 N	5.65 E
188.00	7.96	63.13	187.70	2.98	3.34 N	5.77 E
189.00	8.05	63.17	188.69	2.82	3.40 N	5.89 E
190.00	8.14	63.31	189.68	2.77	3.47 N	6.02 E
191.00	8.23	63.63	190.67	2.89	3.53 N	6.15 E
192.00	8.30	64.01	191.66	2.78	3.59 N	6.28 E
193.00	8.36	64.29	192.65	2.26	3.66 N	6.41 E
194.00	8.42	64.44	193.64	1.78	3.72 N	6.54 E
195.00	8.47	64.52	194.63	1.51	3.78 N	6.67 E
196.00	8.51	64.64	195.62	1.47	3.85 N	6.80 E
197.00	8.56	64.85	196.61	1.66	3.91 N	6.94 E
198.00	8.61	65.11	197.60	2.01	3.97 N	7.07 E
199.00	8.69	65.37	198.59	2.47	4.04 N	7.21 E
200.00	8.78	65.55	199.57	2.91	4.10 N	7.35 E
201.00	8.89	65.65	200.56	3.21	4.16 N	7.49 E



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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
202.00	8.99	65.77	201.55	3.26	4.23 N	7.63 E
203.00	9.10	65.98	202.54	3.24	4.29 N	7.77 E
204.00	9.20	66.28	203.53	3.33	4.36 N	7.92 E
205.00	9.30	66.60	204.51	3.43	4.42 N	8.07 E
206.00	9.40	66.88	205.50	3.43	4.48 N	8.21 E
207.00	9.49	67.08	206.49	2.88	4.55 N	8.37 E
208.00	9.55	67.19	207.47	1.66	4.61 N	8.52 E
209.00	9.62	67.37	208.46	2.38	4.68 N	8.67 E
210.00	9.71	67.54	209.44	2.75	4.74 N	8.83 E
211.00	9.78	67.61	210.43	2.25	4.81 N	8.98 E
212.00	9.85	67.54	211.41	2.07	4.87 N	9.14 E
213.00	9.92	67.38	212.40	2.38	4.94 N	9.30 E
214.00	10.00	67.21	213.38	2.55	5.00 N	9.46 E
215.00	10.09	67.11	214.37	2.69	5.07 N	9.62 E
216.00	10.18	67.00	215.35	2.64	5.14 N	9.78 E
217.00	10.27	66.86	216.34	2.79	5.21 N	9.94 E
218.00	10.37	66.64	217.32	3.29	5.28 N	10.11 E
219.00	10.49	66.45	218.31	3.74	5.35 N	10.28 E
220.00	10.63	66.36	219.29	4.29	5.43 N	10.44 E
221.00	10.79	66.37	220.27	4.65	5.50 N	10.61 E
222.00	10.93	66.50	221.25	4.47	5.58 N	10.79 E
222.00	10.94	66.31	221.25	0.00	5.58 N	10.79 E
223.00	11.02	66.53	222.23	2.71	5.65 N	10.96 E
224.00	11.10	66.54	223.22	2.40	5.73 N	11.14 E
225.00	11.19	66.82	224.20	3.15	5.80 N	11.31 E
226.00	11.29	66.85	225.18	3.01	5.88 N	11.49 E
227.00	11.41	66.88	226.16	3.60	5.96 N	11.67 E
228.00	11.52	66.74	227.14	3.40	6.04 N	11.86 E
229.00	11.66	66.65	228.12	4.23	6.12 N	12.04 E
230.00	11.78	66.62	229.10	3.60	6.20 N	12.23 E
231.00	11.94	66.58	230.08	4.81	6.28 N	12.42 E
232.00	12.06	66.58	231.05	3.60	6.36 N	12.61 E
233.00	12.13	66.50	232.03	2.16	6.44 N	12.80 E
234.00	12.22	66.60	233.01	2.77	6.53 N	12.99 E
235.00	12.28	66.67	233.99	1.85	6.61 N	13.19 E
236.00	12.37	66.57	234.96	2.77	6.70 N	13.38 E
237.00	12.47	66.49	235.94	3.04	6.78 N	13.58 E



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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
238.00	12.57	66.45	236.92	3.01	6.87 N	13.78 E
239.00	12.73	66.53	237.89	4.83	6.96 N	13.98 E
240.00	12.88	66.54	238.87	4.50	7.04 N	14.18 E
241.00	12.99	66.46	239.84	3.34	7.13 N	14.39 E
242.00	13.09	66.31	240.82	3.17	7.22 N	14.60 E
243.00	13.17	66.17	241.79	2.58	7.32 N	14.80 E
244.00	13.27	66.10	242.76	3.04	7.41 N	15.01 E
245.00	13.39	66.04	243.74	3.62	7.50 N	15.22 E
246.00	13.51	66.09	244.71	3.62	7.60 N	15.44 E
247.00	13.57	66.03	245.68	1.85	7.69 N	15.65 E
248.00	13.60	66.13	246.65	1.14	7.79 N	15.86 E
249.00	13.56	66.33	247.63	1.85	7.88 N	16.08 E
250.00	13.46	67.05	248.60	5.87	7.97 N	16.29 E
251.00	13.22	68.63	249.57	13.09	8.06 N	16.51 E
252.00	12.91	70.46	250.54	15.51	8.14 N	16.72 E
253.00	12.55	72.81	251.52	18.92	8.21 N	16.93 E
254.00	12.20	74.53	252.50	15.25	8.27 N	17.13 E
255.00	11.99	75.64	253.47	9.40	8.32 N	17.34 E
256.00	12.05	75.31	254.45	2.74	8.38 N	17.54 E
257.00	12.36	73.54	255.43	14.58	8.43 N	17.74 E
258.00	12.90	71.24	256.41	22.13	8.50 N	17.95 E
259.00	13.52	68.75	257.38	25.24	8.58 N	18.17 E
260.00	14.02	67.13	258.35	18.94	8.67 N	18.39 E
261.00	14.36	66.13	259.32	12.57	8.76 N	18.61 E
262.00	14.51	65.62	260.29	5.90	8.87 N	18.84 E
263.00	14.53	65.48	261.26	1.21	8.97 N	19.07 E
264.00	14.47	65.57	262.23	1.92	9.07 N	19.29 E
265.00	14.38	65.71	263.19	2.90	9.18 N	19.52 E
266.00	14.30	65.86	264.16	2.65	9.28 N	19.75 E
267.00	14.20	66.01	265.13	3.20	9.38 N	19.97 E
268.00	14.12	66.02	266.10	2.40	9.48 N	20.20 E
269.00	14.04	66.09	267.07	2.45	9.58 N	20.42 E
270.00	13.97	66.24	268.04	2.37	9.67 N	20.64 E
271.00	13.94	66.62	269.01	2.89	9.77 N	20.86 E
272.00	13.90	66.97	269.98	2.80	9.87 N	21.08 E
273.00	13.85	67.24	270.95	2.45	9.96 N	21.30 E

A Gyrodata Directional Survey

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BRASKEM  
Well: Mina 28  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
274.00	13.76	67.43	271.92	3.02	10.05 N	21.52 E
275.00	13.65	67.60	272.90	3.51	10.14 N	21.74 E
276.00	13.57	67.76	273.87	2.65	10.23 N	21.96 E
277.00	13.54	67.79	274.84	0.92	10.32 N	22.18 E
278.00	13.53	67.66	275.81	0.96	10.41 N	22.39 E
279.00	13.56	67.78	276.78	1.23	10.50 N	22.61 E
280.00	13.57	67.97	277.76	1.37	10.58 N	22.83 E
281.00	13.53	68.44	278.73	3.51	10.67 N	23.04 E
282.00	13.49	68.83	279.70	2.99	10.76 N	23.26 E
283.00	13.46	68.85	280.67	0.91	10.84 N	23.48 E
284.00	13.45	68.82	281.65	0.37	10.93 N	23.70 E
285.00	13.45	68.66	282.62	1.12	11.01 N	23.91 E
286.00	13.43	68.62	283.59	0.66	11.09 N	24.13 E
287.00	13.39	68.58	284.56	1.23	11.18 N	24.35 E
288.00	13.34	68.59	285.54	1.50	11.26 N	24.56 E
289.00	13.31	68.71	286.51	1.22	11.35 N	24.77 E
290.00	13.31	68.77	287.48	0.41	11.43 N	24.99 E
291.00	13.31	68.94	288.46	1.17	11.51 N	25.20 E
292.00	13.33	69.03	289.43	0.86	11.60 N	25.42 E
293.00	13.33	69.12	290.40	0.62	11.68 N	25.63 E
294.00	13.32	69.29	291.38	1.21	11.76 N	25.85 E
295.00	13.31	69.44	292.35	1.08	11.84 N	26.07 E
296.00	13.31	69.50	293.32	0.41	11.92 N	26.28 E
297.00	13.31	69.49	294.30	0.07	12.00 N	26.50 E
298.00	13.29	69.46	295.27	0.63	12.08 N	26.71 E
299.00	13.27	69.34	296.24	1.02	12.16 N	26.93 E
300.00	13.27	69.12	297.21	1.51	12.25 N	27.14 E
301.00	13.28	68.98	298.19	1.01	12.33 N	27.36 E
302.00	13.27	68.91	299.16	0.57	12.41 N	27.57 E
303.00	13.25	68.97	300.13	0.73	12.49 N	27.78 E
304.00	13.18	69.28	301.11	2.99	12.57 N	28.00 E
305.00	13.14	69.48	302.08	1.82	12.65 N	28.21 E
306.00	13.10	69.62	303.06	1.53	12.73 N	28.42 E
307.00	13.07	69.78	304.03	1.41	12.81 N	28.64 E
308.00	13.05	69.86	305.00	0.81	12.89 N	28.85 E
309.00	13.07	69.76	305.98	0.91	12.97 N	29.06 E
310.00	13.12	69.80	306.95	1.52	13.05 N	29.27 E



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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
311.00	13.11	70.00	307.93	1.39	13.12 N	29.49 E
312.00	13.14	70.14	308.90	1.31	13.20 N	29.70 E
313.00	13.11	70.16	309.87	0.91	13.28 N	29.91 E
314.00	13.11	69.97	310.85	1.29	13.36 N	30.13 E
315.00	13.07	69.80	311.82	1.67	13.43 N	30.34 E
316.00	13.05	69.80	312.80	0.60	13.51 N	30.55 E
317.00	13.05	69.94	313.77	0.95	13.59 N	30.76 E
318.00	13.04	70.09	314.74	1.06	13.67 N	30.98 E
319.00	13.02	70.20	315.72	0.96	13.74 N	31.19 E
320.00	13.00	70.04	316.69	1.24	13.82 N	31.40 E
321.00	13.00	69.92	317.67	0.81	13.90 N	31.61 E
322.00	13.01	69.80	318.64	0.86	13.97 N	31.82 E
323.00	13.04	69.88	319.62	1.05	14.05 N	32.03 E
324.00	13.04	70.05	320.59	1.15	14.13 N	32.25 E
325.00	13.01	70.18	321.56	1.26	14.21 N	32.46 E
326.00	13.00	70.25	322.54	0.56	14.28 N	32.67 E
327.00	13.00	70.17	323.51	0.54	14.36 N	32.88 E
328.00	13.04	70.18	324.49	1.20	14.44 N	33.09 E
329.00	13.07	70.33	325.46	1.36	14.51 N	33.31 E
330.00	13.07	70.55	326.44	1.49	14.59 N	33.52 E
331.00	13.05	70.74	327.41	1.42	14.66 N	33.73 E
332.00	13.07	70.85	328.38	0.96	14.74 N	33.94 E
333.00	13.09	70.90	329.36	0.69	14.81 N	34.16 E
334.00	13.14	70.77	330.33	1.74	14.89 N	34.37 E
335.00	13.17	70.66	331.31	1.17	14.96 N	34.59 E
336.00	13.21	70.62	332.28	1.23	15.04 N	34.80 E
337.00	13.21	70.72	333.25	0.69	15.11 N	35.02 E
338.00	13.23	70.77	334.23	0.69	15.19 N	35.23 E
339.00	13.20	70.87	335.20	1.13	15.26 N	35.45 E
340.00	13.19	71.03	336.17	1.14	15.34 N	35.67 E
341.00	13.17	71.17	337.15	1.13	15.41 N	35.88 E
342.00	13.16	71.27	338.12	0.75	15.48 N	36.10 E
343.00	13.16	71.34	339.09	0.48	15.56 N	36.31 E
344.00	13.12	71.35	340.07	1.20	15.63 N	36.53 E
345.00	13.08	71.40	341.04	1.25	15.70 N	36.74 E
346.00	13.07	71.55	342.02	1.06	15.77 N	36.96 E
347.00	13.03	71.57	342.99	1.21	15.85 N	37.17 E

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A Gyrodata Directional Survey

BRASKEM  
Well: Mina 28  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
348.00	13.02	71.69	343.96	0.87	15.92 N	37.39 E
349.00	12.98	71.58	344.94	1.41	15.99 N	37.60 E
350.00	12.92	71.42	345.91	2.10	16.06 N	37.81 E
351.00	12.90	71.14	346.89	1.97	16.13 N	38.02 E
352.00	12.91	70.87	347.86	1.83	16.20 N	38.23 E
353.00	12.92	70.67	348.84	1.37	16.28 N	38.45 E
354.00	12.92	70.53	349.81	0.94	16.35 N	38.66 E
355.00	12.89	70.42	350.79	1.16	16.43 N	38.87 E
356.00	12.85	70.31	351.76	1.41	16.50 N	39.08 E
357.00	12.84	70.20	352.74	0.79	16.57 N	39.29 E
358.00	12.86	70.11	353.71	0.85	16.65 N	39.50 E
359.00	12.92	69.93	354.69	2.17	16.73 N	39.71 E
360.00	12.99	69.65	355.66	2.82	16.80 N	39.92 E
361.00	13.06	69.23	356.64	3.53	16.88 N	40.13 E
362.00	13.13	68.96	357.61	2.79	16.96 N	40.34 E
363.00	13.18	68.75	358.58	2.08	17.05 N	40.55 E
364.00	13.24	68.52	359.56	2.39	17.13 N	40.76 E
365.00	13.29	68.27	360.53	2.28	17.21 N	40.98 E
366.00	13.33	68.11	361.50	1.63	17.30 N	41.19 E
367.00	13.35	67.94	362.48	1.32	17.39 N	41.40 E
368.00	13.37	67.78	363.45	1.26	17.47 N	41.62 E
369.00	13.33	67.76	364.42	1.21	17.56 N	41.83 E
370.00	13.30	67.64	365.40	1.22	17.65 N	42.05 E
371.00	13.25	67.60	366.37	1.53	17.74 N	42.26 E
372.00	13.14	67.72	367.34	3.40	17.82 N	42.47 E
373.00	13.00	67.58	368.32	4.31	17.91 N	42.68 E
374.00	12.83	67.51	369.29	5.12	17.99 N	42.88 E
375.00	12.71	67.20	370.27	4.15	18.08 N	43.09 E
376.00	12.69	66.71	371.24	3.29	18.16 N	43.29 E
377.00	12.74	66.09	372.22	4.36	18.25 N	43.49 E
378.00	12.83	65.24	373.19	6.26	18.34 N	43.69 E
379.00	12.95	64.33	374.17	7.07	18.44 N	43.90 E
380.00	13.08	63.51	375.14	6.78	18.54 N	44.10 E
381.00	13.22	62.59	376.12	7.55	18.64 N	44.30 E
382.00	13.36	61.64	377.09	7.78	18.75 N	44.50 E
383.00	13.50	60.76	378.06	7.43	18.86 N	44.71 E

A Gyrodata Directional Survey



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BRASKEM  
Well: Mina 28  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
384.00	13.64	59.97	379.03	6.97	18.98 N	44.91 E
385.00	13.78	59.45	380.01	5.60	19.10 N	45.12 E
386.00	13.89	58.96	380.98	4.82	19.22 N	45.32 E
387.00	13.99	58.54	381.95	4.27	19.34 N	45.53 E
388.00	14.05	58.15	382.92	3.36	19.47 N	45.73 E
389.00	14.10	57.71	383.89	3.54	19.60 N	45.94 E
390.00	14.11	57.37	384.86	2.50	19.73 N	46.15 E
391.00	14.10	57.05	385.83	2.36	19.86 N	46.35 E
392.00	14.06	56.81	386.80	2.12	20.00 N	46.55 E
393.00	14.00	56.60	387.77	2.36	20.13 N	46.76 E
394.00	13.91	56.31	388.74	3.42	20.26 N	46.96 E
395.00	13.78	56.18	389.71	4.01	20.39 N	47.16 E
396.00	13.60	56.12	390.68	5.42	20.53 N	47.35 E
397.00	13.36	56.29	391.65	7.30	20.66 N	47.55 E
398.00	13.07	56.62	392.63	8.99	20.78 N	47.74 E
399.00	12.78	57.01	393.60	9.09	20.90 N	47.92 E
400.00	12.55	57.34	394.58	7.23	21.02 N	48.11 E
401.00	12.50	57.44	395.55	1.64	21.14 N	48.29 E
402.00	12.63	57.25	396.53	4.09	21.26 N	48.47 E
403.00	12.88	56.93	397.50	7.79	21.38 N	48.66 E
404.00	13.20	56.53	398.48	9.97	21.50 N	48.85 E
405.00	13.56	56.19	399.45	11.05	21.63 N	49.04 E
406.00	13.92	55.81	400.42	11.13	21.76 N	49.24 E
407.00	14.26	55.43	401.39	10.57	21.90 N	49.44 E
408.00	14.52	55.20	402.36	7.99	22.04 N	49.64 E
409.00	14.70	55.10	403.33	5.45	22.19 N	49.85 E
410.00	14.83	55.12	404.30	3.90	22.33 N	50.06 E
411.00	14.91	55.15	405.26	2.41	22.48 N	50.27 E
412.00	14.98	55.15	406.23	2.10	22.63 N	50.48 E
413.00	15.04	55.13	407.19	1.81	22.77 N	50.69 E
414.00	15.11	55.07	408.16	2.15	22.92 N	50.91 E
415.00	15.17	54.96	409.12	2.00	23.07 N	51.12 E
416.00	15.24	54.81	410.09	2.41	23.22 N	51.34 E
417.00	15.30	54.68	411.05	2.07	23.37 N	51.55 E
418.00	15.35	54.54	412.02	1.87	23.53 N	51.77 E
419.00	15.40	54.43	412.98	1.74	23.68 N	51.98 E
420.00	15.46	54.27	413.95	2.21	23.84 N	52.20 E

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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
421.00	15.52	54.06	414.91	2.46	23.99 N	52.42 E
422.00	15.58	53.80	415.87	2.76	24.15 N	52.63 E
423.00	15.64	53.57	416.84	2.59	24.31 N	52.85 E
424.00	15.72	53.30	417.80	3.25	24.47 N	53.07 E
425.00	15.78	53.04	418.76	2.78	24.63 N	53.28 E
426.00	15.84	52.79	419.72	2.72	24.80 N	53.50 E
427.00	15.90	52.49	420.69	3.05	24.96 N	53.72 E
428.00	15.98	52.23	421.65	3.22	25.13 N	53.94 E
429.00	16.03	51.95	422.61	2.76	25.30 N	54.15 E
430.00	16.10	51.70	423.57	2.95	25.47 N	54.37 E
431.00	16.10	51.53	424.53	1.41	25.64 N	54.59 E
432.00	16.13	51.43	425.49	1.23	25.82 N	54.80 E
433.00	16.21	51.42	426.45	2.40	25.99 N	55.02 E
434.00	16.33	51.47	427.41	3.62	26.17 N	55.24 E
435.00	16.48	51.60	428.37	4.63	26.34 N	55.46 E
436.00	16.62	51.73	429.33	4.34	26.52 N	55.69 E
437.00	16.74	51.83	430.29	3.70	26.70 N	55.91 E
438.00	16.83	51.86	431.25	2.71	26.87 N	56.14 E
439.00	16.88	51.83	432.20	1.52	27.05 N	56.37 E
440.00	16.93	51.86	433.16	1.52	27.23 N	56.60 E
441.00	16.97	51.99	434.12	1.65	27.41 N	56.83 E
442.00	17.04	52.26	435.07	3.17	27.59 N	57.06 E
443.00	17.12	52.54	436.03	3.44	27.77 N	57.29 E
444.00	17.20	52.81	436.98	3.39	27.95 N	57.52 E
445.00	17.28	53.10	437.94	3.52	28.13 N	57.76 E
446.00	17.36	53.45	438.89	3.94	28.31 N	58.00 E
447.00	17.43	53.80	439.85	3.78	28.48 N	58.24 E
448.00	17.48	54.14	440.80	3.41	28.66 N	58.48 E
449.00	17.52	54.42	441.75	2.80	28.84 N	58.73 E
450.00	17.54	54.78	442.71	3.31	29.01 N	58.97 E
451.00	17.60	55.13	443.66	3.65	29.18 N	59.22 E
452.00	17.68	55.50	444.61	4.13	29.36 N	59.47 E
453.00	17.75	55.86	445.57	3.90	29.53 N	59.72 E
454.00	17.82	56.21	446.52	3.83	29.70 N	59.97 E
455.00	17.84	56.51	447.47	2.82	29.87 N	60.23 E
456.00	17.89	56.82	448.42	3.22	30.04 N	60.48 E
457.00	17.95	57.12	449.37	3.30	30.20 N	60.74 E



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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
458.00	18.02	57.43	450.33	3.56	30.37 N	61.00 E
459.00	18.10	57.69	451.28	3.41	30.54 N	61.26 E
460.00	18.18	57.89	452.23	3.04	30.70 N	61.53 E
461.00	18.27	58.08	453.18	3.24	30.87 N	61.79 E
462.00	18.37	58.31	454.13	3.70	31.04 N	62.06 E
463.00	18.46	58.61	455.07	3.92	31.20 N	62.33 E
464.00	18.54	58.81	456.02	3.06	31.37 N	62.60 E
465.00	18.62	58.95	456.97	2.75	31.53 N	62.87 E
466.00	18.72	59.06	457.92	3.18	31.69 N	63.15 E
467.00	18.83	59.16	458.87	3.44	31.86 N	63.42 E
468.00	18.95	59.23	459.81	3.66	32.03 N	63.70 E
469.00	19.07	59.30	460.76	3.66	32.19 N	63.98 E
470.00	19.18	59.36	461.70	3.35	32.36 N	64.26 E
471.00	19.28	59.35	462.65	3.00	32.53 N	64.55 E
472.00	19.40	59.35	463.59	3.60	32.70 N	64.83 E
473.00	19.49	59.36	464.53	2.70	32.87 N	65.12 E
474.00	19.58	59.36	465.47	2.70	33.04 N	65.40 E
475.00	19.65	59.43	466.42	2.22	33.21 N	65.69 E
476.00	19.69	59.50	467.36	1.39	33.38 N	65.98 E
477.00	19.70	59.66	468.30	1.65	33.55 N	66.27 E
478.00	19.71	59.81	469.24	1.55	33.72 N	66.57 E
479.00	19.72	60.03	470.18	2.25	33.89 N	66.86 E
480.00	19.73	60.32	471.12	2.95	34.06 N	67.15 E
481.00	19.75	60.67	472.07	3.60	34.22 N	67.44 E
482.00	19.74	61.02	473.01	3.56	34.39 N	67.74 E
483.00	19.71	61.45	473.95	4.45	34.55 N	68.03 E
484.00	19.69	61.83	474.89	3.89	34.71 N	68.33 E
485.00	19.64	62.34	475.83	5.36	34.87 N	68.63 E
486.00	19.60	62.91	476.77	5.87	35.02 N	68.93 E
487.00	19.55	63.48	477.72	5.92	35.17 N	69.23 E
488.00	19.50	64.03	478.66	5.71	35.32 N	69.53 E
489.00	19.47	64.60	479.60	5.77	35.46 N	69.83 E
490.00	19.44	65.09	480.54	4.98	35.61 N	70.13 E
491.00	19.42	65.58	481.49	4.93	35.75 N	70.43 E
492.00	19.41	66.01	482.43	4.30	35.88 N	70.73 E
493.00	19.39	66.45	483.37	4.43	36.02 N	71.04 E

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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
494.00	19.40	66.90	484.32	4.49	36.15 N	71.34 E
495.00	19.44	67.35	485.26	4.65	36.28 N	71.65 E
496.00	19.49	67.82	486.20	4.93	36.40 N	71.96 E
497.00	19.56	68.26	487.14	4.89	36.53 N	72.27 E
498.00	19.63	68.58	488.09	3.84	36.65 N	72.58 E
499.00	19.70	68.79	489.03	2.98	36.77 N	72.89 E
500.00	19.78	68.89	489.97	2.61	36.90 N	73.21 E
501.00	19.87	68.95	490.91	2.77	37.02 N	73.52 E
502.00	19.95	69.06	491.85	2.65	37.14 N	73.84 E
503.00	20.03	69.17	492.79	2.65	37.26 N	74.16 E
504.00	20.08	69.25	493.73	1.71	37.38 N	74.48 E
505.00	20.09	69.16	494.67	0.97	37.51 N	74.80 E
506.00	20.00	69.14	495.61	2.71	37.63 N	75.12 E
507.00	19.61	69.31	496.55	11.83	37.75 N	75.44 E
508.00	18.44	70.27	497.49	36.33	37.86 N	75.75 E
509.00	17.12	71.40	498.45	40.93	37.96 N	76.03 E
510.00	16.89	71.21	499.40	7.10	38.05 N	76.31 E
511.00	17.64	69.86	500.36	25.51	38.15 N	76.59 E
512.00	19.30	68.13	501.31	52.44	38.27 N	76.89 E
513.00	20.22	67.29	502.25	28.88	38.40 N	77.20 E
514.00	20.51	67.03	503.18	9.11	38.53 N	77.52 E
515.00	20.67	66.85	504.12	5.16	38.67 N	77.84 E
516.00	20.77	66.72	505.06	3.30	38.81 N	78.17 E
517.00	20.83	66.66	505.99	1.91	38.95 N	78.49 E
518.00	20.90	66.67	506.93	2.10	39.09 N	78.82 E
519.00	20.97	66.66	507.86	2.10	39.23 N	79.15 E
520.00	21.02	66.68	508.79	1.52	39.37 N	79.48 E
521.00	21.04	66.69	509.73	0.61	39.51 N	79.81 E
522.00	21.04	66.68	510.66	0.11	39.66 N	80.14 E
523.00	20.97	66.71	511.59	2.12	39.80 N	80.47 E
524.00	20.70	66.74	512.53	8.11	39.94 N	80.79 E
525.00	20.13	66.82	513.47	17.12	40.08 N	81.11 E
526.00	19.24	67.16	514.41	26.92	40.21 N	81.42 E
527.00	18.86	67.28	515.35	11.46	40.33 N	81.73 E
528.00	19.04	67.25	516.30	5.41	40.46 N	82.02 E
529.00	19.84	67.03	517.24	24.10	40.59 N	82.33 E



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# A Gyrodata Directional Survey

BRASKEM  
Well: Mina 28  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
530.00	20.72	66.75	518.18	26.56	40.73 N	82.65 E
531.00	21.17	66.65	519.11	13.54	40.87 N	82.98 E
532.00	21.37	66.60	520.04	6.02	41.01 N	83.31 E
533.00	21.43	66.60	520.98	1.80	41.16 N	83.65 E
534.00	21.46	66.56	521.91	1.00	41.30 N	83.98 E
535.00	21.49	66.54	522.84	0.93	41.45 N	84.32 E
536.00	21.53	66.49	523.77	1.32	41.59 N	84.65 E
537.00	21.57	66.46	524.70	1.24	41.74 N	84.99 E
538.00	21.62	66.40	525.63	1.64	41.89 N	85.33 E
539.00	21.66	66.35	526.56	1.32	42.03 N	85.67 E
540.00	21.70	66.30	527.49	1.32	42.18 N	86.00 E
541.00	21.72	66.28	528.42	0.64	42.33 N	86.34 E
542.00	21.74	66.28	529.34	0.60	42.48 N	86.68 E
543.00	21.79	66.27	530.27	1.50	42.63 N	87.02 E
544.00	21.84	66.29	531.20	1.52	42.78 N	87.36 E
545.00	21.91	66.32	532.13	2.13	42.93 N	87.70 E
546.00	21.98	66.35	533.06	2.13	43.08 N	88.05 E
547.00	22.05	66.37	533.98	2.11	43.23 N	88.39 E
548.00	22.10	66.36	534.91	1.50	43.38 N	88.73 E
549.00	22.15	66.34	535.84	1.52	43.53 N	89.08 E
550.00	22.19	66.29	536.76	1.33	43.68 N	89.42 E
551.00	22.25	66.28	537.69	1.80	43.83 N	89.77 E
552.00	22.33	66.21	538.61	2.53	43.99 N	90.12 E
553.00	22.42	66.20	539.54	2.70	44.14 N	90.47 E
554.00	22.52	66.21	540.46	3.00	44.29 N	90.81 E
555.00	22.62	66.28	541.39	3.11	44.45 N	91.17 E
556.00	22.69	66.34	542.31	2.21	44.60 N	91.52 E
557.00	22.75	66.41	543.23	1.97	44.76 N	91.87 E
558.00	22.81	66.45	544.15	1.86	44.91 N	92.23 E
559.00	22.87	66.51	545.07	1.93	45.07 N	92.58 E
560.00	22.93	66.57	546.00	1.93	45.22 N	92.94 E
561.00	23.01	66.54	546.92	2.43	45.38 N	93.30 E
562.00	23.10	66.50	547.84	2.74	45.54 N	93.66 E
563.00	23.18	66.45	548.76	2.47	45.69 N	94.02 E
564.00	23.25	66.48	549.68	2.13	45.85 N	94.38 E
565.00	23.31	66.48	550.59	1.80	46.01 N	94.74 E
566.00	23.37	66.41	551.51	1.98	46.17 N	95.11 E

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# A Gyrodata Directional Survey

BRASKEM  
Well: Mina 28  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
567.00	23.42	66.29	552.43	2.07	46.32 N	95.47 E
568.00	23.49	66.19	553.35	2.42	46.49 N	95.83 E
569.00	23.59	66.12	554.26	3.12	46.65 N	96.20 E
570.00	23.75	66.11	555.18	4.80	46.81 N	96.57 E
571.00	23.87	66.19	556.09	3.73	46.97 N	96.93 E
572.00	23.98	66.23	557.01	3.34	47.14 N	97.31 E
573.00	24.05	66.27	557.92	2.16	47.30 N	97.68 E
574.00	24.06	66.23	558.84	0.57	47.46 N	98.05 E
575.00	24.06	66.22	559.75	0.12	47.63 N	98.42 E
576.00	24.04	66.24	560.66	0.65	47.79 N	98.80 E
577.00	23.98	66.37	561.58	2.40	47.96 N	99.17 E
578.00	23.90	66.49	562.49	2.81	48.12 N	99.54 E
579.00	23.78	66.62	563.40	3.93	48.28 N	99.91 E
580.00	23.64	66.80	564.32	4.73	48.44 N	100.28 E
581.00	23.42	66.87	565.24	6.65	48.60 N	100.65 E
582.00	23.25	66.89	566.15	5.11	48.75 N	101.01 E
583.00	23.20	66.77	567.07	2.07	48.91 N	101.38 E
584.00	23.27	66.60	567.99	2.91	49.06 N	101.74 E
585.00	23.47	66.56	568.91	6.02	49.22 N	102.10 E
586.00	23.67	66.59	569.83	6.01	49.38 N	102.47 E
587.00	23.82	66.71	570.74	4.73	49.54 N	102.84 E
588.00	23.94	66.89	571.66	4.21	49.70 N	103.21 E
589.00	23.97	67.12	572.57	2.94	49.86 N	103.58 E
590.00	23.91	67.34	573.48	3.23	50.01 N	103.96 E
591.00	23.80	67.57	574.40	4.32	50.17 N	104.33 E
592.00	23.59	67.77	575.31	6.75	50.32 N	104.70 E
593.00	23.26	68.08	576.23	10.57	50.47 N	105.07 E
594.00	22.84	68.49	577.15	13.49	50.62 N	105.44 E
595.00	22.44	68.86	578.08	12.74	50.76 N	105.79 E
596.00	22.20	69.01	579.00	7.40	50.89 N	106.15 E
597.00	22.08	68.99	579.93	3.61	51.03 N	106.50 E
598.00	22.06	68.92	580.85	0.99	51.16 N	106.85 E
599.00	22.04	68.84	581.78	1.08	51.30 N	107.20 E
600.00	22.01	68.82	582.71	0.93	51.43 N	107.55 E
601.00	21.96	68.83	583.63	1.50	51.57 N	107.90 E
602.00	21.89	68.87	584.56	2.15	51.70 N	108.25 E
603.00	21.80	68.97	585.49	2.92	51.84 N	108.60 E



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A Gyrodata Directional Survey

BRASKEM

Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
604.00	21.68	69.09	586.42	3.84	51.97 N	108.94 E
605.00	21.55	69.34	587.35	4.78	52.10 N	109.29 E
606.00	21.41	69.59	588.28	5.02	52.23 N	109.63 E
607.00	21.24	69.82	589.21	5.68	52.35 N	109.97 E
608.00	21.08	70.00	590.14	5.18	52.48 N	110.31 E
609.00	20.92	70.15	591.08	5.06	52.60 N	110.65 E
610.00	20.78	70.31	592.01	4.53	52.72 N	110.98 E
611.00	20.64	70.48	592.95	4.57	52.84 N	111.31 E
612.00	20.51	70.64	593.88	4.25	52.96 N	111.65 E
613.00	20.36	70.82	594.82	4.88	53.07 N	111.98 E
614.00	20.22	71.00	595.76	4.60	53.19 N	112.30 E
615.00	20.07	71.24	596.70	5.14	53.30 N	112.63 E
616.00	19.88	71.47	597.64	6.17	53.41 N	112.95 E
617.00	19.70	71.66	598.58	5.73	53.51 N	113.27 E
618.00	19.43	71.84	599.52	8.30	53.62 N	113.59 E
619.00	19.03	72.01	600.46	12.12	53.72 N	113.90 E
620.00	18.40	72.23	601.41	19.02	53.82 N	114.21 E
621.00	17.50	72.53	602.36	27.14	53.91 N	114.50 E
622.00	16.76	72.93	603.32	22.48	54.00 N	114.79 E
623.00	16.65	73.30	604.28	4.59	54.08 N	115.06 E
624.00	17.05	73.57	605.23	12.23	54.17 N	115.34 E
625.00	17.65	73.75	606.19	18.07	54.25 N	115.62 E
626.00	17.86	74.00	607.14	6.70	54.33 N	115.92 E
627.00	17.74	74.13	608.09	3.79	54.42 N	116.21 E
628.00	17.54	74.46	609.05	6.71	54.50 N	116.50 E
629.00	17.28	74.72	610.00	8.14	54.58 N	116.79 E
630.00	17.10	74.87	610.96	5.56	54.66 N	117.08 E
631.00	16.90	75.10	611.91	6.33	54.73 N	117.36 E
632.00	16.67	75.04	612.87	6.92	54.81 N	117.64 E
633.00	16.45	75.31	613.83	6.99	54.88 N	117.91 E
634.00	16.20	75.37	614.79	7.52	54.95 N	118.19 E
635.00	16.06	75.64	615.75	4.76	55.02 N	118.45 E
636.00	15.87	75.77	616.71	5.80	55.09 N	118.72 E
637.00	15.83	75.93	617.67	1.78	55.16 N	118.99 E
638.00	15.70	76.33	618.63	5.08	55.22 N	119.25 E
639.00	15.61	76.50	619.60	3.03	55.28 N	119.51 E

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# A Gyrodata Directional Survey

BRASKEM


Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
640.00	15.48	76.87	620.56	4.90	55.35 N	119.77 E
641.00	15.34	76.97	621.52	4.27	55.41 N	120.03 E
642.00	15.18	77.06	622.49	4.85	55.46 N	120.29 E
643.00	15.05	77.10	623.45	3.91	55.52 N	120.54 E
644.00	14.93	77.23	624.42	3.74	55.58 N	120.79 E
645.00	14.82	77.41	625.39	3.58	55.64 N	121.04 E
646.00	14.70	77.68	626.35	4.15	55.69 N	121.29 E
647.00	14.57	78.03	627.32	4.72	55.74 N	121.54 E
648.00	14.49	78.41	628.29	3.73	55.80 N	121.79 E
649.00	14.44	79.00	629.26	4.67	55.85 N	122.03 E
650.00	14.38	79.49	630.23	4.08	55.89 N	122.28 E
651.00	14.31	79.92	631.19	3.82	55.94 N	122.52 E
652.00	14.20	80.19	632.16	3.86	55.98 N	122.76 E
653.00	14.08	80.43	633.13	4.01	56.02 N	123.00 E
654.00	13.96	80.82	634.10	4.58	56.06 N	123.24 E
655.00	13.82	81.19	635.07	4.97	56.10 N	123.48 E
656.00	13.69	81.53	636.05	4.59	56.13 N	123.71 E
657.00	13.55	81.83	637.02	4.70	56.17 N	123.95 E
658.00	13.42	82.10	637.99	4.33	56.20 N	124.18 E
659.00	13.26	82.32	638.96	5.04	56.23 N	124.41 E
660.00	13.09	82.58	639.94	5.40	56.26 N	124.63 E
661.00	12.94	82.87	640.91	4.91	56.29 N	124.86 E
662.00	12.77	83.07	641.89	5.27	56.32 N	125.08 E
663.00	12.60	83.15	642.86	5.13	56.34 N	125.29 E
664.00	12.43	83.14	643.84	5.10	56.37 N	125.51 E
665.00	12.26	83.17	644.81	5.10	56.39 N	125.72 E
666.00	12.08	83.38	645.79	5.56	56.42 N	125.93 E
667.00	11.90	83.68	646.77	5.71	56.44 N	126.14 E
668.00	11.68	83.95	647.75	6.80	56.46 N	126.34 E
669.00	11.47	84.14	648.73	6.40	56.48 N	126.54 E
670.00	11.29	84.36	649.71	5.55	56.50 N	126.74 E
671.00	11.17	84.59	650.69	3.84	56.52 N	126.93 E
672.00	11.05	84.91	651.67	4.05	56.54 N	127.12 E
673.00	10.93	85.21	652.65	3.99	56.56 N	127.31 E
674.00	10.81	85.36	653.64	3.70	56.57 N	127.50 E
675.00	10.65	85.44	654.62	4.82	56.59 N	127.69 E
676.00	10.48	85.65	655.60	5.23	56.60 N	127.87 E



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### A Gyrodata Directional Survey

BRASKEM

Well: Mina 28

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC041

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
677.00	10.31	86.03	656.58	5.50	56.61 N	128.05 E
678.00	10.13	86.61	657.57	6.22	56.63 N	128.23 E
679.00	9.95	87.13	658.55	6.05	56.64 N	128.40 E
680.00	9.78	87.60	659.54	5.64	56.64 N	128.57 E
681.00	9.63	87.70	660.52	4.49	56.65 N	128.74 E
682.00	9.45	88.05	661.51	5.69	56.66 N	128.91 E
683.00	9.33	88.47	662.50	4.10	56.66 N	129.07 E
684.00	9.15	88.92	663.48	5.78	56.67 N	129.23 E
685.00	9.03	89.21	664.47	4.05	56.67 N	129.39 E
686.00	8.92	90.06	665.46	5.09	56.67 N	129.54 E
687.00	8.86	90.34	666.45	2.22	56.67 N	129.70 E
688.00	8.76	90.65	667.44	3.25	56.67 N	129.85 E
689.00	8.62	91.23	668.42	5.04	56.66 N	130.00 E
690.00	8.50	91.80	669.41	4.45	56.66 N	130.15 E
691.00	8.37	92.44	670.40	4.86	56.66 N	130.30 E
692.00	8.22	92.97	671.39	4.98	56.65 N	130.44 E
693.00	8.05	93.51	672.38	5.67	56.64 N	130.58 E
694.00	7.79	93.67	673.37	7.66	56.63 N	130.72 E
695.00	7.52	94.33	674.36	8.67	56.62 N	130.85 E

**Final Station Closure: Distance: 142.58 m Az: 66.60 deg.**

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**Parte 5**  
**Controle de Qualidade**

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Survey QC – Vertical Continuous Analysis Sheet	<b>gyrodata</b>
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**SURVEY QUALITY CONTROL – SPECIFICATION DATA**

**PRE-JOB CALIBRATION VERIFICATION (ROLL TEST)**

System Parameter	dGx	dGy	dmbo	Mean Gravity Error	Stdev Gravity Error
Standard Deviation	0.009	0.009	0.009	0.00014	0.00001
Tolerance	0.033	0.033	0.087	0.00591	0.00720

**CALIBRATION**

Tool Number	FA088	Calibration Date	06 Jan 2016
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**OPERATING TEMPERATURE**

Calibration range	From	30.03	To	120.04	
Gyro operating range for Job	From	61.47	To	62.09	In-Spec if +/- 2.5 °C of Calibration

**INCLINATION DIFFERENCE TEST**

Chi-square test value	1.4
Tolerance	34.4
Number of overlapping survey stations used	15.0

**CO-ORDINATE DIFFERENCE TEST**

	North	East	Vertical
Chi-square test value	0.8	0.2	0.3
Tolerance	34.4	34.4	34.4
Number of overlapping survey stations used	15.0	15.0	15.0





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Survey QC - RGS-CT Continuous Specification Sheet	<b>gyrodata</b>
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#### SURVEY QUALITY CONTROL - SPECIFICATION DATA

##### PRE-JOB CALIBRATION VERIFICATION (ROLL TEST)

System Parameter	dGx	dGy	dmbo	Mean Gravity Error *	Stdev Gravity Error
Standard Deviation	0.009	0.009	0.009	0.00014	0.00001
Tolerance	0.033	0.033	0.087	0.00591	0.00720

##### GYRO VERIFICATION (ADVANCED INITIALISATION)

Gyro Compass Parameter	Gyro noise	dGx	dGy	dmbo	Max corr coef
Standard Deviation	0.024	0.003	0.004	0.000	0.13
Tolerance	0.141	0.033	0.033	0.087	0.43
Initialisation inclination standard deviation					0.11
Initialisation azimuth standard deviation					0.56
Initialisation azimuth uncertainty in percent of error model - Tolerance < 100%					53%

##### ACCELEROMETER VERIFICATION (G-TOTAL TEST) - not applicable for 2 accelerometer systems

G-Total Test Parameter	Mean Gravity Error	Mean Gravity Error Standard Deviation
Error	-0.00004	0.00001
Tolerance	0.00592	0.01764

##### CALIBRATION

Tool Number	FA088	Calibration Date	06 Jan 2016
-------------	-------	------------------	-------------

##### OPERATING TEMPERATURE

Calibration range	From	30.03	To	120.04	
Gyro operating range	From	61.47	To	62.09	In-Spec if +/- 2.5 °C of Calibration

##### CONTINUOUS DRIFT CORRECTION

Linear Drift Uncertainty	0.20	Random Walk Uncertainty	0.08
Tolerance	0.46	Tolerance	0.23

##### CONTINUOUS MISALIGNMENT CORRECTION

Misalignment Parameter	dMx	dMy	Cross corr coef
Standard Deviation	0.00	0.00	0.23
Tolerance	0.12	0.12	0.70

##### DEPTH CONTROL

Wireline Company	FLODIM	Line type	MONO	Encoder SF	-
Max Depth (TD)	695.00		CCL Corrected	YES	
Zero Depth (Rig up)	-1.50m		Rezero Depth	-2.50m	
Given pup joint depth	N/A		Measured PJ	N/A	
Stretch cor. At TD divided by TD/1000			N/A		Spec' - 1.5/1000
Dif. Between rigup and rezero depths divided by TD/1000			N/A		Spec' - 2.0/1000
Dif. Between given and meas depth divided by meas/1000			N/A		Spec' - 2.0/1000


##### INDIVIDUAL STATION REPORT


% of Total stations accepted	Tolerance > 80%	100%
Consecutive Interval out of Specification	Tolerance < 100 m (300 ft)	0 meters

##### SURVEY RUNNING TIME

Rig up	4/18/2019 1:00:00 PM	Rig down	4/18/2019 7:30:00 PM
Start Inrun	4/18/2019 2:00:00 PM	Field Survey Presented	4/21/2019 10:00:00 AM
End outrun	4/18/2019 6:45:00 PM	Lost Time	N/A
Comments			



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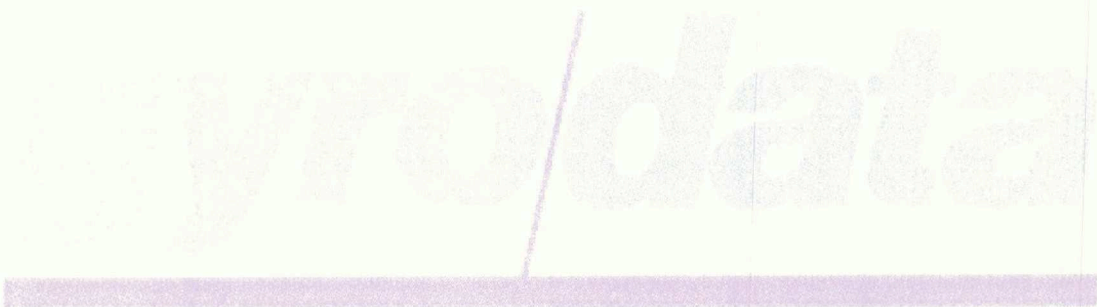
Survey QC - RGS-CT Continuous Specification Sheet	

ACCEPTANCE SUMMARY

	Accept Yes / No
Pre-job calibration verification (roll test)	YES
Gyro Verification (Advanced Initialisation)	YES
Accelerometer verification (G-Total Test)	YES
Operating temperature within calibration range (+/- 2.5°)	YES
Continuous Drift Correction	YES
Continuous Misalignment Correction	YES
Depth Control	YES
Individual Station Report	YES

NAME AND DATE
Click here to enter text.
SIGNATURE
Click here to enter text.

**Note :** Any modifications or amendments to this sheet must be reported to the client representative and the Gyrodata survey focal point.



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**Parte 6**  
**Relatório Cronológico**  
**da Operação**



## 6.0 RELATÓRIO CRONOLÓGICO DA OPERAÇÃO


### 18 de Abril de 2019

08:00 Chegada na braskem para inicio do trabalho  
10:30 Montagem de ferramenta Gyrodata na mina 16  
11:00 Conexão com caminhão Flodim  
11:30 Ferramenta topou na mesma profundidade que antes (252m)  
12:30 Desmontagem de equipamentos e ida para a mina 28.  
13:00 Montagem de ferramenta Gyrodata na mina 28  
14:00 Inicio de Corrida Multishot modo Compass  
19:00 Desmontagem de equipamentos e saída da mina 28

### 19 de Abril de 2019

08:30 Pós calibração

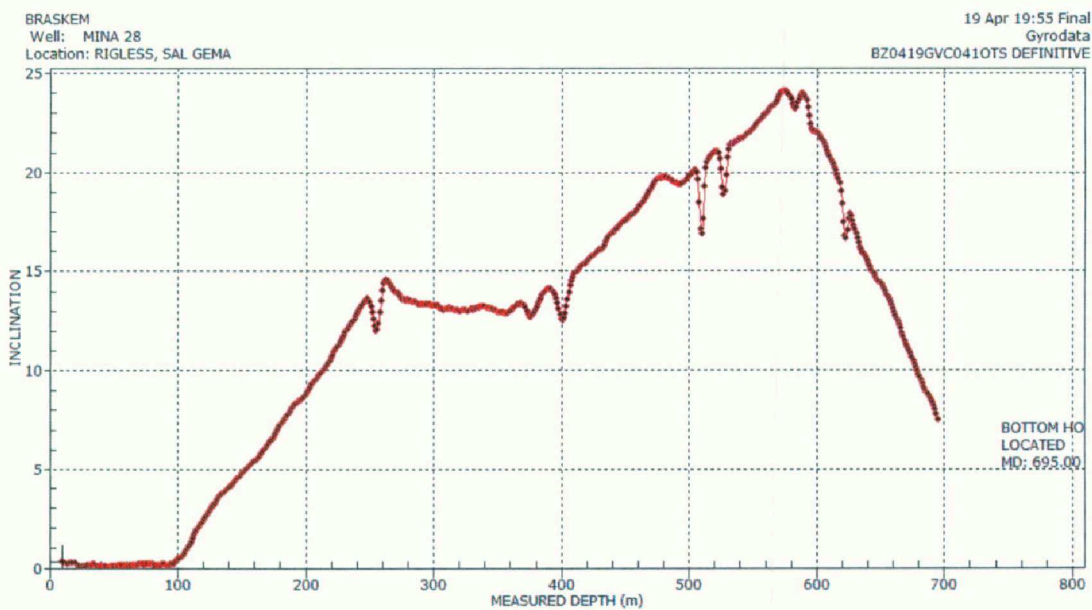


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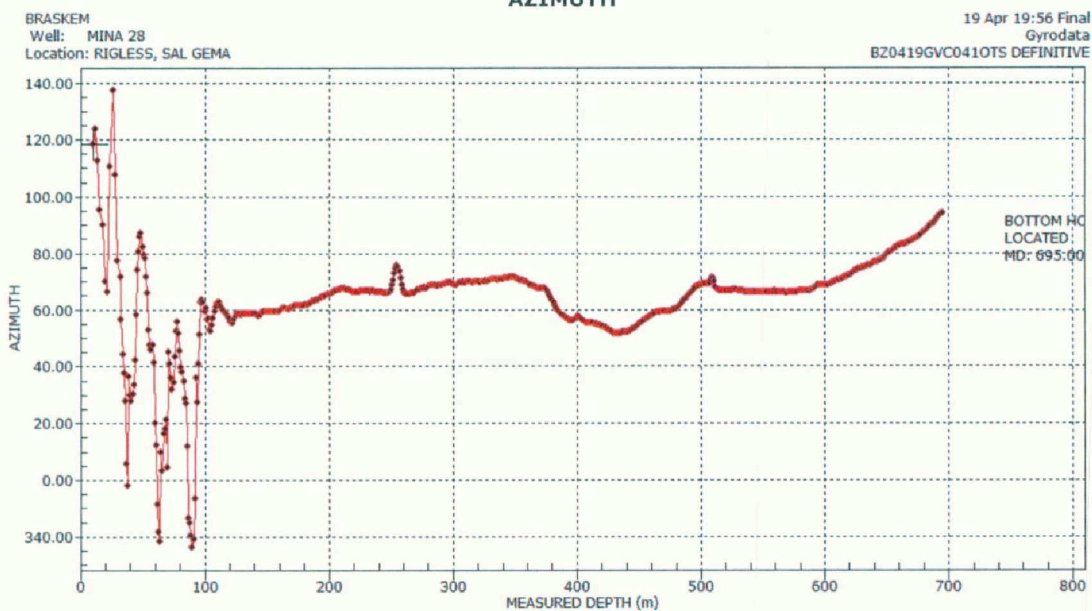
**Parte 7**  
**Gráficos**

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### INCLINATION



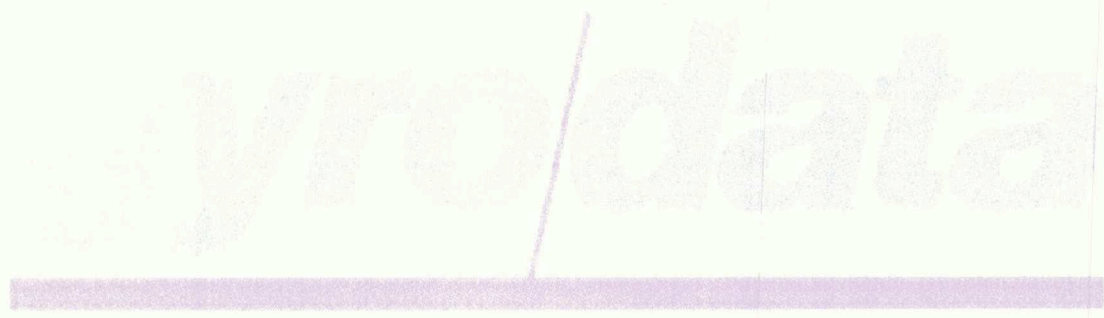
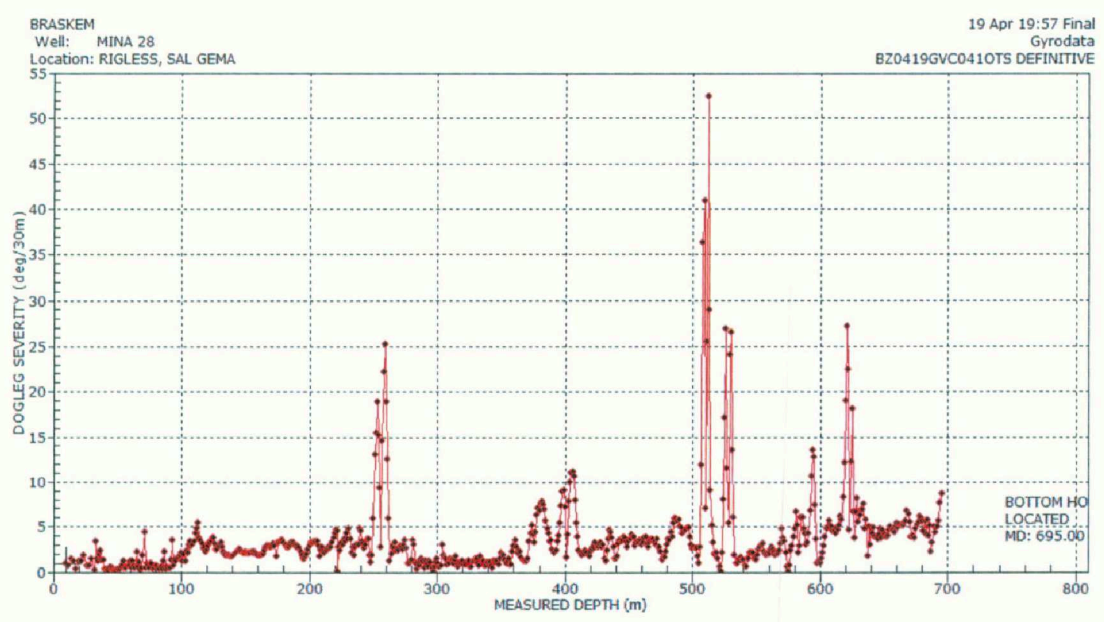
### AZIMUTH





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DOG LEG (deg/30m)

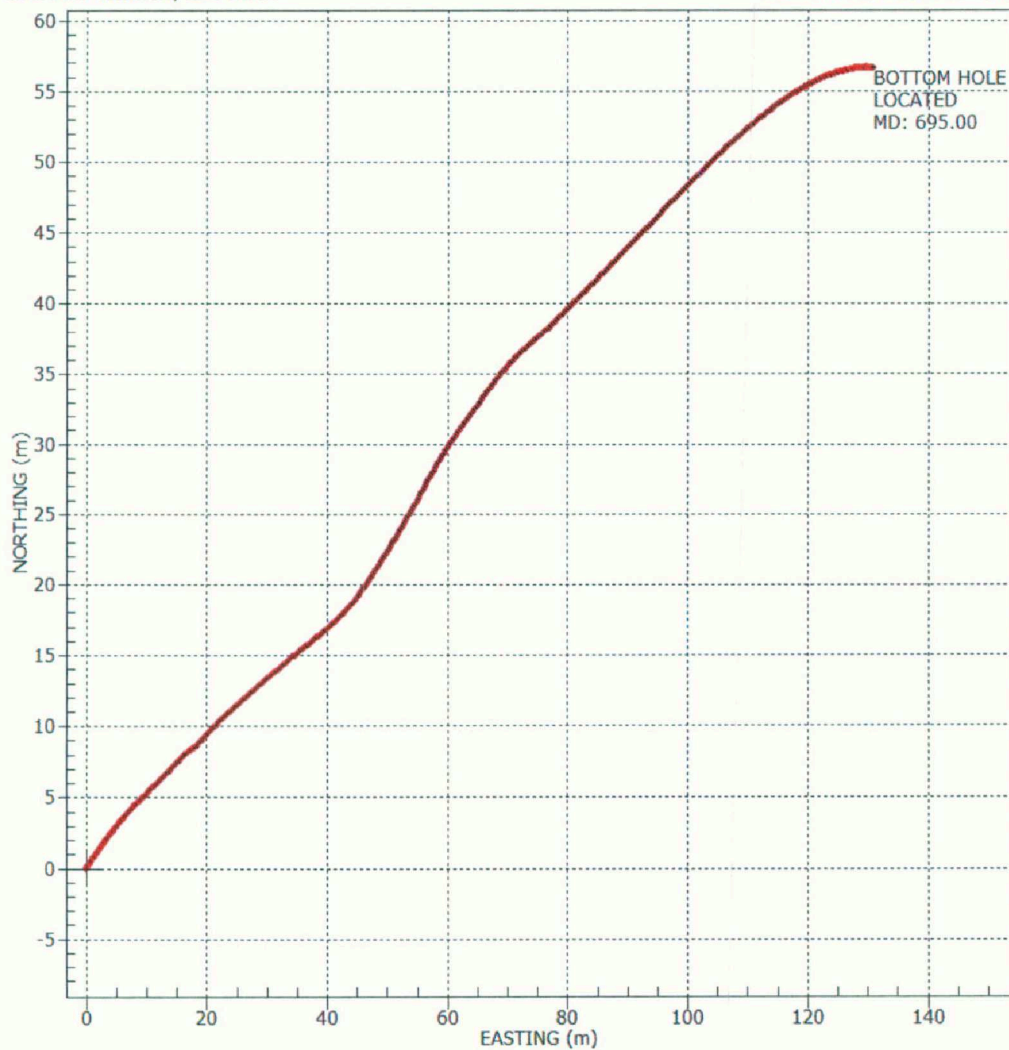


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NORTE / LESTE

BRASKEM  
Well: MINA 28  
Location: RIGLESS, SAL GEMA

19 Apr 19:58 Final  
Gyrodata  
BZ0419GVC041OTS DEFINITIVE





**Braskem**

Campo: Sal Gema

Poço: Mina 11

Gyro Multishot Contínuo

Data da Amostragem: 19 de Abril de 2019

**Número de Trabalho: BZ0419GVC042**

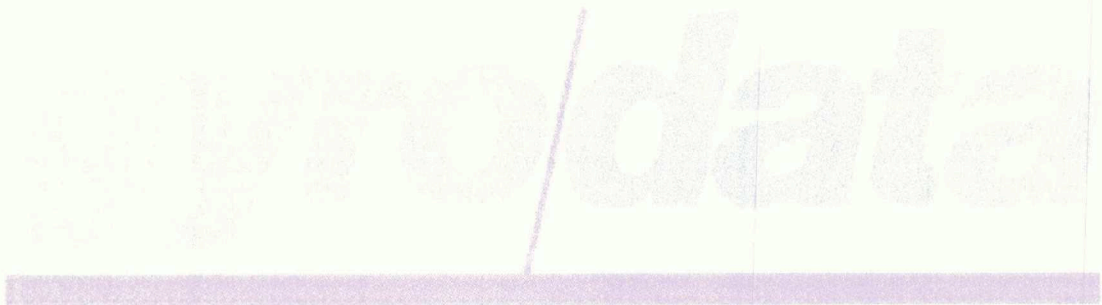
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## ÍNDICE

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9.0	Detalhes da Amostragem .....	7
10.0	Listagem Definitiva da Amostragem .....	9
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**Parte 1**  
**Discussão**

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## 1.0 DISCUSSÃO

O Giroscópio FA088 foi utilizado para fazer uma amostragem na Mina 11.

A amostragem foi coletada da superfície até 356.00m.

Todas as Profundidades estão referenciadas à cabeça do poço.

A referência ao norte é Norte Verdadeiro.

Todas as Profundidades foram tomadas do cabo de perfilagem da unidade Flodim.



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**Parte 2**  
**Página de Certificado da Amostragem**



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## 2.0 PÁGINA DE CERTIFICADO DA AMOSTRAGEM

Os dados e cálculos para esta amostragem foram obtidos e atuados por mim de acordo com padrões e procedimentos da Gyrodata do Brasil LTDA, são verdadeiros e corretos pelo meu melhor conhecimento.

Leonardo Gomes

Data: 20 de Abril de 2019

Os dados e cálculos para esta amostragem foram checados por mim e conforme os padrões e procedimentos da Gyrodata do Brasil LTDA.

Este relatório representa uma amostragem direcional do poço baseado nos dados originais obtidos na localização do poço.

Checado por :

Operations Manager

Lucas Assad

Data: 20 de Abril de 2019

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**Parte 3**  
**Detalhes da Amostragem**

3.0      DETALHES DA AMOSTRAGEM

Cliente	:	Braskem
Sonda	:	N/A
Campo	:	Sal Gema
Poço	:	Mina 11
Latitude	:	9.640300 deg. S
Longitude	:	35.745700 deg. W
Data da amostragem	:	19 de Abril de 2019
Tipo de amostragem	:	Gyro Multishot Contínuo
Referência de profundidade	:	Ground
Max. Profundidade da amostragem	:	356.00 metros
Origem da seção vertical	:	-
Azimute da seção vertical	:	-
Referência Norte	:	Norte Verdadeiro
Grid Correction	:	-
Método de cálculo	:	Mínima Curvatura
Surveyors	:	Leonardo Gomes



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**Parte 4**  
**Listagem Definitiva da Amostragem**

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#### 4.0 LISTAGEM DEFINITIVA DA AMOSTRAGEM

### A Gyrodata Directional Survey

for

BRASKEM

Well: Mina 11,  
Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC042

Run Date: 19 Apr 2019

Report Generated: 21 Apr 2019 09:30

Surveyor:

Calculation Method: MINIMUM CURVATURE

Survey surface coordinates obtained from: Company Man

Survey Latitude: 9.640300 deg. S

Longitude: 35.745700 deg. W

Azimuth Correction:

Gyro: Bearings are Relative to True North

Depth Reference: Ground

Vertical Section Calculated from Well Head Location

Closure Calculated from Well Head Location

Horizontal Coordinates Calculated from Well Head Location

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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 11

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC042

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
0.00	0.00	0.00	0.00	0.00	0.00 N	0.00 E
30.00	0.22	137.09	30.00	0.21	0.04 S	0.04 E
31.00	0.21	132.32	31.00	0.54	0.04 S	0.04 E
32.00	0.20	135.85	32.00	0.57	0.05 S	0.04 E
33.00	0.19	134.19	33.00	0.37	0.05 S	0.05 E
34.00	0.17	134.63	34.00	0.66	0.05 S	0.05 E
35.00	0.16	111.28	35.00	1.99	0.05 S	0.05 E
36.00	0.15	105.38	36.00	0.49	0.05 S	0.05 E
37.00	0.15	101.60	37.00	0.30	0.05 S	0.06 E
38.00	0.16	96.12	38.00	0.46	0.05 S	0.06 E
39.00	0.16	90.12	39.00	0.51	0.05 S	0.06 E
40.00	0.17	84.43	40.00	0.59	0.05 S	0.06 E
41.00	0.18	78.48	41.00	0.64	0.05 S	0.07 E
42.00	0.20	75.62	42.00	0.53	0.05 S	0.07 E
43.00	0.21	72.76	43.00	0.47	0.05 S	0.07 E
44.00	0.23	71.35	44.00	0.59	0.05 S	0.08 E
45.00	0.24	69.92	45.00	0.51	0.05 S	0.08 E
46.00	0.26	71.71	46.00	0.54	0.05 S	0.09 E
47.00	0.27	71.56	47.00	0.42	0.05 S	0.09 E
48.00	0.29	70.78	48.00	0.38	0.05 S	0.09 E
49.00	0.30	70.22	49.00	0.34	0.04 S	0.10 E
50.00	0.31	70.67	50.00	0.34	0.04 S	0.10 E
51.00	0.32	71.63	51.00	0.26	0.04 S	0.11 E
52.00	0.33	72.56	52.00	0.36	0.04 S	0.11 E
53.00	0.34	73.07	53.00	0.28	0.04 S	0.12 E
54.00	0.34	73.80	54.00	0.25	0.03 S	0.13 E
55.00	0.35	74.57	55.00	0.20	0.03 S	0.13 E
56.00	0.35	75.82	56.00	0.29	0.03 S	0.14 E
57.00	0.36	76.87	57.00	0.36	0.03 S	0.14 E
58.00	0.38	78.24	58.00	0.45	0.03 S	0.15 E
59.00	0.39	80.15	59.00	0.55	0.03 S	0.16 E
60.00	0.40	81.77	60.00	0.45	0.03 S	0.16 E
61.00	0.41	82.97	61.00	0.44	0.03 S	0.17 E
62.00	0.42	83.93	62.00	0.44	0.02 S	0.18 E
63.00	0.43	84.60	63.00	0.36	0.02 S	0.18 E
64.00	0.45	84.83	64.00	0.39	0.02 S	0.19 E
65.00	0.46	84.87	65.00	0.45	0.02 S	0.20 E
66.00	0.48	84.74	66.00	0.42	0.02 S	0.21 E
67.00	0.49	84.59	67.00	0.30	0.02 S	0.22 E
68.00	0.49	84.73	68.00	0.21	0.02 S	0.23 E
69.00	0.50	84.67	69.00	0.09	0.02 S	0.23 E
70.00	0.50	84.40	70.00	0.07	0.02 S	0.24 E
71.00	0.50	84.02	71.00	0.13	0.02 S	0.25 E
72.00	0.50	83.52	72.00	0.18	0.02 S	0.26 E
73.00	0.51	83.06	73.00	0.14	0.02 S	0.27 E
74.00	0.51	82.64	74.00	0.11	0.01 S	0.28 E



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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 11

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC042

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
75.00	0.51	82.01	75.00	0.18	0.01 S	0.29 E
76.00	0.51	81.71	76.00	0.08	0.01 S	0.29 E
77.00	0.50	81.70	77.00	0.15	0.01 S	0.30 E
78.00	0.50	81.55	78.00	0.16	0.01 S	0.31 E
79.00	0.49	81.39	79.00	0.16	0.01 S	0.32 E
80.00	0.49	81.11	80.00	0.12	0.01 S	0.33 E
81.00	0.49	80.74	81.00	0.13	0.01 S	0.34 E
82.00	0.49	80.74	82.00	0.03	0.00 S	0.35 E
83.00	0.48	80.96	83.00	0.08	0.00 S	0.35 E
84.00	0.48	81.14	84.00	0.16	0.00 S	0.36 E
85.00	0.48	81.72	85.00	0.19	0.00 S	0.37 E
86.00	0.47	82.51	86.00	0.25	0.00 N	0.38 E
87.00	0.47	83.16	87.00	0.17	0.00 N	0.39 E
88.00	0.47	84.15	88.00	0.25	0.00 N	0.40 E
89.00	0.46	85.34	89.00	0.33	0.00 N	0.40 E
90.00	0.45	86.56	90.00	0.36	0.00 N	0.41 E
91.00	0.45	87.79	91.00	0.40	0.00 N	0.42 E
92.00	0.44	89.04	92.00	0.42	0.00 N	0.43 E
93.00	0.42	90.10	93.00	0.43	0.00 N	0.43 E
94.00	0.41	91.49	94.00	0.54	0.00 N	0.44 E
95.00	0.40	93.32	95.00	0.55	0.00 N	0.45 E
96.00	0.38	95.16	96.00	0.63	0.00 N	0.46 E
97.00	0.36	96.90	97.00	0.54	0.00 N	0.46 E
98.00	0.35	99.01	98.00	0.67	0.00 N	0.47 E
99.00	0.33	100.80	99.00	0.58	0.00 N	0.47 E
100.00	0.32	102.64	100.00	0.55	0.00 N	0.48 E
101.00	0.30	104.50	101.00	0.49	0.00 S	0.48 E
102.00	0.29	106.54	102.00	0.40	0.00 S	0.49 E
103.00	0.28	109.04	103.00	0.48	0.00 S	0.49 E
104.00	0.28	111.58	104.00	0.46	0.01 S	0.50 E
105.00	0.27	112.98	105.00	0.23	0.01 S	0.50 E
106.00	0.26	113.65	106.00	0.26	0.01 S	0.51 E
107.00	0.26	114.03	107.00	0.16	0.01 S	0.51 E
108.00	0.25	115.62	108.00	0.37	0.01 S	0.52 E
109.00	0.24	114.88	109.00	0.15	0.02 S	0.52 E
110.00	0.23	114.53	110.00	0.30	0.02 S	0.52 E
111.00	0.23	114.03	111.00	0.28	0.02 S	0.53 E
112.00	0.22	114.25	112.00	0.24	0.02 S	0.53 E
113.00	0.21	113.52	113.00	0.34	0.02 S	0.53 E
114.00	0.20	112.27	114.00	0.27	0.02 S	0.54 E
115.00	0.20	110.64	115.00	0.18	0.02 S	0.54 E
116.00	0.19	109.91	116.00	0.19	0.03 S	0.54 E
117.00	0.19	109.48	117.00	0.10	0.03 S	0.55 E
118.00	0.18	108.95	118.00	0.10	0.03 S	0.55 E
119.00	0.19	106.65	119.00	0.22	0.03 S	0.55 E

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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 11

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC042

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
120.00	0.18	106.37	120.00	0.21	0.03 S	0.56 E
121.00	0.18	105.70	121.00	0.11	0.03 S	0.56 E
122.00	0.18	104.96	122.00	0.07	0.03 S	0.56 E
123.00	0.17	104.99	123.00	0.03	0.03 S	0.56 E
124.00	0.18	104.96	124.00	0.03	0.03 S	0.57 E
125.00	0.18	104.82	125.00	0.03	0.03 S	0.57 E
126.00	0.17	105.16	126.00	0.12	0.03 S	0.57 E
127.00	0.17	105.25	127.00	0.01	0.03 S	0.58 E
128.00	0.17	105.43	128.00	0.18	0.04 S	0.58 E
129.00	0.16	103.53	129.00	0.29	0.04 S	0.58 E
130.00	0.15	99.34	130.00	0.43	0.04 S	0.58 E
131.00	0.15	93.21	131.00	0.48	0.04 S	0.59 E
132.00	0.15	86.37	132.00	0.53	0.04 S	0.59 E
133.00	0.14	79.28	133.00	0.55	0.04 S	0.59 E
134.00	0.14	70.77	134.00	0.64	0.04 S	0.59 E
135.00	0.14	56.85	135.00	1.03	0.04 S	0.60 E
136.00	0.15	34.02	136.00	1.75	0.03 S	0.60 E
137.00	0.14	26.57	137.00	0.60	0.03 S	0.60 E
138.00	0.14	26.57	138.00	0.15	0.03 S	0.60 E
139.00	0.14	21.20	139.00	0.40	0.03 S	0.60 E
140.00	0.13	357.43	140.00	1.65	0.02 S	0.60 E
141.00	0.13	337.09	141.00	1.38	0.02 S	0.60 E
142.00	0.13	341.57	142.00	0.31	0.02 S	0.60 E
143.00	0.13	337.98	143.00	0.28	0.02 S	0.60 E
144.00	0.14	341.27	144.00	0.30	0.02 S	0.60 E
145.00	0.15	274.02	145.00	4.75	0.01 S	0.60 E
146.00	0.14	175.48	146.00	6.55	0.02 S	0.60 E
147.00	0.14	165.76	147.00	0.73	0.02 S	0.60 E
148.00	0.14	162.62	148.00	0.33	0.02 S	0.60 E
149.00	0.15	171.87	149.00	0.75	0.02 S	0.60 E
150.00	0.16	174.41	150.00	0.42	0.03 S	0.60 E
151.00	0.18	163.70	151.00	1.03	0.03 S	0.60 E
152.00	0.18	161.46	152.00	0.30	0.03 S	0.60 E
153.00	0.19	160.20	153.00	0.13	0.03 S	0.60 E
154.00	0.19	158.36	154.00	0.18	0.04 S	0.60 E
155.00	0.18	155.85	155.00	0.26	0.04 S	0.60 E
156.00	0.18	153.29	156.00	0.27	0.04 S	0.60 E
157.00	0.17	148.06	157.00	0.50	0.05 S	0.61 E
158.00	0.17	140.78	158.00	0.69	0.05 S	0.61 E
159.00	0.16	133.18	159.00	0.70	0.05 S	0.61 E
160.00	0.15	124.32	160.00	0.74	0.05 S	0.61 E
161.00	0.14	112.97	161.00	0.90	0.05 S	0.61 E
162.00	0.14	101.36	162.00	0.87	0.05 S	0.62 E
163.00	0.13	93.85	163.00	0.60	0.05 S	0.62 E
164.00	0.12	88.61	164.00	0.43	0.05 S	0.62 E
165.00	0.12	84.38	165.00	0.27	0.05 S	0.62 E



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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 11

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC042

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
166.00	0.11	83.19	166.00	0.08	0.05 S	0.63 E
167.00	0.12	83.47	167.00	0.12	0.05 S	0.63 E
168.00	0.12	85.61	168.00	0.16	0.05 S	0.63 E
169.00	0.13	88.53	169.00	0.26	0.05 S	0.63 E
170.00	0.13	92.64	170.00	0.29	0.05 S	0.63 E
171.00	0.13	96.95	171.00	0.32	0.05 S	0.64 E
172.00	0.14	103.03	172.00	0.46	0.05 S	0.64 E
173.00	0.14	108.45	173.00	0.42	0.06 S	0.64 E
174.00	0.15	110.82	174.00	0.30	0.06 S	0.64 E
175.00	0.16	112.46	175.00	0.25	0.06 S	0.65 E
176.00	0.16	113.16	176.00	0.16	0.06 S	0.65 E
177.00	0.17	110.89	177.00	0.25	0.06 S	0.65 E
178.00	0.17	109.80	178.00	0.18	0.06 S	0.65 E
179.00	0.17	105.81	179.00	0.37	0.06 S	0.66 E
180.00	0.17	97.07	180.00	0.78	0.06 S	0.66 E
181.00	0.19	104.12	181.00	0.78	0.06 S	0.66 E
182.00	0.20	104.34	182.00	0.54	0.06 S	0.67 E
183.00	0.22	105.66	183.00	0.59	0.06 S	0.67 E
184.00	0.24	69.19	184.00	4.42	0.06 S	0.67 E
185.00	0.27	21.80	185.00	6.21	0.06 S	0.68 E
186.00	0.29	357.54	186.00	3.60	0.06 S	0.68 E
187.00	0.31	340.57	187.00	2.76	0.05 S	0.68 E
188.00	0.34	340.23	188.00	0.78	0.05 S	0.67 E
189.00	0.38	337.07	189.00	1.37	0.04 S	0.67 E
190.00	0.43	336.40	190.00	1.57	0.03 S	0.67 E
191.00	0.48	336.06	191.00	1.35	0.03 S	0.67 E
192.00	0.50	333.23	192.00	0.96	0.02 S	0.66 E
193.00	0.51	331.84	193.00	0.44	0.01 S	0.66 E
194.00	0.51	330.45	194.00	0.38	0.00 S	0.65 E
195.00	0.51	329.67	195.00	0.21	0.00 N	0.65 E
196.00	0.50	329.06	196.00	0.29	0.01 N	0.64 E
197.00	0.50	328.16	197.00	0.25	0.02 N	0.64 E
198.00	0.49	327.41	198.00	0.26	0.03 N	0.64 E
199.00	0.47	327.57	199.00	0.63	0.03 N	0.63 E
200.00	0.42	328.47	200.00	1.46	0.04 N	0.63 E
201.00	0.37	329.65	201.00	1.61	0.05 N	0.62 E
202.00	0.33	328.51	202.00	1.25	0.05 N	0.62 E
203.00	0.30	330.10	203.00	0.85	0.06 N	0.62 E
204.00	0.29	336.34	204.00	1.06	0.06 N	0.61 E
205.00	0.28	9.23	205.00	4.80	0.07 N	0.61 E
206.00	0.26	81.82	206.00	9.56	0.07 N	0.62 E
207.00	0.26	120.59	207.00	5.17	0.07 N	0.62 E
208.00	0.25	125.25	208.00	0.67	0.07 N	0.62 E
209.00	0.24	122.12	209.00	0.50	0.06 N	0.63 E
210.00	0.24	116.79	210.00	0.66	0.06 N	0.63 E
211.00	0.25	128.29	211.00	1.53	0.06 N	0.64 E



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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 11

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC042

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
212.00	0.26	133.50	212.00	0.79	0.06 N	0.64 E
213.00	0.27	134.71	213.00	0.23	0.05 N	0.64 E
214.00	0.27	135.44	214.00	0.12	0.05 N	0.65 E
215.00	0.27	136.62	215.00	0.19	0.05 N	0.65 E
216.00	0.27	136.89	216.00	0.04	0.04 N	0.65 E
217.00	0.27	136.99	217.00	0.03	0.04 N	0.66 E
218.00	0.26	137.29	218.00	0.16	0.04 N	0.66 E
219.00	0.26	137.07	219.00	0.04	0.03 N	0.66 E
220.00	0.27	136.43	220.00	0.13	0.03 N	0.66 E
221.00	0.27	135.97	221.00	0.06	0.03 N	0.67 E
222.00	0.27	135.04	222.00	0.13	0.02 N	0.67 E
223.00	0.27	134.11	223.00	0.16	0.02 N	0.67 E
224.00	0.27	134.36	224.00	0.05	0.02 N	0.68 E
225.00	0.27	134.53	225.00	0.02	0.01 N	0.68 E
226.00	0.27	133.93	226.00	0.09	0.01 N	0.68 E
227.00	0.27	133.71	227.00	0.04	0.01 N	0.69 E
228.00	0.27	133.25	228.00	0.09	0.00 N	0.69 E
229.00	0.27	132.41	229.00	0.12	0.00 S	0.69 E
230.00	0.26	132.15	230.00	0.10	0.00 S	0.70 E
231.00	0.26	131.74	231.00	0.19	0.01 S	0.70 E
232.00	0.25	131.23	232.00	0.16	0.01 S	0.70 E
233.00	0.25	131.17	233.00	0.09	0.01 S	0.71 E
234.00	0.25	131.25	234.00	0.09	0.02 S	0.71 E
235.00	0.24	130.96	235.00	0.15	0.02 S	0.71 E
236.00	0.24	129.62	236.00	0.19	0.02 S	0.72 E
237.00	0.24	128.30	237.00	0.17	0.02 S	0.72 E
238.00	0.24	127.07	238.00	0.16	0.03 S	0.72 E
239.00	0.24	125.03	239.00	0.25	0.03 S	0.73 E
240.00	0.24	123.40	240.00	0.21	0.03 S	0.73 E
241.00	0.24	122.26	241.00	0.21	0.03 S	0.73 E
242.00	0.25	121.09	242.00	0.21	0.04 S	0.74 E
243.00	0.25	120.17	243.00	0.17	0.04 S	0.74 E
244.00	0.26	119.35	244.00	0.26	0.04 S	0.75 E
245.00	0.26	118.25	245.00	0.16	0.04 S	0.75 E
246.00	0.26	117.24	246.00	0.14	0.04 S	0.75 E
247.00	0.26	115.80	247.00	0.29	0.05 S	0.76 E
248.00	0.25	113.83	248.00	0.37	0.05 S	0.76 E
249.00	0.23	112.51	249.00	0.40	0.05 S	0.77 E
250.00	0.22	112.41	250.00	0.36	0.05 S	0.77 E
251.00	0.21	111.73	251.00	0.46	0.05 S	0.77 E
252.00	0.19	110.58	252.00	0.52	0.05 S	0.78 E
253.00	0.17	109.55	253.00	0.55	0.05 S	0.78 E
254.00	0.17	106.26	254.00	0.33	0.06 S	0.78 E
255.00	0.17	102.05	255.00	0.37	0.06 S	0.78 E
256.00	0.15	109.04	256.00	0.70	0.06 S	0.79 E
257.00	0.14	105.92	257.00	0.51	0.06 S	0.79 E

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# A Gyrodata Directional Survey

BRASKEM

Well: Mina 11

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC042

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
258.00	0.12	104.04	258.00	0.47	0.06 S	0.79 E
259.00	0.11	107.48	259.00	0.37	0.06 S	0.79 E
260.00	0.11	42.13	260.00	3.52	0.06 S	0.80 E
261.00	0.12	337.64	261.00	3.68	0.06 S	0.80 E
262.00	0.13	317.05	262.00	1.33	0.06 S	0.79 E
263.00	0.13	330.33	263.00	0.87	0.05 S	0.79 E
264.00	0.13	226.40	264.00	5.95	0.05 S	0.79 E
265.00	0.15	199.61	265.00	1.99	0.06 S	0.79 E
266.00	0.14	294.15	266.00	6.39	0.06 S	0.79 E
267.00	0.16	207.75	267.00	6.15	0.06 S	0.79 E
268.00	0.17	205.22	268.00	0.55	0.06 S	0.79 E
269.00	0.19	191.22	269.00	1.48	0.06 S	0.79 E
270.00	0.21	184.31	270.00	0.93	0.07 S	0.78 E
271.00	0.23	179.16	271.00	0.78	0.07 S	0.78 E
272.00	0.22	164.27	272.00	1.77	0.07 S	0.79 E
273.00	0.24	158.57	273.00	0.81	0.08 S	0.79 E
274.00	0.25	152.39	274.00	0.91	0.08 S	0.79 E
275.00	0.27	147.23	275.00	0.91	0.09 S	0.79 E
276.00	0.27	145.30	276.00	0.33	0.09 S	0.79 E
277.00	0.28	142.05	277.00	0.61	0.09 S	0.80 E
278.00	0.28	140.58	278.00	0.22	0.10 S	0.80 E
279.00	0.28	139.13	279.00	0.22	0.10 S	0.80 E
280.00	0.28	138.14	280.00	0.15	0.10 S	0.81 E
281.00	0.29	138.43	281.00	0.07	0.11 S	0.81 E
282.00	0.29	138.75	282.00	0.08	0.11 S	0.81 E
283.00	0.29	139.42	283.00	0.10	0.12 S	0.82 E
284.00	0.29	139.81	284.00	0.07	0.12 S	0.82 E
285.00	0.28	140.26	285.00	0.09	0.12 S	0.82 E
286.00	0.28	141.20	286.00	0.23	0.13 S	0.83 E
287.00	0.28	142.55	287.00	0.20	0.13 S	0.83 E
288.00	0.28	143.71	288.00	0.17	0.13 S	0.83 E
289.00	0.28	145.61	289.00	0.29	0.14 S	0.83 E
290.00	0.27	147.12	290.00	0.22	0.14 S	0.84 E
291.00	0.27	147.61	291.00	0.14	0.15 S	0.84 E
292.00	0.27	147.82	292.00	0.07	0.15 S	0.84 E
293.00	0.27	147.95	293.00	0.02	0.15 S	0.84 E
294.00	0.27	148.58	294.00	0.11	0.16 S	0.85 E
295.00	0.28	149.07	295.00	0.11	0.16 S	0.85 E
296.00	0.28	149.31	296.00	0.10	0.17 S	0.85 E
297.00	0.28	149.49	297.00	0.12	0.17 S	0.85 E
298.00	0.28	149.85	298.00	0.08	0.18 S	0.86 E
299.00	0.28	149.72	299.00	0.06	0.18 S	0.86 E
300.00	0.28	148.94	300.00	0.12	0.18 S	0.86 E
301.00	0.28	148.45	301.00	0.11	0.19 S	0.86 E
302.00	0.28	147.89	302.00	0.10	0.19 S	0.87 E
303.00	0.27	147.24	303.00	0.23	0.20 S	0.87 E