

A Gyrodata Directional Survey


BRASKEM

Well: Mina 15

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC037

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
187.00	0.69	45.55	186.99	0.55	0.79 N	1.64 E
188.00	0.71	39.11	187.99	0.50	0.80 N	1.65 E
189.00	0.73	33.57	188.99	0.45	0.81 N	1.65 E
190.00	0.75	28.96	189.99	0.41	0.82 N	1.66 E
191.00	0.76	25.74	190.99	0.36	0.83 N	1.67 E
192.00	0.76	24.65	191.99	0.31	0.84 N	1.67 E
193.00	0.75	24.56	192.99	0.25	0.85 N	1.68 E
194.00	0.74	24.52	193.99	0.19	0.86 N	1.68 E
195.00	0.73	24.91	194.99	0.13	0.88 N	1.69 E
196.00	0.71	25.66	195.99	0.11	0.89 N	1.69 E
197.00	0.70	26.33	196.99	0.15	0.90 N	1.70 E
198.00	0.68	27.35	197.99	0.21	0.91 N	1.71 E
199.00	0.65	29.48	198.99	0.28	0.92 N	1.71 E
200.00	0.62	33.01	199.99	0.36	0.93 N	1.72 E
201.00	0.59	37.69	200.99	0.43	0.94 N	1.72 E
202.00	0.57	42.81	201.99	0.50	0.95 N	1.73 E
203.00	0.56	47.38	202.99	0.56	0.95 N	1.74 E
204.00	0.55	51.67	203.99	0.62	0.96 N	1.74 E
205.00	0.54	56.36	204.99	0.67	0.96 N	1.75 E
206.00	0.53	61.19	205.99	0.70	0.97 N	1.76 E
207.00	0.52	66.27	206.99	0.70	0.97 N	1.77 E
208.00	0.52	71.75	207.99	0.69	0.98 N	1.78 E
209.00	0.51	77.01	208.99	0.67	0.98 N	1.78 E
210.00	0.51	81.45	209.99	0.66	0.98 N	1.79 E
211.00	0.51	84.75	210.99	0.64	0.98 N	1.80 E
212.00	0.51	86.83	211.99	0.62	0.98 N	1.81 E
213.00	0.51	88.15	212.99	0.59	0.98 N	1.82 E
214.00	0.51	89.39	213.99	0.55	0.98 N	1.83 E
215.00	0.51	90.41	214.99	0.50	0.98 N	1.84 E
216.00	0.50	91.08	215.99	0.45	0.98 N	1.85 E
217.00	0.50	91.53	216.99	0.39	0.98 N	1.86 E
218.00	0.49	91.48	217.99	0.34	0.98 N	1.86 E
219.00	0.49	90.91	218.99	0.30	0.98 N	1.87 E
220.00	0.48	90.34	219.99	0.25	0.98 N	1.88 E
221.00	0.47	89.77	220.99	0.20	0.98 N	1.89 E
222.00	0.47	89.14	221.99	0.15	0.98 N	1.90 E

ORIGINAL
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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
223.00	0.46	88.52	222.99	0.09	0.98 N	1.91 E
224.00	0.46	88.06	223.99	0.04	0.98 N	1.91 E
225.00	0.45	87.64	224.99	0.01	0.98 N	1.92 E
226.00	0.45	87.30	225.99	0.04	0.98 N	1.93 E
227.00	0.45	87.04	226.99	0.06	0.98 N	1.94 E
228.00	0.45	86.76	227.99	0.08	0.98 N	1.94 E
229.00	0.45	86.48	228.99	0.10	0.98 N	1.95 E
230.00	0.45	86.19	229.99	0.12	0.98 N	1.96 E
231.00	0.45	85.92	230.99	0.14	0.99 N	1.97 E
232.00	0.45	85.65	231.99	0.16	0.99 N	1.98 E
233.00	0.46	85.42	232.99	0.19	0.99 N	1.98 E
234.00	0.46	85.07	233.99	0.21	0.99 N	1.99 E
235.00	0.47	84.40	234.99	0.24	0.99 N	2.00 E
236.00	0.48	83.64	235.99	0.26	0.99 N	2.01 E
237.00	0.48	82.89	236.99	0.28	0.99 N	2.02 E
238.00	0.49	82.14	237.99	0.30	0.99 N	2.02 E
239.00	0.50	81.34	238.99	0.32	0.99 N	2.03 E
240.00	0.51	80.73	239.99	0.35	0.99 N	2.04 E
241.00	0.52	80.34	240.99	0.37	1.00 N	2.05 E
242.00	0.52	79.94	241.99	0.37	1.00 N	2.06 E
243.00	0.53	79.51	242.99	0.37	1.00 N	2.07 E
244.00	0.54	78.81	243.99	0.35	1.00 N	2.08 E
245.00	0.54	77.78	244.99	0.32	1.00 N	2.09 E
246.00	0.53	76.23	245.99	0.29	1.00 N	2.10 E
247.00	0.52	73.59	246.99	0.27	1.01 N	2.11 E
248.00	0.51	69.97	247.99	0.25	1.01 N	2.11 E
249.00	0.50	66.03	248.99	0.22	1.01 N	2.12 E
250.00	0.50	62.22	249.99	0.19	1.02 N	2.13 E
251.00	0.49	58.58	250.99	0.15	1.02 N	2.14 E
252.00	0.47	54.75	251.99	0.11	1.03 N	2.14 E
253.00	0.46	50.60	252.99	0.08	1.03 N	2.15 E
254.00	0.45	46.16	253.99	0.07	1.04 N	2.16 E
255.00	0.44	41.50	254.99	0.06	1.04 N	2.16 E
256.00	0.43	38.02	255.99	0.07	1.05 N	2.17 E
257.00	0.43	36.56	256.99	0.07	1.05 N	2.17 E
258.00	0.43	37.36	257.99	0.07	1.06 N	2.18 E

DIRECTIONAL
FIG. 2.420
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A Gyrodata Directional Survey

BRASKEM
Well: Mina 15
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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
259.00	0.43	40.14	258.99	0.07	1.06 N	2.18 E
260.00	0.43	43.46	259.99	0.08	1.07 N	2.19 E
261.00	0.42	46.56	260.99	0.09	1.08 N	2.19 E
262.00	0.42	49.47	261.99	0.11	1.08 N	2.20 E
263.00	0.42	52.68	262.99	0.14	1.08 N	2.20 E
264.00	0.42	56.40	263.99	0.18	1.09 N	2.21 E
265.00	0.42	60.66	264.99	0.21	1.09 N	2.21 E
266.00	0.43	65.81	265.99	0.25	1.10 N	2.22 E
267.00	0.43	70.54	266.99	0.28	1.10 N	2.23 E
268.00	0.44	74.00	267.99	0.31	1.10 N	2.23 E
269.00	0.45	76.29	268.99	0.35	1.10 N	2.24 E
270.00	0.45	77.59	269.99	0.38	1.11 N	2.25 E
271.00	0.45	78.63	270.99	0.41	1.11 N	2.26 E
272.00	0.46	79.78	271.99	0.42	1.11 N	2.27 E
273.00	0.46	80.93	272.99	0.42	1.11 N	2.27 E
274.00	0.47	82.14	273.99	0.40	1.11 N	2.28 E
275.00	0.47	83.26	274.99	0.38	1.11 N	2.29 E
276.00	0.47	84.26	275.99	0.36	1.11 N	2.30 E
277.00	0.47	85.17	276.99	0.34	1.11 N	2.31 E
278.00	0.47	86.03	277.99	0.32	1.11 N	2.31 E
279.00	0.46	86.90	278.99	0.29	1.11 N	2.32 E
280.00	0.46	87.79	279.99	0.26	1.11 N	2.33 E
281.00	0.46	88.70	280.99	0.23	1.12 N	2.34 E
282.00	0.46	89.60	281.99	0.19	1.12 N	2.35 E
283.00	0.46	90.48	282.99	0.16	1.12 N	2.35 E
284.00	0.46	91.54	283.99	0.15	1.12 N	2.36 E
285.00	0.45	92.58	284.99	0.14	1.11 N	2.37 E
286.00	0.45	93.52	285.99	0.13	1.11 N	2.38 E
287.00	0.45	94.32	286.99	0.12	1.11 N	2.39 E
288.00	0.45	94.59	287.99	0.10	1.11 N	2.39 E
289.00	0.44	94.82	288.99	0.09	1.11 N	2.40 E
290.00	0.44	95.18	289.99	0.08	1.11 N	2.41 E
291.00	0.44	95.47	290.99	0.07	1.11 N	2.42 E
292.00	0.44	95.74	291.99	0.06	1.11 N	2.42 E
293.00	0.44	96.05	292.99	0.05	1.11 N	2.43 E
294.00	0.44	96.40	293.99	0.04	1.11 N	2.44 E

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A Gyrodata Directional Survey

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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
295.00	0.44	96.33	294.99	0.03	1.11 N	2.45 E
296.00	0.44	95.99	295.99	0.02	1.11 N	2.45 E
297.00	0.44	95.66	296.99	0.01	1.11 N	2.46 E
298.00	0.44	95.38	297.99	0.01	1.11 N	2.47 E
299.00	0.44	95.29	298.99	0.01	1.10 N	2.48 E
300.00	0.44	95.19	299.99	0.02	1.10 N	2.49 E
301.00	0.44	94.85	300.99	0.03	1.10 N	2.49 E
302.00	0.44	94.35	301.99	0.03	1.10 N	2.50 E
303.00	0.44	93.93	302.99	0.03	1.10 N	2.51 E
304.00	0.44	93.42	303.99	0.03	1.10 N	2.52 E
305.00	0.44	92.82	304.99	0.02	1.10 N	2.52 E
306.00	0.44	92.38	305.98	0.02	1.10 N	2.53 E
307.00	0.44	91.97	306.98	0.03	1.10 N	2.54 E
308.00	0.44	91.48	307.98	0.03	1.10 N	2.55 E
309.00	0.44	91.12	308.98	0.03	1.10 N	2.55 E
310.00	0.44	90.86	309.98	0.03	1.10 N	2.56 E
311.00	0.45	90.47	310.98	0.04	1.10 N	2.57 E
312.00	0.45	90.18	311.98	0.05	1.10 N	2.58 E
313.00	0.45	90.11	312.98	0.06	1.10 N	2.59 E
314.00	0.45	90.13	313.98	0.06	1.10 N	2.59 E
315.00	0.45	90.13	314.98	0.07	1.10 N	2.60 E
316.00	0.45	90.25	315.98	0.07	1.10 N	2.61 E
317.00	0.44	90.45	316.98	0.08	1.10 N	2.62 E
318.00	0.44	90.73	317.98	0.08	1.10 N	2.62 E
319.00	0.44	91.41	318.98	0.09	1.10 N	2.63 E
320.00	0.44	92.12	319.98	0.09	1.10 N	2.64 E
321.00	0.43	92.76	320.98	0.10	1.10 N	2.65 E
322.00	0.43	93.40	321.98	0.10	1.10 N	2.65 E
323.00	0.42	94.09	322.98	0.10	1.10 N	2.66 E
324.00	0.41	94.78	323.98	0.10	1.10 N	2.67 E
325.00	0.41	95.32	324.98	0.11	1.10 N	2.68 E
326.00	0.40	95.97	325.98	0.11	1.10 N	2.68 E
327.00	0.39	96.59	326.98	0.11	1.10 N	2.69 E
328.00	0.38	97.21	327.98	0.12	1.09 N	2.70 E
329.00	0.38	97.80	328.98	0.12	1.09 N	2.70 E
330.00	0.37	97.57	329.98	0.12	1.09 N	2.71 E

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BRASKEM
Well: Mina 15
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Job Number: BZ0419GVC037

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
331.00	0.37	96.88	330.98	0.12	1.09 N	2.72 E
332.00	0.36	96.15	331.98	0.12	1.09 N	2.72 E
333.00	0.36	95.44	332.98	0.13	1.09 N	2.73 E
334.00	0.35	95.15	333.98	0.12	1.09 N	2.73 E
335.00	0.35	95.07	334.98	0.12	1.09 N	2.74 E
336.00	0.35	95.20	335.98	0.00	1.09 N	2.75 E
337.00	0.34	94.99	336.98	0.00	1.09 N	2.75 E
338.00	0.34	94.61	337.98	0.00	1.09 N	2.76 E
339.00	0.34	94.22	338.98	0.00	1.09 N	2.76 E
340.00	0.34	93.78	339.98	0.00	1.09 N	2.77 E
341.00	0.34	93.90	340.98	0.00	1.09 N	2.78 E
342.00	0.34	94.54	341.98	0.00	1.09 N	2.78 E
343.00	0.34	96.25	342.98	0.00	1.09 N	2.79 E
344.00	0.34	97.10	343.98	0.00	1.09 N	2.79 E
345.00	0.33	95.70	344.98	0.00	1.08 N	2.80 E
346.00	0.32	92.76	345.98	0.00	1.08 N	2.81 E
347.00	0.32	92.95	346.98	0.00	1.08 N	2.81 E
348.00	0.32	94.53	347.98	0.00	1.08 N	2.82 E
349.00	0.32	95.13	348.98	0.00	1.08 N	2.82 E
350.00	0.32	93.54	349.98	0.00	1.08 N	2.83 E

Final Station Closure: Distance: 3.03 m Az: 69.05 deg.

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Parte 5
Controle de Qualidade

Parte 6
Relatório Cronológico
da Operação

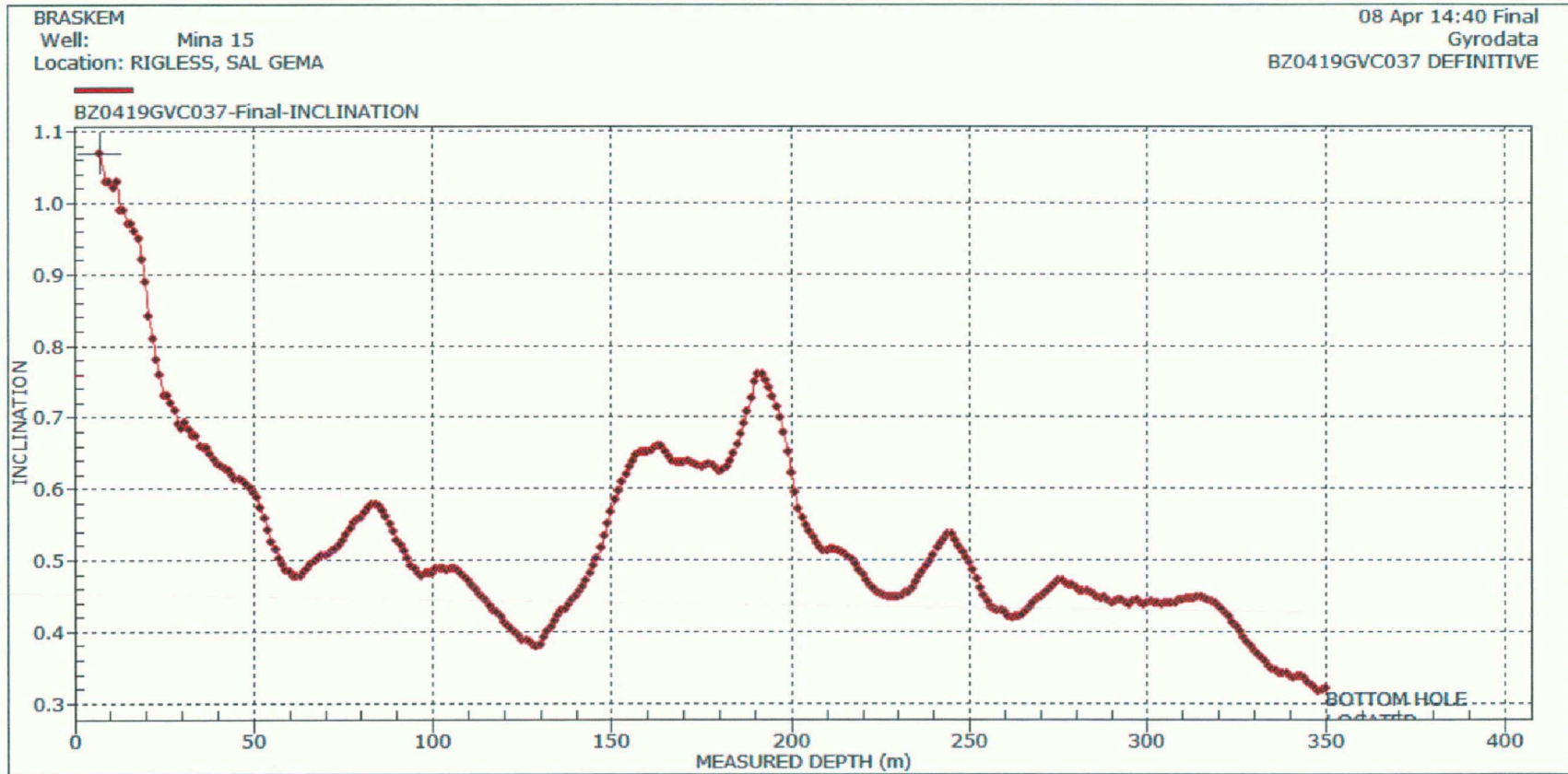
6.0 RELATÓRIO CRONOLÓGICO DA OPERAÇÃO

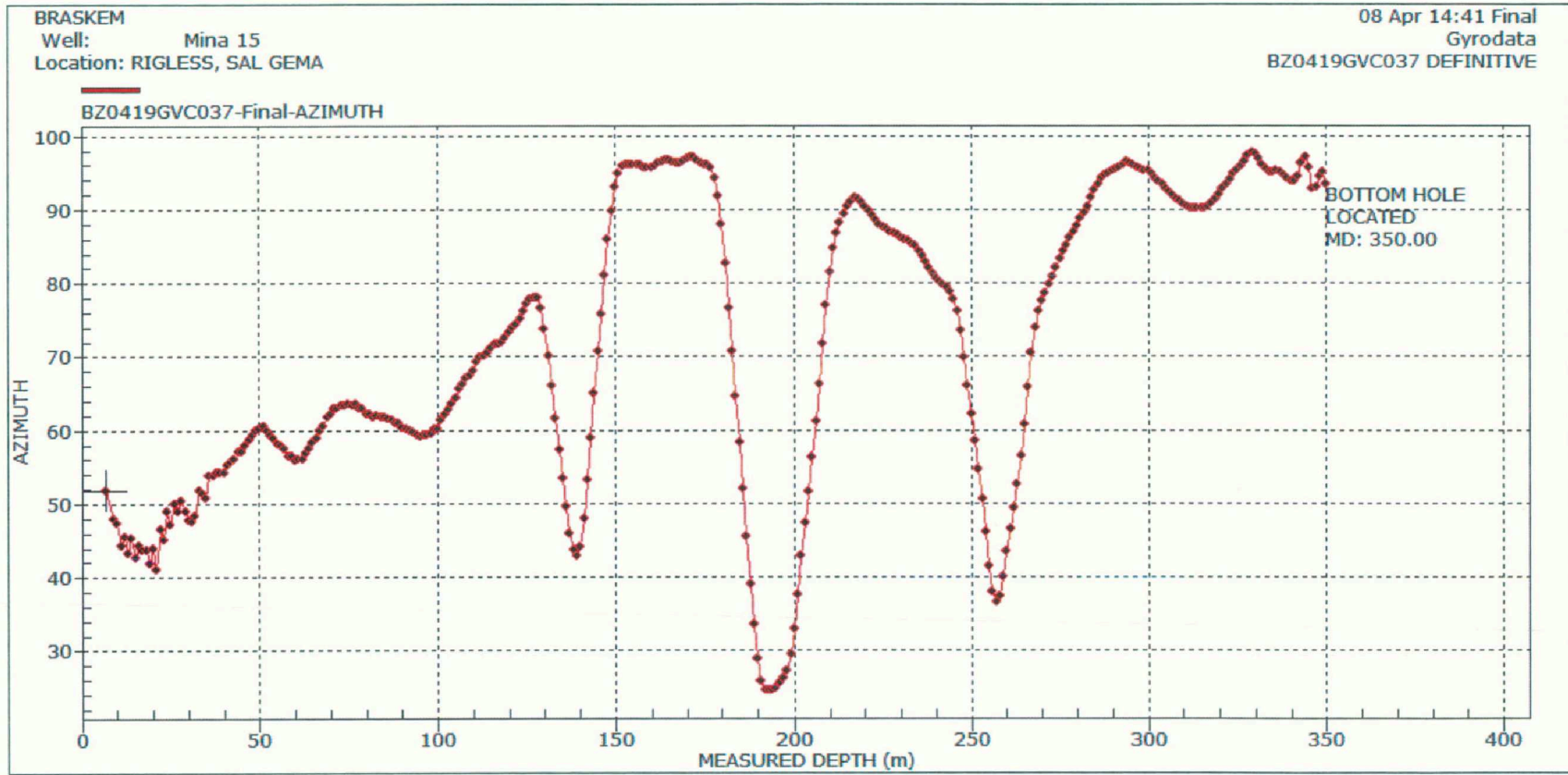
07 de abril de 2019

- 06:50 Chegada da equipe mina 15
- 07:00 Aguardando preparação do poço
- 12:00 Conexão gyrodata/flodim
- 13:50 Início de corrida mina 15
- 16:40 Desmontagem de equipamentos
- 16:50 Saida da equipe mina 15
- 17:00 Pós calibração

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Parte 7
Gráficos





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FIG. 7.430
[Signature]

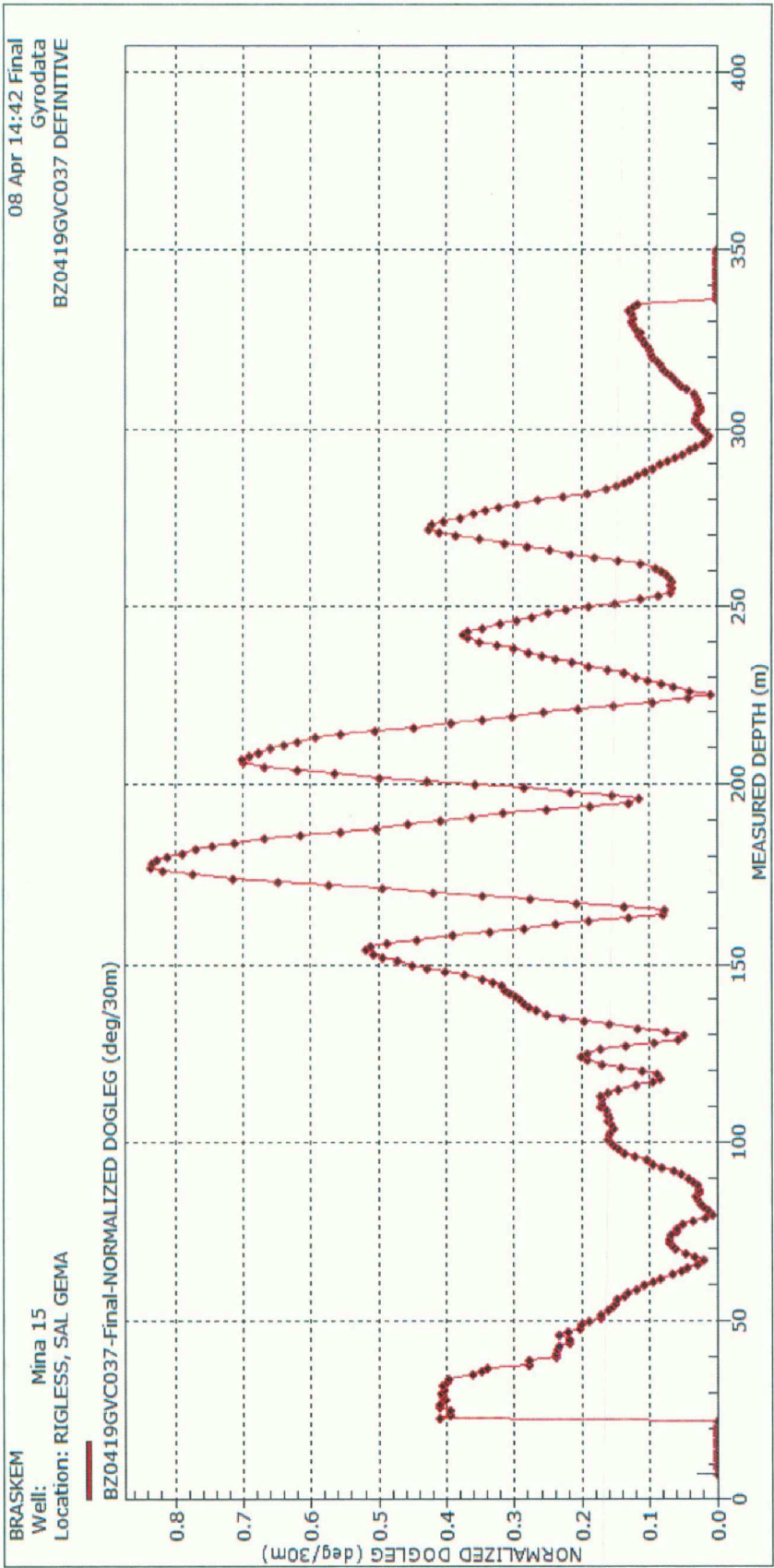
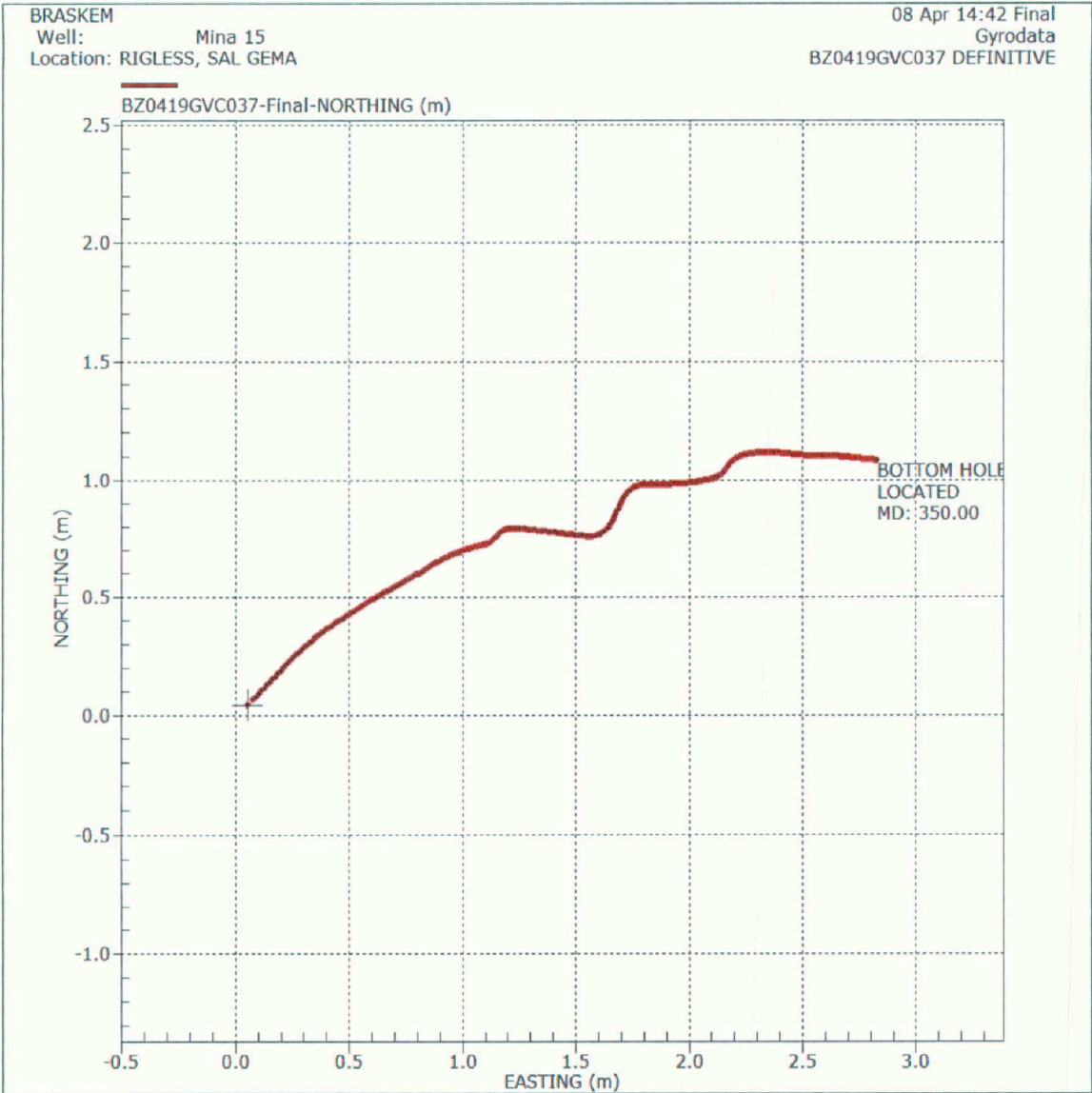


FIG. 7.439





Braskem

Campo: Sal Gema

Poço: Mina 22

Gyro Multshot Contínuo

Data da Amostragem: 7 de Abril de 2019

Número de Trabalho: BZ0419GVC038

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Parte 1
Discussão

ORIGINAL
Fto. 2.435
[assinatura]

1.0 DISCUSSÃO

O Giroscópio FA088 foi utilizado para fazer uma amostragem na Mina 22.

A amostragem foi coletada da superfície até 590.00m.

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.

DNPM/AL
Fls. 7.436
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Parte 2
Página de Certificado da Amostragem

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.

Lúcio Oliveira / Leonardo Gomes

Data: 07 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: 07 de Abril de 2019

DNPM/AL
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Parte 3
Detalhes da Amostragem

ORIGINAL
Fis. 7.439


3.0 DETALHES DA AMOSTRAGEM

Cliente	:	Braskem
Sonda	:	N/A
Campo	:	Sal Gema
Poço	:	Mina 22
Latitude	:	9.637262 deg. S
Longitude	:	35.748161 deg. W
Data da amostragem	:	7 de Abril de 2019
Tipo de amostragem	:	Gyro Multishot Contínuo
Referência de profundidade	:	Ground
Max. Profundidade da amostragem	:	590.00 metros
Origem da seção vertical	:	-
Azimute da seção vertical	:	-
Referência Norte	:	Norte Verdadeiro
Grid Correction	:	-
Método de cálculo	:	Mínima Curvatura
Surveyors	:	Lúcio Oliveira / Leonardo Gomes

Parte 4
Listagem Definitiva da Amostragem

ORIGINAL
Fis. 2481
[Signature]

4.0 LISTAGEM DEFINITIVA DA AMOSTRAGEM

A Gyrodata Directional Survey

for

BRASKEM

Well: **Mina 22**,
Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC038

Run Date: 07 Apr 2019

Calculation Method: MINIMUM CURVATURE

Survey Latitude: 9.637262 deg. S
Longitude: 35.748161 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 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

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	0.56	72.54	10.00	0.00	0.01 N	0.05 E
11.98	0.56	65.83	11.98	0.00	0.02 N	0.06 E
14.00	0.60	55.66	14.00	0.00	0.03 N	0.08 E
16.04	0.61	44.17	16.04	0.00	0.05 N	0.10 E
18.02	0.65	38.62	18.02	0.00	0.06 N	0.11 E
20.06	0.66	42.31	20.06	0.00	0.08 N	0.13 E
21.99	0.65	43.21	21.99	0.00	0.10 N	0.14 E
24.04	0.62	39.60	24.04	0.00	0.11 N	0.16 E
26.02	0.58	37.02	26.02	0.34	0.13 N	0.17 E
30.00	0.62	41.59	30.00	0.21	0.16 N	0.20 E
31.00	0.63	40.97	31.00	0.21	0.17 N	0.20 E
32.00	0.62	40.59	32.00	0.10	0.18 N	0.21 E
33.00	0.61	40.07	33.00	0.10	0.19 N	0.22 E
34.00	0.60	39.90	34.00	0.06	0.19 N	0.23 E
35.00	0.61	37.57	35.00	0.06	0.20 N	0.23 E
36.00	0.61	39.14	36.00	0.11	0.21 N	0.24 E
37.00	0.60	38.59	37.00	0.12	0.22 N	0.25 E
38.00	0.60	38.14	38.00	0.11	0.23 N	0.25 E
39.00	0.60	37.91	39.00	0.11	0.23 N	0.26 E
40.00	0.61	37.54	40.00	0.08	0.24 N	0.26 E
41.00	0.61	37.25	41.00	0.07	0.25 N	0.27 E
42.00	0.61	36.44	42.00	0.07	0.26 N	0.28 E
43.00	0.61	36.27	43.00	0.07	0.27 N	0.28 E
44.00	0.61	35.68	44.00	0.07	0.28 N	0.29 E
45.00	0.61	35.09	45.00	0.11	0.29 N	0.30 E
46.00	0.62	34.94	46.00	0.11	0.29 N	0.30 E
47.00	0.61	34.56	47.00	0.11	0.30 N	0.31 E
48.00	0.62	34.13	48.00	0.11	0.31 N	0.31 E
49.00	0.62	33.80	49.00	0.11	0.32 N	0.32 E
50.00	0.62	33.36	50.00	0.09	0.33 N	0.33 E
51.00	0.62	33.32	51.00	0.11	0.34 N	0.33 E
52.00	0.61	33.00	52.00	0.11	0.35 N	0.34 E
53.00	0.62	33.05	53.00	0.11	0.36 N	0.34 E
54.00	0.62	32.50	54.00	0.11	0.37 N	0.35 E
55.00	0.62	32.41	55.00	0.11	0.38 N	0.36 E

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A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
56.00	0.63	32.41	56.00	0.10	0.38 N	0.36 E
57.00	0.63	32.01	57.00	0.10	0.39 N	0.37 E
58.00	0.63	32.08	58.00	0.10	0.40 N	0.37 E
59.00	0.63	31.79	59.00	0.09	0.41 N	0.38 E
60.00	0.64	31.60	60.00	0.08	0.42 N	0.39 E
61.00	0.64	31.47	61.00	0.08	0.43 N	0.39 E
62.00	0.64	30.98	62.00	0.08	0.44 N	0.40 E
63.00	0.65	30.87	63.00	0.08	0.45 N	0.40 E
64.00	0.65	30.51	64.00	0.07	0.46 N	0.41 E
65.00	0.65	30.51	65.00	0.07	0.47 N	0.41 E
66.00	0.65	30.26	66.00	0.06	0.48 N	0.42 E
67.00	0.66	30.15	67.00	0.06	0.49 N	0.43 E
68.00	0.66	29.96	68.00	0.06	0.50 N	0.43 E
69.00	0.66	29.47	69.00	0.05	0.51 N	0.44 E
70.00	0.66	29.28	70.00	0.05	0.52 N	0.44 E
71.00	0.66	29.10	71.00	0.05	0.53 N	0.45 E
72.00	0.66	28.96	72.00	0.05	0.54 N	0.45 E
73.00	0.66	28.92	73.00	0.05	0.55 N	0.46 E
74.00	0.66	28.78	74.00	0.05	0.56 N	0.46 E
75.00	0.66	28.73	75.00	0.05	0.57 N	0.47 E
76.00	0.66	28.60	76.00	0.05	0.58 N	0.48 E
77.00	0.66	28.55	77.00	0.05	0.59 N	0.48 E
78.00	0.66	28.46	78.00	0.04	0.60 N	0.49 E
79.00	0.66	28.62	79.00	0.04	0.61 N	0.49 E
80.00	0.66	28.77	80.00	0.04	0.62 N	0.50 E
81.00	0.66	28.97	81.00	0.04	0.63 N	0.50 E
82.00	0.66	28.97	82.00	0.04	0.64 N	0.51 E
83.00	0.66	28.97	83.00	0.03	0.65 N	0.51 E
84.00	0.66	28.97	84.00	0.03	0.66 N	0.52 E
85.00	0.66	29.02	85.00	0.02	0.67 N	0.53 E
86.00	0.66	29.12	86.00	0.02	0.68 N	0.53 E
87.00	0.66	29.08	87.00	0.02	0.69 N	0.54 E
88.00	0.66	29.05	88.00	0.02	0.70 N	0.54 E
89.00	0.66	28.77	89.00	0.02	0.71 N	0.55 E
90.00	0.67	28.46	90.00	0.03	0.72 N	0.55 E
91.00	0.67	28.10	90.99	0.03	0.73 N	0.56 E

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A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038


MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
92.00	0.67	27.82	91.99	0.03	0.74 N	0.56 E
93.00	0.67	27.72	92.99	0.03	0.75 N	0.57 E
94.00	0.68	27.63	93.99	0.04	0.76 N	0.58 E
95.00	0.68	27.53	94.99	0.05	0.77 N	0.58 E
96.00	0.68	27.34	95.99	0.05	0.78 N	0.59 E
97.00	0.67	27.17	96.99	0.06	0.79 N	0.59 E
98.00	0.67	27.24	97.99	0.07	0.80 N	0.60 E
99.00	0.66	27.27	98.99	0.07	0.81 N	0.60 E
100.00	0.66	27.52	99.99	0.08	0.83 N	0.61 E
101.00	0.66	27.70	100.99	0.08	0.84 N	0.61 E
102.00	0.65	28.03	101.99	0.08	0.85 N	0.62 E
103.00	0.64	27.98	102.99	0.08	0.86 N	0.62 E
104.00	0.64	27.77	103.99	0.08	0.87 N	0.63 E
105.00	0.64	27.60	104.99	0.08	0.88 N	0.63 E
106.00	0.63	27.33	105.99	0.08	0.88 N	0.64 E
107.00	0.63	27.03	106.99	0.07	0.89 N	0.64 E
108.00	0.63	26.58	107.99	0.07	0.90 N	0.65 E
109.00	0.63	25.97	108.99	0.07	0.91 N	0.65 E
110.00	0.63	25.28	109.99	0.06	0.92 N	0.66 E
111.00	0.63	24.57	110.99	0.06	0.93 N	0.66 E
112.00	0.63	23.85	111.99	0.05	0.94 N	0.67 E
113.00	0.63	23.12	112.99	0.05	0.95 N	0.67 E
114.00	0.63	22.75	113.99	0.05	0.96 N	0.68 E
115.00	0.63	22.52	114.99	0.06	0.97 N	0.68 E
116.00	0.63	22.25	115.99	0.07	0.99 N	0.69 E
117.00	0.63	22.12	116.99	0.08	1.00 N	0.69 E
118.00	0.63	22.02	117.99	0.08	1.01 N	0.69 E
119.00	0.63	21.97	118.99	0.09	1.02 N	0.70 E
120.00	0.63	21.99	119.99	0.10	1.03 N	0.70 E
121.00	0.63	21.97	120.99	0.11	1.04 N	0.71 E
122.00	0.64	22.09	121.99	0.12	1.05 N	0.71 E
123.00	0.64	22.37	122.99	0.13	1.06 N	0.71 E
124.00	0.64	22.62	123.99	0.13	1.07 N	0.72 E
125.00	0.65	22.80	124.99	0.14	1.08 N	0.72 E
126.00	0.65	22.93	125.99	0.15	1.09 N	0.73 E
127.00	0.66	23.00	126.99	0.17	1.10 N	0.73 E

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A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
128.00	0.66	23.00	127.99	0.19	1.11 N	0.74 E
129.00	0.67	22.91	128.99	0.21	1.12 N	0.74 E
130.00	0.68	22.73	129.99	0.23	1.13 N	0.75 E
131.00	0.68	22.55	130.99	0.25	1.14 N	0.75 E
132.00	0.69	22.39	131.99	0.27	1.15 N	0.75 E
133.00	0.69	22.24	132.99	0.30	1.16 N	0.76 E
134.00	0.70	21.94	133.99	0.31	1.18 N	0.76 E
135.00	0.71	21.44	134.99	0.33	1.19 N	0.77 E
136.00	0.71	20.81	135.99	0.34	1.20 N	0.77 E
137.00	0.72	20.12	136.99	0.34	1.21 N	0.78 E
138.00	0.72	19.33	137.99	0.33	1.22 N	0.78 E
139.00	0.73	18.46	138.99	0.31	1.23 N	0.79 E
140.00	0.74	17.55	139.99	0.30	1.25 N	0.79 E
141.00	0.75	16.48	140.99	0.28	1.26 N	0.79 E
142.00	0.77	15.26	141.99	0.27	1.27 N	0.80 E
143.00	0.78	14.07	142.99	0.25	1.28 N	0.80 E
144.00	0.80	12.73	143.99	0.23	1.30 N	0.80 E
145.00	0.82	11.39	144.99	0.21	1.31 N	0.81 E
146.00	0.83	10.36	145.99	0.20	1.33 N	0.81 E
147.00	0.85	9.36	146.99	0.19	1.34 N	0.81 E
148.00	0.87	8.29	147.99	0.18	1.35 N	0.81 E
149.00	0.88	7.46	148.99	0.17	1.37 N	0.82 E
150.00	0.90	6.81	149.99	0.17	1.39 N	0.82 E
151.00	0.91	6.32	150.99	0.16	1.40 N	0.82 E
152.00	0.90	6.11	151.99	0.16	1.42 N	0.82 E
153.00	0.89	6.17	152.99	0.15	1.43 N	0.82 E
154.00	0.88	6.41	153.99	0.15	1.45 N	0.82 E
155.00	0.86	6.71	154.99	0.15	1.46 N	0.83 E
156.00	0.84	7.01	155.99	0.15	1.48 N	0.83 E
157.00	0.83	7.07	156.99	0.16	1.49 N	0.83 E
158.00	0.81	7.27	157.99	0.16	1.51 N	0.83 E
159.00	0.79	7.61	158.99	0.18	1.52 N	0.83 E
160.00	0.77	7.69	159.99	0.20	1.53 N	0.84 E
161.00	0.75	7.70	160.99	0.22	1.55 N	0.84 E
162.00	0.73	7.71	161.99	0.24	1.56 N	0.84 E
163.00	0.72	7.78	162.99	0.27	1.57 N	0.84 E

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A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
164.00	0.71	7.83	163.99	0.29	1.58 N	0.84 E
165.00	0.71	7.63	164.99	0.31	1.60 N	0.84 E
166.00	0.70	7.46	165.99	0.32	1.61 N	0.85 E
167.00	0.69	7.35	166.99	0.33	1.62 N	0.85 E
168.00	0.68	7.36	167.99	0.32	1.63 N	0.85 E
169.00	0.68	7.14	168.99	0.32	1.64 N	0.85 E
170.00	0.67	6.64	169.99	0.31	1.66 N	0.85 E
171.00	0.66	6.39	170.99	0.29	1.67 N	0.85 E
172.00	0.66	6.21	171.99	0.28	1.68 N	0.85 E
173.00	0.65	6.02	172.99	0.26	1.69 N	0.86 E
174.00	0.65	5.55	173.99	0.23	1.70 N	0.86 E
175.00	0.64	5.00	174.99	0.20	1.71 N	0.86 E
176.00	0.63	4.60	175.99	0.15	1.72 N	0.86 E
177.00	0.62	4.22	176.99	0.10	1.73 N	0.86 E
178.00	0.61	3.83	177.99	0.07	1.74 N	0.86 E
179.00	0.60	3.44	178.99	0.05	1.76 N	0.86 E
180.00	0.59	3.21	179.99	0.14	1.77 N	0.86 E
181.00	0.59	3.39	180.99	0.20	1.78 N	0.86 E
182.00	0.58	3.31	181.99	0.25	1.79 N	0.86 E
183.00	0.57	3.14	182.99	0.29	1.80 N	0.86 E
184.00	0.56	2.97	183.99	0.31	1.81 N	0.86 E
185.00	0.55	2.95	184.99	0.33	1.82 N	0.86 E
186.00	0.55	2.95	185.99	0.35	1.83 N	0.86 E
187.00	0.55	2.95	186.99	0.35	1.83 N	0.87 E
188.00	0.56	2.93	187.99	0.34	1.84 N	0.87 E
189.00	0.56	3.14	188.99	0.31	1.85 N	0.87 E
190.00	0.58	2.80	189.99	0.28	1.86 N	0.87 E
191.00	0.61	2.62	190.99	0.25	1.87 N	0.87 E
192.00	0.65	2.51	191.99	0.22	1.89 N	0.87 E
193.00	0.69	2.40	192.99	0.19	1.90 N	0.87 E
194.00	0.74	5.04	193.99	0.17	1.91 N	0.87 E
195.00	0.79	359.02	194.99	0.15	1.92 N	0.87 E
196.00	0.83	356.81	195.99	0.13	1.94 N	0.87 E
197.00	0.87	354.18	196.99	0.11	1.95 N	0.87 E
198.00	0.91	354.24	197.99	0.08	1.97 N	0.87 E
199.00	0.94	354.29	198.99	0.07	1.98 N	0.86 E

ORIGINAL
Fig. 7.417
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A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
200.00	0.96	355.32	199.99	0.06	2.00 N	0.86 E
201.00	0.98	355.47	200.99	0.04	2.02 N	0.86 E
202.00	0.98	355.49	201.99	0.03	2.03 N	0.86 E
203.00	0.96	355.38	202.99	0.03	2.05 N	0.86 E
204.00	0.93	355.25	203.99	0.04	2.07 N	0.86 E
205.00	0.90	356.69	204.99	0.06	2.08 N	0.86 E
206.00	0.87	358.25	205.99	0.10	2.10 N	0.86 E
207.00	0.83	7.08	206.99	0.15	2.11 N	0.86 E
208.00	0.80	2.35	207.99	0.20	2.13 N	0.86 E
209.00	0.77	2.11	208.99	0.25	2.14 N	0.86 E
210.00	0.75	2.12	209.99	0.31	2.15 N	0.86 E
211.00	0.72	2.20	210.99	0.37	2.17 N	0.86 E
212.00	0.68	2.98	211.99	0.42	2.18 N	0.86 E
213.00	0.65	2.84	212.99	0.45	2.19 N	0.86 E
214.00	0.63	3.45	213.99	0.49	2.20 N	0.86 E
215.00	0.61	4.07	214.99	0.51	2.21 N	0.86 E
216.00	0.59	4.74	215.99	0.53	2.22 N	0.86 E
217.00	0.57	5.36	216.99	0.53	2.23 N	0.86 E
218.00	0.56	5.71	217.99	0.51	2.24 N	0.86 E
219.00	0.54	6.03	218.98	0.48	2.25 N	0.87 E
220.00	0.53	6.60	219.98	0.44	2.26 N	0.87 E
221.00	0.52	7.25	220.98	0.40	2.27 N	0.87 E
222.00	0.51	8.16	221.98	0.33	2.28 N	0.87 E
223.00	0.50	8.54	222.98	0.31	2.29 N	0.87 E
224.00	0.49	9.15	223.98	0.28	2.30 N	0.87 E
225.00	0.49	9.15	224.98	0.25	2.31 N	0.87 E
226.00	0.49	9.20	225.98	0.22	2.31 N	0.87 E
227.00	0.49	9.48	226.98	0.19	2.32 N	0.88 E
228.00	0.49	9.83	227.98	0.17	2.33 N	0.88 E
229.00	0.49	10.70	228.98	0.16	2.34 N	0.88 E
230.00	0.49	11.58	229.98	0.16	2.35 N	0.88 E
231.00	0.48	12.22	230.98	0.15	2.36 N	0.88 E
232.00	0.49	12.85	231.98	0.15	2.36 N	0.88 E
233.00	0.49	13.01	232.98	0.16	2.37 N	0.89 E
234.00	0.50	13.42	233.98	0.17	2.38 N	0.89 E
235.00	0.51	13.83	234.98	0.18	2.39 N	0.89 E

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A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
236.00	0.51	14.53	235.98	0.18	2.40 N	0.89 E
237.00	0.52	15.11	236.98	0.19	2.41 N	0.89 E
238.00	0.53	15.58	237.98	0.20	2.42 N	0.90 E
239.00	0.54	16.02	238.98	0.21	2.42 N	0.90 E
240.00	0.55	16.23	239.98	0.21	2.43 N	0.90 E
241.00	0.56	16.64	240.98	0.23	2.44 N	0.90 E
242.00	0.57	17.04	241.98	0.23	2.45 N	0.91 E
243.00	0.58	17.39	242.98	0.24	2.46 N	0.91 E
244.00	0.59	18.14	243.98	0.25	2.47 N	0.91 E
245.00	0.59	18.86	244.98	0.25	2.48 N	0.92 E
246.00	0.60	19.37	245.98	0.26	2.49 N	0.92 E
247.00	0.61	19.94	246.98	0.27	2.50 N	0.92 E
248.00	0.61	20.83	247.98	0.27	2.51 N	0.93 E
249.00	0.62	21.31	248.98	0.28	2.52 N	0.93 E
250.00	0.62	22.09	249.98	0.28	2.53 N	0.93 E
251.00	0.62	22.71	250.98	0.28	2.54 N	0.94 E
252.00	0.62	23.34	251.98	0.28	2.55 N	0.94 E
253.00	0.63	24.13	252.98	0.28	2.56 N	0.95 E
254.00	0.63	24.88	253.98	0.28	2.57 N	0.95 E
255.00	0.64	25.53	254.98	0.29	2.58 N	0.96 E
256.00	0.64	26.48	255.98	0.29	2.59 N	0.96 E
257.00	0.65	27.56	256.98	0.30	2.60 N	0.97 E
258.00	0.65	28.67	257.98	0.31	2.61 N	0.97 E
259.00	0.65	29.39	258.98	0.33	2.62 N	0.98 E
260.00	0.66	30.22	259.98	0.34	2.63 N	0.98 E
261.00	0.67	30.48	260.98	0.36	2.64 N	0.99 E
262.00	0.69	30.70	261.98	0.38	2.65 N	1.00 E
263.00	0.70	30.76	262.98	0.40	2.66 N	1.00 E
264.00	0.71	30.78	263.98	0.42	2.67 N	1.01 E
265.00	0.72	31.03	264.98	0.43	2.68 N	1.01 E
266.00	0.73	31.32	265.98	0.45	2.69 N	1.02 E
267.00	0.74	31.34	266.98	0.45	2.70 N	1.03 E
268.00	0.75	31.41	267.98	0.46	2.72 N	1.03 E
269.00	0.76	31.64	268.98	0.46	2.73 N	1.04 E
270.00	0.77	32.33	269.98	0.46	2.74 N	1.05 E
271.00	0.78	33.65	270.98	0.46	2.75 N	1.06 E

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A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

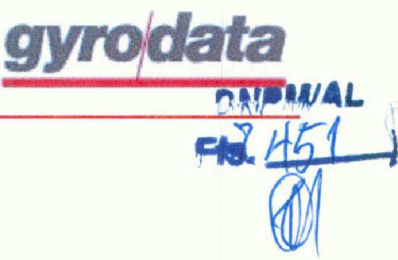
MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
272.00	0.78	35.79	271.98	0.45	2.76 N	1.06 E
273.00	0.77	38.50	272.98	0.45	2.77 N	1.07 E
274.00	0.77	41.37	273.98	0.44	2.78 N	1.08 E
275.00	0.77	44.09	274.98	0.44	2.79 N	1.09 E
276.00	0.77	46.60	275.98	0.44	2.80 N	1.10 E
277.00	0.77	49.15	276.98	0.44	2.81 N	1.11 E
278.00	0.77	51.72	277.98	0.45	2.82 N	1.12 E
279.00	0.77	54.03	278.98	0.46	2.83 N	1.13 E
280.00	0.77	56.17	279.98	0.46	2.84 N	1.14 E
281.00	0.77	58.02	280.98	0.46	2.84 N	1.15 E
282.00	0.77	59.40	281.98	0.46	2.85 N	1.16 E
283.00	0.78	60.39	282.98	0.47	2.86 N	1.18 E
284.00	0.78	61.09	283.98	0.47	2.86 N	1.19 E
285.00	0.78	61.57	284.98	0.47	2.87 N	1.20 E
286.00	0.78	62.12	285.98	0.46	2.88 N	1.21 E
287.00	0.78	62.80	286.98	0.44	2.88 N	1.22 E
288.00	0.78	63.36	287.98	0.41	2.89 N	1.24 E
289.00	0.79	63.86	288.98	0.37	2.89 N	1.25 E
290.00	0.78	64.41	289.98	0.34	2.90 N	1.26 E
291.00	0.78	64.94	290.98	0.32	2.91 N	1.27 E
292.00	0.77	65.46	291.98	0.29	2.91 N	1.29 E
293.00	0.77	66.06	292.98	0.26	2.92 N	1.30 E
294.00	0.77	66.52	293.98	0.23	2.92 N	1.31 E
295.00	0.76	66.76	294.98	0.21	2.93 N	1.32 E
296.00	0.76	67.13	295.98	0.19	2.93 N	1.33 E
297.00	0.75	67.56	296.98	0.18	2.94 N	1.35 E
298.00	0.74	67.83	297.98	0.17	2.94 N	1.36 E
299.00	0.74	68.02	298.98	0.17	2.95 N	1.37 E
300.00	0.73	68.52	299.98	0.16	2.95 N	1.38 E
301.00	0.72	69.07	300.98	0.16	2.96 N	1.39 E
302.00	0.72	69.46	301.98	0.16	2.96 N	1.41 E
303.00	0.72	69.93	302.98	0.16	2.97 N	1.42 E
304.00	0.72	70.15	303.98	0.16	2.97 N	1.43 E
305.00	0.71	70.41	304.98	0.16	2.97 N	1.44 E
306.00	0.71	70.81	305.98	0.16	2.98 N	1.45 E
307.00	0.71	70.98	306.98	0.16	2.98 N	1.46 E

ORIGINAL
Fto. 7.150
[Signature]

A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

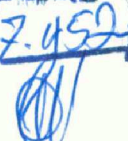
MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
308.00	0.70	71.15	307.98	0.16	2.99 N	1.48 E
309.00	0.70	71.32	308.98	0.16	2.99 N	1.49 E
310.00	0.70	71.52	309.98	0.16	2.99 N	1.50 E
311.00	0.70	71.86	310.98	0.16	3.00 N	1.51 E
312.00	0.70	72.19	311.98	0.16	3.00 N	1.52 E
313.00	0.70	72.20	312.98	0.16	3.01 N	1.53 E
314.00	0.70	72.32	313.98	0.15	3.01 N	1.55 E
315.00	0.70	72.54	314.98	0.14	3.01 N	1.56 E
316.00	0.70	72.67	315.98	0.13	3.02 N	1.57 E
317.00	0.70	73.13	316.98	0.13	3.02 N	1.58 E
318.00	0.70	73.62	317.98	0.12	3.02 N	1.59 E
319.00	0.70	74.22	318.98	0.11	3.03 N	1.60 E
320.00	0.70	74.92	319.98	0.10	3.03 N	1.62 E
321.00	0.69	75.39	320.98	0.10	3.03 N	1.63 E
322.00	0.69	75.97	321.98	0.10	3.04 N	1.64 E
323.00	0.69	76.76	322.98	0.10	3.04 N	1.65 E
324.00	0.69	77.50	323.98	0.10	3.04 N	1.66 E
325.00	0.69	78.01	324.98	0.10	3.05 N	1.67 E
326.00	0.69	78.58	325.98	0.10	3.05 N	1.69 E
327.00	0.69	79.23	326.98	0.10	3.05 N	1.70 E
328.00	0.69	79.59	327.98	0.10	3.05 N	1.71 E
329.00	0.69	79.68	328.98	0.10	3.05 N	1.72 E
330.00	0.69	79.50	329.98	0.11	3.06 N	1.73 E
331.00	0.69	79.34	330.98	0.11	3.06 N	1.75 E
332.00	0.69	79.42	331.98	0.10	3.06 N	1.76 E
333.00	0.69	79.25	332.98	0.09	3.06 N	1.77 E
334.00	0.69	78.89	333.98	0.08	3.07 N	1.78 E
335.00	0.69	78.73	334.98	0.07	3.07 N	1.79 E
336.00	0.69	78.83	335.98	0.06	3.07 N	1.80 E
337.00	0.69	78.93	336.98	0.05	3.07 N	1.82 E
338.00	0.69	78.96	337.98	0.04	3.07 N	1.83 E
339.00	0.69	79.11	338.98	0.03	3.08 N	1.84 E
340.00	0.70	79.45	339.98	0.02	3.08 N	1.85 E
341.00	0.69	79.82	340.98	0.02	3.08 N	1.86 E
342.00	0.70	80.14	341.98	0.04	3.08 N	1.88 E
343.00	0.70	80.43	342.98	0.04	3.09 N	1.89 E



A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
344.00	0.71	80.80	343.98	0.04	3.09 N	1.90 E
345.00	0.71	81.17	344.98	0.04	3.09 N	1.91 E
346.00	0.71	81.42	345.98	0.05	3.09 N	1.92 E
347.00	0.71	81.38	346.98	0.05	3.09 N	1.94 E
348.00	0.71	81.12	347.98	0.05	3.10 N	1.95 E
349.00	0.71	80.74	348.98	0.06	3.10 N	1.96 E
350.00	0.71	80.45	349.98	0.06	3.10 N	1.97 E
351.00	0.71	80.25	350.98	0.07	3.10 N	1.99 E
352.00	0.71	79.98	351.98	0.07	3.10 N	2.00 E
353.00	0.71	79.58	352.98	0.07	3.11 N	2.01 E
354.00	0.71	79.17	353.98	0.07	3.11 N	2.02 E
355.00	0.71	78.78	354.98	0.08	3.11 N	2.03 E
356.00	0.71	78.46	355.98	0.09	3.11 N	2.05 E
357.00	0.72	78.15	356.98	0.09	3.12 N	2.06 E
358.00	0.72	77.83	357.98	0.09	3.12 N	2.07 E
359.00	0.72	77.71	358.98	0.10	3.12 N	2.08 E
360.00	0.73	77.76	359.98	0.10	3.12 N	2.10 E
361.00	0.73	77.73	360.97	0.10	3.13 N	2.11 E
362.00	0.74	77.76	361.97	0.09	3.13 N	2.12 E
363.00	0.74	77.91	362.97	0.08	3.13 N	2.13 E
364.00	0.74	78.04	363.97	0.07	3.13 N	2.15 E
365.00	0.75	78.26	364.97	0.05	3.14 N	2.16 E
366.00	0.75	78.67	365.97	0.04	3.14 N	2.17 E
367.00	0.76	79.07	366.97	0.05	3.14 N	2.18 E
368.00	0.76	79.49	367.97	0.06	3.14 N	2.20 E
369.00	0.77	80.31	368.97	0.07	3.15 N	2.21 E
370.00	0.78	81.16	369.97	0.08	3.15 N	2.22 E
371.00	0.78	81.94	370.97	0.09	3.15 N	2.24 E
372.00	0.79	82.67	371.97	0.09	3.15 N	2.25 E
373.00	0.79	83.27	372.97	0.07	3.15 N	2.26 E
374.00	0.80	83.98	373.97	0.06	3.16 N	2.28 E
375.00	0.80	85.00	374.97	0.05	3.16 N	2.29 E
376.00	0.79	85.60	375.97	0.05	3.16 N	2.31 E
377.00	0.78	85.72	376.97	0.06	3.16 N	2.32 E
378.00	0.76	85.58	377.97	0.07	3.16 N	2.33 E
379.00	0.74	85.32	378.97	0.08	3.16 N	2.35 E

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Fis. 7.452


A Gyrodata Directional Survey


BRASKEM

Well: Mina 22

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
380.00	0.73	84.60	379.97	0.10	3.16 N	2.36 E
381.00	0.70	83.76	380.97	0.11	3.16 N	2.37 E
382.00	0.68	82.96	381.97	0.12	3.17 N	2.38 E
383.00	0.67	82.18	382.97	0.12	3.17 N	2.39 E
384.00	0.65	81.40	383.97	0.13	3.17 N	2.41 E
385.00	0.64	80.54	384.97	0.13	3.17 N	2.42 E
386.00	0.63	79.59	385.97	0.14	3.17 N	2.43 E
387.00	0.64	79.36	386.97	0.15	3.17 N	2.44 E
388.00	0.65	79.47	387.97	0.17	3.18 N	2.45 E
389.00	0.67	80.00	388.97	0.18	3.18 N	2.46 E
390.00	0.69	80.45	389.97	0.19	3.18 N	2.47 E
391.00	0.71	81.25	390.97	0.22	3.18 N	2.48 E
392.00	0.74	82.08	391.97	0.26	3.18 N	2.50 E
393.00	0.76	82.88	392.97	0.30	3.19 N	2.51 E
394.00	0.78	83.68	393.97	0.35	3.19 N	2.52 E
395.00	0.80	84.49	394.97	0.38	3.19 N	2.54 E
396.00	0.82	85.21	395.97	0.42	3.19 N	2.55 E
397.00	0.83	85.86	396.97	0.44	3.19 N	2.57 E
398.00	0.84	86.24	397.97	0.46	3.19 N	2.58 E
399.00	0.85	86.88	398.97	0.48	3.19 N	2.60 E
400.00	0.87	87.35	399.97	0.49	3.19 N	2.61 E
401.00	0.89	88.10	400.97	0.50	3.19 N	2.63 E
402.00	0.91	88.70	401.97	0.50	3.19 N	2.64 E
403.00	0.93	89.41	402.97	0.48	3.19 N	2.66 E
404.00	0.95	90.26	403.97	0.46	3.19 N	2.67 E
405.00	0.97	91.10	404.97	0.43	3.19 N	2.69 E
406.00	0.98	92.17	405.97	0.41	3.19 N	2.71 E
407.00	1.01	93.25	406.97	0.40	3.19 N	2.72 E
408.00	1.03	94.54	407.97	0.39	3.19 N	2.74 E
409.00	1.05	95.57	408.97	0.39	3.19 N	2.76 E
410.00	1.06	96.19	409.97	0.40	3.19 N	2.78 E
411.00	1.07	96.83	410.97	0.41	3.19 N	2.80 E
412.00	1.07	97.37	411.97	0.41	3.18 N	2.82 E
413.00	1.06	97.92	412.97	0.43	3.18 N	2.83 E
414.00	1.06	98.22	413.97	0.44	3.18 N	2.85 E

DUPM/AL
Fib. 7.453


A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038


MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
415.00	1.06	98.23	414.97	0.45	3.18 N	2.87 E
416.00	1.06	98.35	415.97	0.46	3.17 N	2.89 E
417.00	1.06	98.08	416.97	0.46	3.17 N	2.91 E
418.00	1.05	97.84	417.97	0.45	3.17 N	2.93 E
419.00	1.05	97.24	418.97	0.44	3.17 N	2.94 E
420.00	1.05	96.76	419.97	0.43	3.16 N	2.96 E
421.00	1.06	96.59	420.97	0.41	3.16 N	2.98 E
422.00	1.07	96.40	421.97	0.38	3.16 N	3.00 E
423.00	1.09	96.39	422.97	0.36	3.16 N	3.02 E
424.00	1.11	96.34	423.97	0.33	3.16 N	3.04 E
425.00	1.14	96.60	424.97	0.32	3.15 N	3.06 E
426.00	1.17	97.09	425.97	0.31	3.15 N	3.08 E
427.00	1.19	97.52	426.97	0.31	3.15 N	3.10 E
428.00	1.22	98.17	427.97	0.31	3.15 N	3.12 E
429.00	1.24	98.93	428.97	0.32	3.14 N	3.14 E
430.00	1.26	99.79	429.97	0.33	3.14 N	3.16 E
431.00	1.28	100.74	430.97	0.33	3.13 N	3.18 E
432.00	1.30	101.41	431.97	0.33	3.13 N	3.20 E
433.00	1.31	102.04	432.97	0.34	3.13 N	3.23 E
434.00	1.32	102.49	433.97	0.35	3.12 N	3.25 E
435.00	1.33	102.95	434.97	0.36	3.12 N	3.27 E
436.00	1.33	103.24	435.96	0.36	3.11 N	3.29 E
437.00	1.33	103.41	436.96	0.36	3.11 N	3.32 E
438.00	1.34	103.55	437.96	0.35	3.10 N	3.34 E
439.00	1.34	103.58	438.96	0.33	3.09 N	3.36 E
440.00	1.34	103.45	439.96	0.31	3.09 N	3.38 E
441.00	1.35	103.39	440.96	0.29	3.08 N	3.41 E
442.00	1.35	103.15	441.96	0.27	3.08 N	3.43 E
443.00	1.36	103.09	442.96	0.25	3.07 N	3.45 E
444.00	1.36	103.07	443.96	0.23	3.07 N	3.48 E
445.00	1.37	103.04	444.96	0.21	3.06 N	3.50 E
446.00	1.37	103.07	445.96	0.19	3.06 N	3.52 E
447.00	1.38	103.03	446.96	0.17	3.05 N	3.55 E
448.00	1.38	103.02	447.96	0.16	3.05 N	3.57 E
449.00	1.38	103.07	448.96	0.15	3.04 N	3.59 E
450.00	1.39	103.07	449.96	0.14	3.03 N	3.62 E

DUPWAL
Fb. 7.459
[Signature]

A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
451.00	1.39	103.19	450.96	0.14	3.03 N	3.64 E
452.00	1.40	103.27	451.96	0.14	3.02 N	3.66 E
453.00	1.40	103.51	452.96	0.14	3.02 N	3.69 E
454.00	1.41	103.71	453.96	0.14	3.01 N	3.71 E
455.00	1.41	103.90	454.96	0.14	3.01 N	3.73 E
456.00	1.42	104.05	455.96	0.14	3.00 N	3.76 E
457.00	1.42	104.14	456.96	0.14	2.99 N	3.78 E
458.00	1.42	104.32	457.96	0.14	2.99 N	3.81 E
459.00	1.43	104.53	458.96	0.14	2.98 N	3.83 E
460.00	1.44	104.69	459.96	0.14	2.98 N	3.86 E
461.00	1.44	104.92	460.96	0.14	2.97 N	3.88 E
462.00	1.44	105.09	461.96	0.14	2.96 N	3.90 E
463.00	1.45	105.24	462.96	0.14	2.96 N	3.93 E
464.00	1.45	105.26	463.96	0.14	2.95 N	3.95 E
465.00	1.46	105.19	464.96	0.14	2.94 N	3.98 E
466.00	1.46	105.20	465.96	0.14	2.94 N	4.00 E
467.00	1.47	105.20	466.96	0.14	2.93 N	4.03 E
468.00	1.47	105.19	467.96	0.15	2.92 N	4.05 E
469.00	1.48	105.24	468.96	0.15	2.92 N	4.08 E
470.00	1.48	105.22	469.95	0.15	2.91 N	4.10 E
471.00	1.49	105.18	470.95	0.15	2.90 N	4.13 E
472.00	1.49	105.19	471.95	0.16	2.90 N	4.15 E
473.00	1.49	105.25	472.95	0.16	2.89 N	4.18 E
474.00	1.49	105.33	473.95	0.16	2.88 N	4.20 E
475.00	1.49	105.48	474.95	0.16	2.88 N	4.23 E
476.00	1.50	105.69	475.95	0.16	2.87 N	4.25 E
477.00	1.50	105.83	476.95	0.17	2.86 N	4.28 E
478.00	1.50	106.05	477.95	0.16	2.85 N	4.30 E
479.00	1.50	106.35	478.95	0.16	2.85 N	4.33 E
480.00	1.50	106.64	479.95	0.16	2.84 N	4.35 E
481.00	1.50	107.02	480.95	0.16	2.83 N	4.38 E
482.00	1.50	107.44	481.95	0.16	2.82 N	4.40 E
483.00	1.50	107.88	482.95	0.15	2.82 N	4.43 E
484.00	1.50	108.30	483.95	0.15	2.81 N	4.45 E
485.00	1.50	108.73	484.95	0.15	2.80 N	4.48 E
486.00	1.50	109.19	485.95	0.14	2.79 N	4.50 E

DNPM/AL
Fto. 7.455


A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
487.00	1.50	109.60	486.95	0.14	2.78 N	4.53 E
488.00	1.49	109.97	487.95	0.14	2.77 N	4.55 E
489.00	1.49	110.31	488.95	0.13	2.76 N	4.57 E
490.00	1.49	110.67	489.95	0.13	2.76 N	4.60 E
491.00	1.49	111.00	490.95	0.12	2.75 N	4.62 E
492.00	1.50	111.18	491.95	0.13	2.74 N	4.65 E
493.00	1.50	111.24	492.95	0.13	2.73 N	4.67 E
494.00	1.51	111.20	493.95	0.13	2.72 N	4.70 E
495.00	1.51	111.12	494.95	0.14	2.71 N	4.72 E
496.00	1.51	111.04	495.95	0.14	2.70 N	4.75 E
497.00	1.51	110.95	496.95	0.14	2.69 N	4.77 E
498.00	1.52	110.84	497.95	0.13	2.68 N	4.79 E
499.00	1.52	110.73	498.94	0.13	2.67 N	4.82 E
500.00	1.52	110.58	499.94	0.12	2.66 N	4.84 E
501.00	1.53	110.40	500.94	0.11	2.65 N	4.87 E
502.00	1.53	110.26	501.94	0.10	2.64 N	4.89 E
503.00	1.54	110.12	502.94	0.10	2.63 N	4.92 E
504.00	1.54	109.93	503.94	0.09	2.62 N	4.94 E
505.00	1.55	109.83	504.94	0.09	2.62 N	4.97 E
506.00	1.55	109.94	505.94	0.09	2.61 N	5.00 E
507.00	1.55	110.20	506.94	0.08	2.60 N	5.02 E
508.00	1.55	110.58	507.94	0.08	2.59 N	5.05 E
509.00	1.55	111.06	508.94	0.08	2.58 N	5.07 E
510.00	1.55	111.48	509.94	0.09	2.57 N	5.10 E
511.00	1.55	111.82	510.94	0.09	2.56 N	5.12 E
512.00	1.55	112.12	511.94	0.10	2.55 N	5.15 E
513.00	1.55	112.39	512.94	0.10	2.54 N	5.17 E
514.00	1.55	112.58	513.94	0.11	2.53 N	5.20 E
515.00	1.55	112.71	514.94	0.11	2.52 N	5.22 E
516.00	1.56	112.75	515.94	0.12	2.51 N	5.25 E
517.00	1.56	112.66	516.94	0.12	2.50 N	5.27 E
518.00	1.56	112.51	517.94	0.13	2.49 N	5.30 E
519.00	1.57	112.35	518.94	0.14	2.47 N	5.32 E
520.00	1.57	112.24	519.94	0.15	2.46 N	5.35 E
521.00	1.57	112.23	520.94	0.15	2.45 N	5.37 E
522.00	1.58	112.24	521.94	0.15	2.44 N	5.40 E

A Gyrodata Directional Survey

BRASKEM

Well: Mina 22

Location: RIGLESS, SAL GEMA

Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
523.00	1.58	112.19	522.94	0.14	2.43 N	5.42 E
524.00	1.59	112.09	523.94	0.13	2.42 N	5.45 E
525.00	1.59	112.05	524.94	0.12	2.41 N	5.48 E
526.00	1.60	112.08	525.93	0.12	2.40 N	5.50 E
527.00	1.60	112.17	526.93	0.11	2.39 N	5.53 E
528.00	1.61	112.32	527.93	0.11	2.38 N	5.55 E
529.00	1.61	112.48	528.93	0.11	2.37 N	5.58 E
530.00	1.62	112.64	529.93	0.11	2.36 N	5.60 E
531.00	1.62	112.79	530.93	0.12	2.35 N	5.63 E
532.00	1.63	112.95	531.93	0.12	2.34 N	5.66 E
533.00	1.63	113.17	532.93	0.13	2.33 N	5.68 E
534.00	1.64	113.51	533.93	0.13	2.31 N	5.71 E
535.00	1.64	113.84	534.93	0.14	2.30 N	5.74 E
536.00	1.64	114.07	535.93	0.14	2.29 N	5.76 E
537.00	1.65	114.15	536.93	0.15	2.28 N	5.79 E
538.00	1.65	114.16	537.93	0.16	2.27 N	5.81 E
539.00	1.65	114.08	538.93	0.16	2.26 N	5.84 E
540.00	1.65	113.96	539.93	0.16	2.24 N	5.87 E
541.00	1.65	113.75	540.93	0.16	2.23 N	5.89 E
542.00	1.66	113.48	541.93	0.16	2.22 N	5.92 E
543.00	1.66	113.23	542.93	0.16	2.21 N	5.95 E
544.00	1.66	112.98	543.93	0.16	2.20 N	5.97 E
545.00	1.67	112.81	544.93	0.16	2.19 N	6.00 E
546.00	1.67	112.80	545.93	0.16	2.18 N	6.03 E
547.00	1.68	112.87	546.93	0.16	2.16 N	6.05 E
548.00	1.69	112.97	547.93	0.16	2.15 N	6.08 E
549.00	1.70	113.05	548.93	0.17	2.14 N	6.11 E
550.00	1.71	113.18	549.92	0.17	2.13 N	6.14 E
551.00	1.72	113.32	550.92	0.18	2.12 N	6.16 E
552.00	1.72	113.56	551.92	0.18	2.11 N	6.19 E
553.00	1.73	113.80	552.92	0.19	2.09 N	6.22 E
554.00	1.74	113.86	553.92	0.19	2.08 N	6.25 E
555.00	1.75	113.86	554.92	0.19	2.07 N	6.27 E
556.00	1.75	113.79	555.92	0.19	2.06 N	6.30 E
557.00	1.76	113.70	556.92	0.19	2.05 N	6.33 E
558.00	1.77	113.64	557.92	0.18	2.03 N	6.36 E

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A Gyrodata Directional Survey

BRASKEM
Well: Mina 22
Location: RIGLESS, SAL GEMA
Job Number: BZ0419GVC038

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
559.00	1.77	113.63	558.92	0.17	2.02 N	6.39 E
560.00	1.78	113.59	559.92	0.16	2.01 N	6.41 E
561.00	1.78	113.59	560.92	0.12	2.00 N	6.44 E
562.00	1.79	113.60	561.92	0.08	1.98 N	6.47 E
563.00	1.80	113.54	562.92	0.04	1.97 N	6.50 E
564.00	1.81	113.51	563.92	0.02	1.96 N	6.53 E
565.00	1.81	113.63	564.92	0.02	1.95 N	6.56 E
566.00	1.82	113.91	565.92	0.04	1.93 N	6.59 E
567.00	1.83	114.20	566.92	0.05	1.92 N	6.62 E
568.00	1.83	114.57	567.92	0.06	1.91 N	6.64 E
569.00	1.84	114.94	568.92	0.06	1.89 N	6.67 E
570.00	1.84	115.26	569.92	0.08	1.88 N	6.70 E
571.00	1.84	115.61	570.91	0.07	1.87 N	6.73 E
572.00	1.83	115.95	571.91	0.09	1.85 N	6.76 E
573.00	1.82	116.21	572.91	0.12	1.84 N	6.79 E
574.00	1.80	116.48	573.91	0.13	1.82 N	6.82 E
575.00	1.78	116.32	574.91	0.12	1.81 N	6.85 E
576.00	1.77	115.58	575.91	0.00	1.80 N	6.87 E
577.00	1.75	114.57	576.91	0.00	1.78 N	6.90 E
578.00	1.73	113.44	577.91	0.00	1.77 N	6.93 E
579.00	1.71	112.73	578.91	0.00	1.76 N	6.96 E
580.00	1.70	112.42	579.91	0.00	1.75 N	6.98 E
581.00	1.69	112.28	580.91	0.00	1.74 N	7.01 E
582.00	1.69	112.17	581.91	0.00	1.73 N	7.04 E
583.00	1.70	112.01	582.91	0.00	1.71 N	7.07 E
584.00	1.72	111.94	583.91	0.00	1.70 N	7.09 E
585.00	1.67	114.56	584.91	0.00	1.69 N	7.12 E
586.00	1.72	115.80	585.91	0.00	1.68 N	7.15 E
587.00	1.83	115.90	586.91	0.00	1.67 N	7.18 E
588.00	1.87	115.80	587.91	0.00	1.65 N	7.20 E
589.00	1.87	116.01	588.91	0.00	1.64 N	7.23 E
590.00	1.88	115.67	589.91	0.00	1.62 N	7.26 E

Final Station Closure: Distance: 7.44 m Az: 77.41 deg.

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Parte 5
Controle de Qualidade

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Survey QC – Vertical Continuous Analysis Sheet



SURVEY QUALITY CONTROL – SPECIFICATION DATA

PRE-JOB CALIBRATION VERIFICATION (ROLL TEST)

System Parameter	dGx	dGy	dmbo	Mean Gravity Error	Stdev Gravity Error
Standard Deviation	0.008	0.008	0.008	0.00016	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	41.36	To	64.12	In-Spec if +/- 2.5 °C of Calibration


INCLINATION DIFFERENCE TEST

Chi-square test value	2.9
Tolerance	34.4
Number of overlapping survey stations used	15.0

CO-ORDINATE DIFFERENCE TEST

	North	East	Vertical
Chi-square test value	0.2	2.3	3.8
Tolerance	34.4	34.4	34.4
Number of overlapping survey stations used	15.0	15.0	15.0


Parte 6
Relatório Cronológico
da Operação

DNDM/AL
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6.0 RELATÓRIO CRONOLÓGICO DA OPERAÇÃO

07 de abril de 2019

- 20:00 Chegada da equipe na mina 22
- 20:30 Conexão gyrodata/flodim
- 20:40 Início de corrida mina 22
- 23:00 Desmontagem de equipamentos
- 23:15 Pós calibração

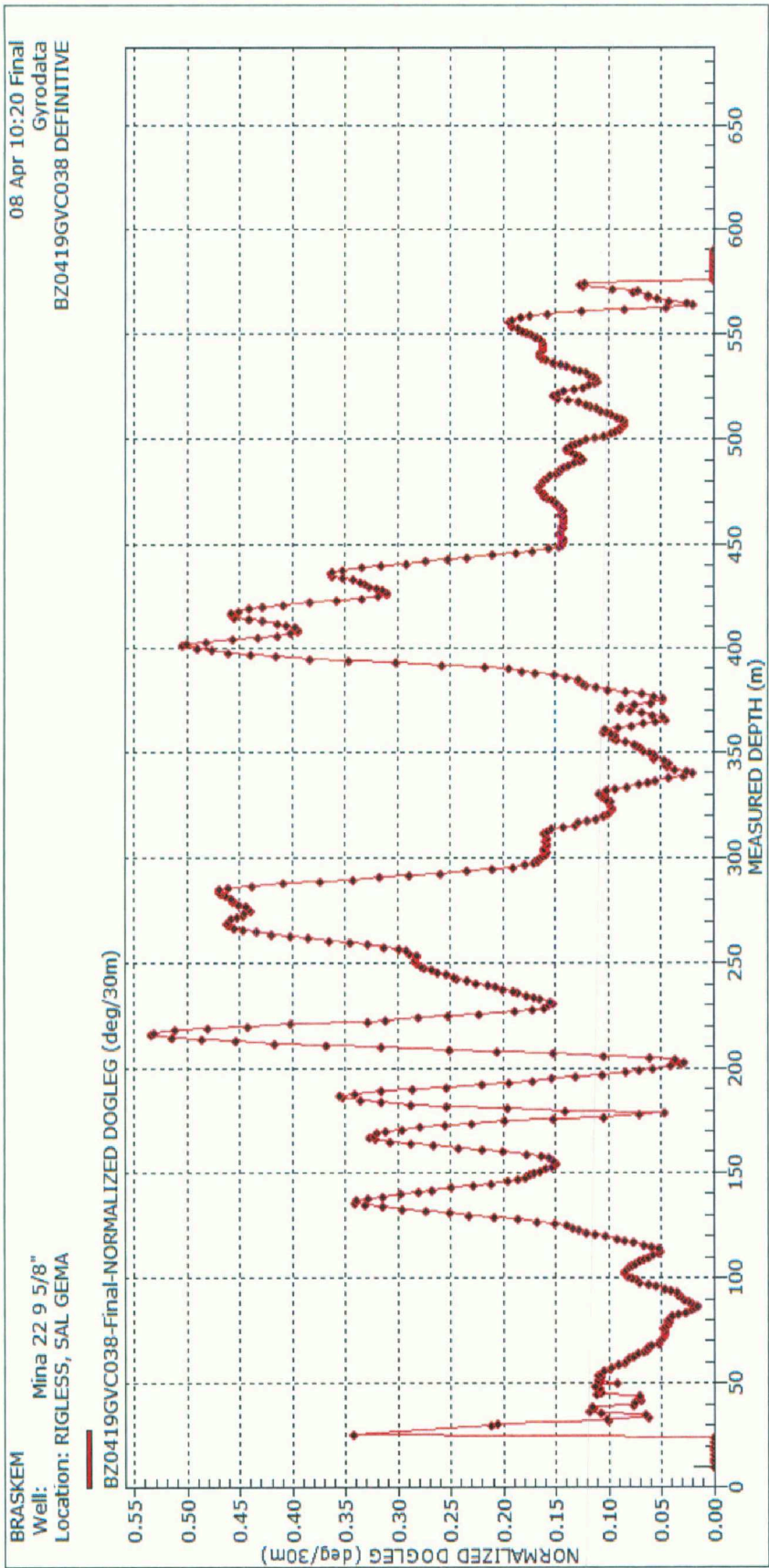
DNPM/AL
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Parte 7
Gráficos

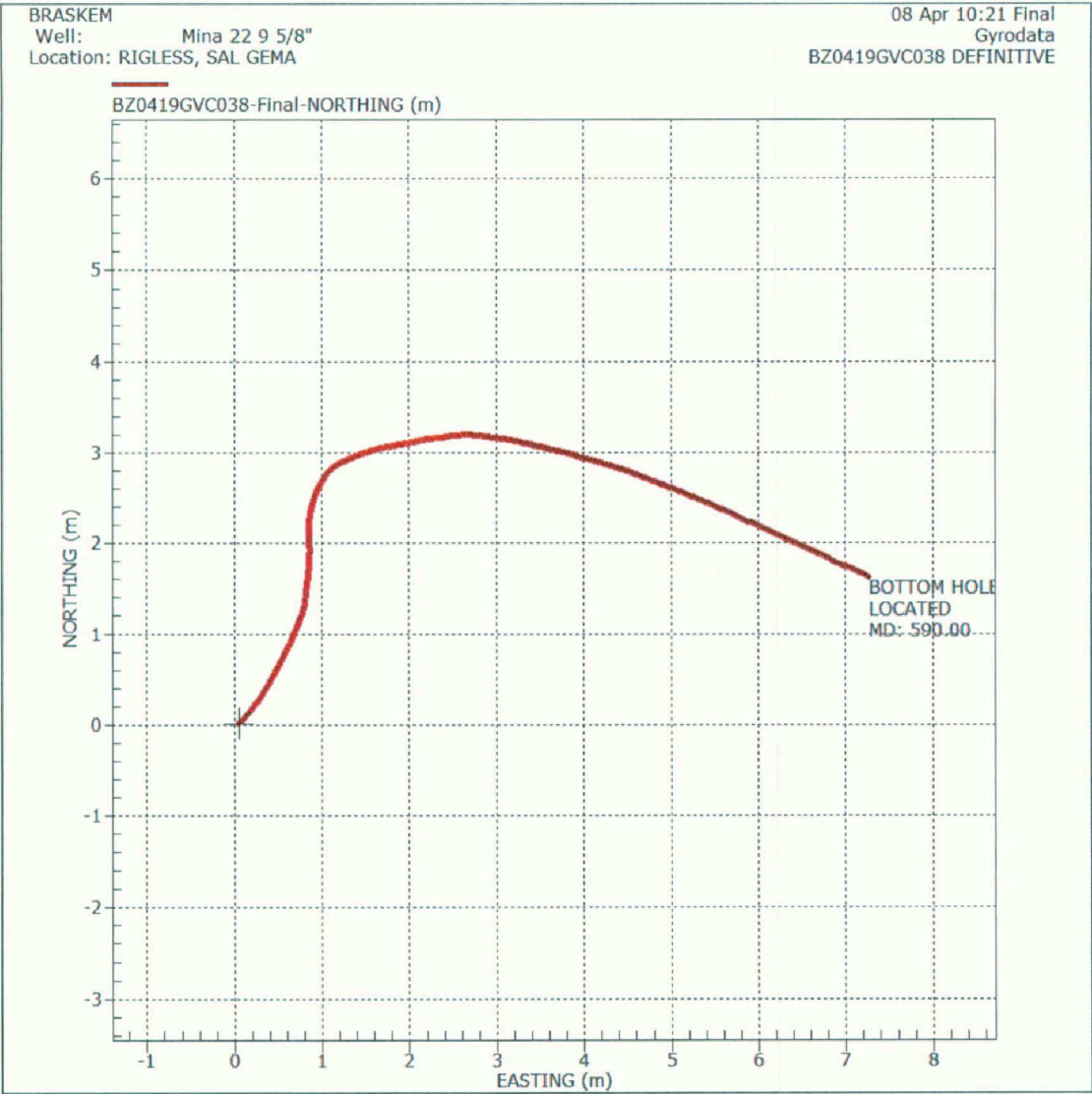




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Fig. 7.466

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Braskem

Campo: Sal Gema

Poço: Mina 19

Gyro Multshot Contínuo

Data da Amostragem: 8 de Abril de 2019

Número de Trabalho: BZ0419GVC039