

UNP/AL  
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A Gyrodata Directional Survey

BRASKEM  
Well: Mina 19  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC039

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
587.00	12.80	231.66	572.78	0.30	69.64 S	94.58 W
588.00	12.82	231.64	573.75	0.29	69.78 S	94.76 W
589.00	12.83	231.58	574.73	0.29	69.92 S	94.93 W
590.00	12.85	231.59	575.70	0.26	70.06 S	95.10 W
591.00	12.88	231.60	576.68	0.20	70.20 S	95.28 W
592.00	12.89	231.62	577.65	0.18	70.33 S	95.45 W
593.00	12.88	231.74	578.63	0.15	70.47 S	95.63 W
594.00	12.91	231.75	579.60	0.13	70.61 S	95.80 W
595.00	12.91	231.86	580.58	0.13	70.75 S	95.98 W
596.00	12.92	231.99	581.55	0.12	70.89 S	96.15 W
597.00	12.95	232.07	582.53	0.14	71.02 S	96.33 W
598.00	12.94	232.19	583.50	0.20	71.16 S	96.51 W
599.00	12.94	232.30	584.48	0.24	71.30 S	96.68 W
600.00	12.94	232.42	585.45	0.27	71.44 S	96.86 W
601.00	12.93	232.56	586.43	0.27	71.57 S	97.04 W
602.00	12.92	232.71	587.40	0.30	71.71 S	97.22 W
603.00	12.93	232.84	588.38	0.29	71.84 S	97.40 W
604.00	12.92	233.02	589.35	0.33	71.98 S	97.57 W
605.00	12.91	232.95	590.33	0.34	72.11 S	97.75 W
606.00	12.90	232.68	591.30	0.36	72.25 S	97.93 W
607.00	12.87	232.53	592.27	0.38	72.38 S	98.11 W
608.00	12.86	232.23	593.25	0.35	72.52 S	98.28 W
609.00	12.85	232.14	594.22	0.36	72.65 S	98.46 W
610.00	12.84	232.32	595.20	0.33	72.79 S	98.64 W
611.00	12.85	232.38	596.17	0.32	72.93 S	98.81 W
612.00	12.87	232.49	597.15	0.32	73.06 S	98.99 W
613.00	12.87	232.55	598.12	0.32	73.20 S	99.16 W
614.00	12.88	232.65	599.10	0.29	73.33 S	99.34 W
615.00	12.88	232.71	600.07	0.27	73.47 S	99.52 W
616.00	12.87	232.86	601.05	0.27	73.60 S	99.70 W
617.00	12.85	232.98	602.02	0.27	73.74 S	99.87 W
618.00	12.86	232.93	603.00	0.31	73.87 S	100.05 W
619.00	12.86	233.08	603.97	0.34	74.01 S	100.23 W
620.00	12.87	233.11	604.95	0.33	74.14 S	100.41 W
621.00	12.87	233.22	605.92	0.33	74.27 S	100.59 W
622.00	12.85	233.31	606.90	0.31	74.41 S	100.76 W

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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
623.00	12.84	233.30	607.87	0.31	74.54 S	100.94W
624.00	12.85	233.33	608.85	0.31	74.67 S	101.12W
625.00	12.87	233.34	609.82	0.28	74.80 S	101.30W
626.00	12.86	233.42	610.80	0.31	74.94 S	101.48W
627.00	12.84	233.44	611.77	0.32	75.07 S	101.66W
628.00	12.79	233.47	612.75	0.32	75.20 S	101.83W
629.00	12.75	233.26	613.72	0.32	75.33 S	102.01W
630.00	12.72	233.13	614.70	0.30	75.47 S	102.19W
631.00	12.68	233.03	615.67	0.31	75.60 S	102.36W
632.00	12.65	232.91	616.65	0.28	75.73 S	102.54W
633.00	12.62	232.97	617.63	0.28	75.86 S	102.71W
634.00	12.58	232.95	618.60	0.29	75.99 S	102.89W
635.00	12.58	232.88	619.58	0.30	76.12 S	103.06W
636.00	12.57	232.85	620.55	0.31	76.26 S	103.24W
637.00	12.57	232.78	621.53	0.32	76.39 S	103.41W
638.00	12.57	232.77	622.51	0.28	76.52 S	103.58W
639.00	12.57	232.77	623.48	0.27	76.65 S	103.76W
640.00	12.58	232.75	624.46	0.28	76.78 S	103.93W
641.00	12.55	232.72	625.43	0.26	76.91 S	104.10W
642.00	12.55	232.71	626.41	0.27	77.05 S	104.27W
643.00	12.55	232.61	627.39	0.24	77.18 S	104.45W
644.00	12.56	232.58	628.36	0.22	77.31 S	104.62W
645.00	12.58	232.50	629.34	0.21	77.44 S	104.79W
646.00	12.58	232.43	630.31	0.20	77.57 S	104.97W
647.00	12.59	232.48	631.29	0.21	77.71 S	105.14W
648.00	12.60	232.50	632.27	0.22	77.84 S	105.31W
649.00	12.60	232.50	633.24	0.24	77.97 S	105.48W
650.00	12.60	232.53	634.22	0.31	78.11 S	105.66W
651.00	12.60	232.55	635.19	0.36	78.24 S	105.83W
652.00	12.59	232.44	636.17	0.47	78.37 S	106.00W
653.00	12.61	232.55	637.15	0.59	78.50 S	106.18W
654.00	12.62	232.66	638.12	0.73	78.64 S	106.35W
655.00	12.62	232.73	639.10	0.89	78.77 S	106.52W
656.00	12.63	232.88	640.07	1.02	78.90 S	106.70W
657.00	12.60	232.87	641.05	1.20	79.03 S	106.87W
658.00	12.58	232.92	642.02	1.40	79.16 S	107.05W



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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
659.00	12.54	232.94	643.00	1.60	79.30 S	107.22W
660.00	12.51	233.06	643.98	1.86	79.43 S	107.39W
661.00	12.49	233.27	644.95	1.99	79.56 S	107.57W
662.00	12.47	233.40	645.93	2.16	79.68 S	107.74W
663.00	12.44	233.53	646.91	2.34	79.81 S	107.91W
664.00	12.41	233.75	647.88	2.51	79.94 S	108.09W
665.00	12.36	233.88	648.86	2.68	80.07 S	108.26W
666.00	12.29	233.93	649.84	2.84	80.19 S	108.43W
667.00	12.21	234.16	650.81	3.01	80.32 S	108.60W
668.00	12.10	234.43	651.79	3.19	80.44 S	108.77W
669.00	11.99	234.82	652.77	3.35	80.56 S	108.94W
670.00	11.87	235.29	653.75	3.52	80.68 S	109.11W
671.00	11.74	235.66	654.73	3.68	80.80 S	109.28W
672.00	11.61	236.22	655.71	3.84	80.91 S	109.45W
673.00	11.48	236.89	656.69	3.98	81.02 S	109.62W
674.00	11.31	237.38	657.67	4.12	81.13 S	109.78W
675.00	11.15	238.29	658.65	4.24	81.23 S	109.95W
676.00	11.11	238.93	659.63	4.35	81.33 S	110.11W
677.00	11.00	239.67	660.61	4.46	81.43 S	110.28W
678.00	10.90	240.43	661.59	4.56	81.52 S	110.44W
679.00	10.81	241.22	662.57	4.63	81.62 S	110.61W
680.00	10.73	242.04	663.56	4.68	81.70 S	110.77W
681.00	10.66	242.87	664.54	4.69	81.79 S	110.93W
682.00	10.60	243.73	665.52	4.64	81.87 S	111.10W
683.00	10.53	244.66	666.50	4.58	81.95 S	111.26W
684.00	10.48	245.62	667.49	4.49	82.03 S	111.43W
685.00	10.42	246.58	668.47	4.38	82.10 S	111.60W
686.00	10.36	247.54	669.45	4.27	82.17 S	111.76W
687.00	10.31	248.49	670.44	4.11	82.24 S	111.93W
688.00	10.25	249.40	671.42	3.93	82.30 S	112.09W
689.00	10.20	250.28	672.41	3.75	82.37 S	112.26W
690.00	10.13	251.12	673.39	3.50	82.42 S	112.43W
691.00	10.06	251.91	674.38	3.37	82.48 S	112.59W
692.00	9.98	252.63	675.36	3.19	82.53 S	112.76W
693.00	9.91	253.31	676.35	3.01	82.58 S	112.92W
694.00	9.83	253.91	677.33	2.83	82.63 S	113.09W

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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
695.00	9.76	254.39	678.32	2.66	82.68 S	113.25W
696.00	9.70	254.72	679.30	2.51	82.72 S	113.42W
697.00	9.67	254.88	680.29	2.37	82.77 S	113.58W
698.00	9.62	255.07	681.27	2.22	82.81 S	113.74W
699.00	9.55	255.25	682.26	2.09	82.85 S	113.90W
700.00	9.49	255.36	683.25	1.97	82.90 S	114.06W
701.00	9.43	255.40	684.23	1.86	82.94 S	114.22W
702.00	9.39	255.39	685.22	1.76	82.98 S	114.38W
703.00	9.35	255.35	686.20	1.69	83.02 S	114.54W
704.00	9.32	255.29	687.19	1.63	83.06 S	114.69W
705.00	9.30	255.18	688.18	1.58	83.10 S	114.85W
706.00	9.27	255.05	689.17	1.54	83.14 S	115.01W
707.00	9.25	254.92	690.15	1.52	83.18 S	115.16W
708.00	9.22	254.80	691.14	1.50	83.23 S	115.32W
709.00	9.19	254.67	692.13	1.50	83.27 S	115.47W
710.00	9.17	254.59	693.11	1.51	83.31 S	115.62W
711.00	9.13	254.52	694.10	1.54	83.35 S	115.78W
712.00	9.10	254.48	695.09	1.59	83.40 S	115.93W
713.00	9.05	254.44	696.08	1.63	83.44 S	116.08W
714.00	9.00	254.41	697.06	1.65	83.48 S	116.23W
715.00	8.95	254.36	698.05	1.68	83.52 S	116.38W
716.00	8.89	254.31	699.04	1.71	83.56 S	116.53W
717.00	8.83	254.27	700.03	1.76	83.61 S	116.68W
718.00	8.77	254.25	701.02	1.81	83.65 S	116.83W
719.00	8.70	254.23	702.00	1.87	83.69 S	116.97W
720.00	8.63	254.22	702.99	1.93	83.73 S	117.12W
721.00	8.56	254.20	703.98	1.99	83.77 S	117.26W
722.00	8.49	254.17	704.97	2.04	83.81 S	117.41W
723.00	8.41	254.12	705.96	2.09	83.85 S	117.55W
724.00	8.33	254.06	706.95	2.14	83.89 S	117.69W
725.00	8.26	254.00	707.94	2.19	83.93 S	117.83W
726.00	8.17	253.94	708.93	2.23	83.97 S	117.96W
727.00	8.09	253.89	709.92	2.26	84.01 S	118.10W
728.00	8.00	253.82	710.91	2.29	84.05 S	118.23W
729.00	7.92	253.75	711.90	2.30	84.09 S	118.37W
730.00	7.83	253.65	712.89	2.31	84.12 S	118.50W



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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
731.00	7.74	253.57	713.88	2.32	84.16 S	118.63W
732.00	7.65	253.50	714.87	2.32	84.20 S	118.76W
733.00	7.56	253.46	715.86	2.32	84.24 S	118.88W
734.00	7.47	253.44	716.85	2.32	84.28 S	119.01W
735.00	7.38	253.44	717.84	2.29	84.31 S	119.13W
736.00	7.30	253.42	718.84	2.24	84.35 S	119.25W
737.00	7.22	253.39	719.83	2.19	84.39 S	119.38W
738.00	7.14	253.35	720.82	2.16	84.42 S	119.49W
739.00	7.06	253.36	721.81	2.14	84.46 S	119.61W
740.00	6.98	253.39	722.81	2.13	84.49 S	119.73W
741.00	6.91	253.44	723.80	2.11	84.53 S	119.85W
742.00	6.84	253.46	724.79	2.09	84.56 S	119.96W
743.00	6.77	253.47	725.78	2.07	84.59 S	120.07W
744.00	6.71	253.44	726.78	2.04	84.63 S	120.19W
745.00	6.64	253.39	727.77	2.02	84.66 S	120.30W
746.00	6.58	253.33	728.76	1.99	84.69 S	120.41W
747.00	6.51	253.36	729.76	1.97	84.73 S	120.52W
748.00	6.45	253.39	730.75	1.93	84.76 S	120.63W
749.00	6.39	253.42	731.74	1.90	84.79 S	120.73W
750.00	6.34	253.44	732.74	1.86	84.82 S	120.84W
751.00	6.32	253.45	733.73	1.83	84.85 S	120.95W
752.00	6.30	253.46	734.73	1.80	84.88 S	121.05W
753.00	6.26	253.49	735.72	1.77	84.92 S	121.16W
754.00	6.19	253.55	736.71	1.73	84.95 S	121.26W
755.00	6.13	253.62	737.71	1.70	84.98 S	121.36W
756.00	6.07	253.72	738.70	1.67	85.01 S	121.46W
757.00	6.00	253.84	739.70	1.64	85.04 S	121.56W
758.00	5.94	253.94	740.69	1.62	85.06 S	121.66W
759.00	5.87	254.03	741.69	1.59	85.09 S	121.76W
760.00	5.81	254.08	742.68	1.57	85.12 S	121.86W
761.00	5.75	254.11	743.68	1.56	85.15 S	121.96W
762.00	5.69	254.10	744.67	1.54	85.18 S	122.05W
763.00	5.63	254.01	745.67	1.52	85.20 S	122.15W
764.00	5.57	253.86	746.66	1.51	85.23 S	122.24W
765.00	5.52	253.73	747.66	1.51	85.26 S	122.34W

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BRASKEM  
Well: Mina 19  
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Job Number: BZ0419GVC039

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
766.00	5.47	253.65	748.65	1.54	85.28 S	122.43W
767.00	5.42	253.56	749.65	1.57	85.31 S	122.52W
768.00	5.37	253.50	750.64	1.58	85.34 S	122.61W
769.00	5.32	253.47	751.64	1.57	85.36 S	122.70W
770.00	5.28	253.40	752.63	1.56	85.39 S	122.79W
771.00	5.24	253.33	753.63	1.54	85.42 S	122.87W
772.00	5.20	253.27	754.63	1.52	85.44 S	122.96W
773.00	5.16	253.24	755.62	1.50	85.47 S	123.05W
774.00	5.11	253.27	756.62	1.49	85.49 S	123.13W
775.00	5.07	253.32	757.61	1.47	85.52 S	123.22W
776.00	5.02	253.33	758.61	1.45	85.54 S	123.30W
777.00	4.97	253.30	759.61	1.42	85.57 S	123.39W
778.00	4.93	253.22	760.60	1.40	85.59 S	123.47W
779.00	4.88	253.16	761.60	1.39	85.62 S	123.55W
780.00	4.83	253.11	762.60	1.37	85.64 S	123.63W
781.00	4.78	253.09	763.59	1.36	85.67 S	123.71W
782.00	4.72	253.04	764.59	1.35	85.69 S	123.79W
783.00	4.67	253.05	765.59	1.34	85.72 S	123.87W
784.00	4.62	253.03	766.58	1.33	85.74 S	123.95W
785.00	4.57	253.02	767.58	1.32	85.76 S	124.02W
786.00	4.52	253.03	768.58	1.32	85.79 S	124.10W
787.00	4.48	253.06	769.57	1.31	85.81 S	124.17W
788.00	4.43	253.11	770.57	1.30	85.83 S	124.25W
789.00	4.39	253.20	771.57	1.28	85.85 S	124.32W
790.00	4.35	253.29	772.56	1.27	85.88 S	124.40W
791.00	4.30	253.35	773.56	1.29	85.90 S	124.47W
792.00	4.26	253.43	774.56	1.32	85.92 S	124.54W
793.00	4.23	253.49	775.56	1.36	85.94 S	124.61W
794.00	4.19	253.58	776.55	1.40	85.96 S	124.68W
795.00	4.15	253.70	777.55	1.42	85.98 S	124.75W
796.00	4.11	253.81	778.55	1.41	86.00 S	124.82W
797.00	4.07	253.88	779.55	1.43	86.02 S	124.89W
798.00	4.03	253.95	780.54	1.48	86.04 S	124.96W
799.00	4.00	253.97	781.54	1.53	86.06 S	125.02W
800.00	3.96	253.98	782.54	1.57	86.08 S	125.09W
801.00	3.92	253.96	783.54	1.60	86.10 S	125.16W



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802.00	3.89	253.89	784.53	1.62	86.12 S	125.22 W
803.00	3.85	253.81	785.53	1.61	86.14 S	125.29 W
804.00	3.83	253.77	786.53	1.57	86.15 S	125.35 W
805.00	3.79	253.71	787.53	1.51	86.17 S	125.41 W
806.00	3.73	253.64	788.52	1.45	86.19 S	125.48 W
807.00	3.65	253.55	789.52	1.38	86.21 S	125.54 W
808.00	3.57	253.42	790.52	1.31	86.23 S	125.60 W
809.00	3.48	253.10	791.52	1.24	86.25 S	125.66 W
810.00	3.41	252.61	792.52	1.17	86.26 S	125.72 W
811.00	3.37	252.13	793.51	1.11	86.28 S	125.77 W
812.00	3.30	251.23	794.51	1.04	86.30 S	125.83 W
813.00	3.21	249.98	795.51	1.00	86.32 S	125.88 W
814.00	3.11	249.12	796.51	0.96	86.34 S	125.93 W
815.00	3.02	248.82	797.51	0.94	86.36 S	125.98 W
816.00	2.94	248.78	798.51	0.93	86.38 S	126.03 W
817.00	2.88	248.78	799.51	0.92	86.39 S	126.08 W
818.00	2.85	248.77	800.50	0.91	86.41 S	126.12 W
819.00	2.85	248.81	801.50	0.91	86.43 S	126.17 W
820.00	2.86	248.95	802.50	0.90	86.45 S	126.22 W
821.00	2.88	249.38	803.50	0.86	86.47 S	126.26 W
822.00	2.90	250.35	804.50	0.81	86.48 S	126.31 W
823.00	2.92	251.70	805.50	0.75	86.50 S	126.36 W
824.00	2.95	253.14	806.50	0.70	86.52 S	126.41 W
825.00	2.98	254.20	807.50	0.67	86.53 S	126.46 W
826.00	3.01	254.88	808.49	0.65	86.54 S	126.51 W
827.00	3.03	255.48	809.49	0.65	86.56 S	126.56 W
828.00	3.05	256.15	810.49	0.66	86.57 S	126.61 W
829.00	3.05	256.87	811.49	0.66	86.58 S	126.66 W
830.00	3.05	257.60	812.49	0.65	86.59 S	126.71 W
831.00	3.03	258.33	813.49	0.64	86.61 S	126.77 W
832.00	3.02	258.93	814.49	0.63	86.62 S	126.82 W
833.00	3.01	259.47	815.48	0.63	86.63 S	126.87 W
834.00	3.00	259.96	816.48	0.63	86.63 S	126.92 W
835.00	2.99	260.45	817.48	0.61	86.64 S	126.97 W
836.00	2.98	260.84	818.48	0.58	86.65 S	127.02 W
837.00	2.97	261.14	819.48	0.53	86.66 S	127.07 W

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A Gyrodata Directional Survey

BRASKEM  
Well: Mina 19  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC039

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
838.00	2.97	261.36	820.48	0.46	86.67 S	127.13W
839.00	2.96	261.46	821.48	0.39	86.68 S	127.18W
840.00	2.96	261.43	822.48	0.33	86.68 S	127.23W
841.00	2.96	261.36	823.47	0.31	86.69 S	127.28W
842.00	2.95	261.31	824.47	0.34	86.70 S	127.33W
843.00	2.95	261.27	825.47	0.39	86.71 S	127.38W
844.00	2.95	261.25	826.47	0.44	86.71 S	127.43W
845.00	2.95	261.23	827.47	0.46	86.72 S	127.48W
846.00	2.96	261.20	828.47	0.48	86.73 S	127.53W
847.00	2.96	261.15	829.47	0.50	86.74 S	127.58W
848.00	2.96	261.08	830.46	0.51	86.75 S	127.64W
849.00	2.96	260.97	831.46	0.50	86.75 S	127.69W
850.00	2.95	260.90	832.46	0.48	86.76 S	127.74W
851.00	2.94	260.86	833.46	0.47	86.77 S	127.79W
852.00	2.91	260.80	834.46	0.44	86.78 S	127.84W
853.00	2.87	260.72	835.46	0.41	86.79 S	127.89W
854.00	2.83	260.50	836.46	0.40	86.79 S	127.94W
855.00	2.79	259.70	837.46	0.42	86.80 S	127.99W
856.00	2.75	258.40	838.45	0.44	86.81 S	128.03W
857.00	2.70	257.11	839.45	0.47	86.82 S	128.08W
858.00	2.65	256.36	840.45	0.52	86.83 S	128.12W
859.00	2.61	256.43	841.45	0.58	86.84 S	128.17W
860.00	2.59	256.57	842.45	0.67	86.85 S	128.21W
861.00	2.56	256.78	843.45	0.81	86.87 S	128.26W
862.00	2.53	257.10	844.45	0.98	86.88 S	128.30W
863.00	2.51	257.47	845.45	1.18	86.88 S	128.34W
864.00	2.51	257.76	846.45	1.42	86.89 S	128.39W
865.00	2.52	257.96	847.45	1.62	86.90 S	128.43W
866.00	2.53	258.29	848.44	1.86	86.91 S	128.47W
867.00	2.55	259.04	849.44	1.93	86.92 S	128.52W
868.00	2.56	260.49	850.44	2.08	86.93 S	128.56W
869.00	2.56	262.35	851.44	2.38	86.94 S	128.60W
870.00	2.56	264.22	852.44	3.08	86.94 S	128.65W
871.00	2.56	265.36	853.44	3.24	86.95 S	128.69W
872.00	2.53	265.88	854.44	3.25	86.95 S	128.74W
873.00	2.49	266.31	855.44	3.34	86.95 S	128.78W



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A Gyrodata Directional Survey

BRASKEM  
Well: Mina 19  
Location: RIGLESS, SAL GEMA  
Job Number: BZ0419GVC039

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
874.00	2.43	266.69	856.44	3.42	86.95 S	128.82W
875.00	2.34	267.03	857.44	3.47	86.96 S	128.86W
876.00	2.20	267.82	858.43	3.45	86.96 S	128.90W
877.00	2.04	269.23	859.43	0.00	86.96 S	128.94W
878.00	1.85	271.45	860.43	0.00	86.96 S	128.98W
879.00	1.66	275.41	861.43	0.00	86.96 S	129.01W
880.00	1.46	278.71	862.43	0.00	86.95 S	129.03W
881.00	1.27	285.88	863.43	0.00	86.95 S	129.06W
882.00	1.11	283.30	864.43	0.00	86.94 S	129.08W
883.00	0.98	290.61	865.43	0.00	86.94 S	129.09W
884.00	0.88	311.64	866.43	0.00	86.93 S	129.11W
885.00	0.85	1.75	867.43	0.00	86.92 S	129.11W
886.00	0.71	27.04	868.43	0.00	86.90 S	129.11W
887.00	0.69	36.60	869.43	0.00	86.89 S	129.10W
888.00	0.80	40.72	870.43	0.00	86.88 S	129.10W
889.00	0.92	42.46	871.43	0.00	86.87 S	129.09W
890.00	1.01	41.79	872.43	0.00	86.86 S	129.07W
891.02	1.03	41.51	873.45	0.00	86.85 S	129.06W

Final Station Closure: Distance: 155.56 m Az: 236.06 deg.

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



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## Survey QC - RGS-CT Continuous Specification 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	0.006	0.006	0.006	0.00015	0.00001
Tolerance	<b>0.033</b>	<b>0.033</b>	<b>0.087</b>	<b>0.00591</b>	<b>0.00720</b>

## GYRO VERIFICATION (ADVANCED INITIALISATION)

Gyro Compass Parameter	Gyro noise	dGx	dGy	dmbo	Max corr coef
Standard Deviation	0.026	0.005	0.004	0.000	0.03
Tolerance	<b>0.141</b>	<b>0.033</b>	<b>0.033</b>	<b>0.087</b>	<b>0.44</b>
Initialisation inclination standard deviation					0.08
Initialisation azimuth standard deviation					0.15
Initialisation azimuth uncertainty in percent of error model – Tolerance < 100%					35%

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

G-Total Test Parameter	Mean Gravity Error	Mean Gravity Error Standard Deviation
Error	-0.00001	0.00001
Tolerance	0.00592	0.01980

## 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	From	<b>52.49</b>	To	<b>64.31</b>	In-Spec if +/- 2.5 °C of Calibration

## CONTINUOUS DRIFT CORRECTION

Linear Drift Uncertainty	0.17	Random Walk Uncertainty	0.09
Tolerance	<b>0.46</b>	Tolerance	<b>0.23</b>

### CONTINUOUS MISALIGNMENT CORRECTION

Misalignment Parameter	dMx	dMy	Cross corr coef
Standard Deviation	0.00	0.00	0.57
Tolerance	<b>0.12</b>	<b>0.12</b>	<b>0.70</b>

## DEPTH CONTROL

Wireline Company	FLODIM	Line type	MONO	Encoder SF	-
Max Depth (TD)	670.00		CCL Corrected	YES	
Zero Depth (Rig up)	-1.50		Rezero Depth	-2.77	
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%	<b>100%</b>
Consecutive Interval out of Specification	Tolerance < 100 m (300 ft)	<b>0 meters</b>

## SURVEY RUNNING TIME

SURVEY RUNNING TIME			
Rig up	4/8/2019 01:00:00	Rig down	4/8/2019 00:57:00
Start Inrun	4/8/2019 01:18:00	Field Survey Presented	4/8/2019 00:57:00
End outrun	4/8/2019 03:57:00	Lost Time	N/A
Comments N/A			

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Survey QC - RGS-CT Continuous Specification Sheet		gyrodata
<b>ACCEPTANCE SUMMARY</b>		
	Accept Yes / No	<b>NAME AND DATE</b>
Pre-job calibration verification (roll test)	YES	Click here to enter text.
Gyro Verification (Advanced Initialisation)	YES	
Accelerometer verification (G-Total Test)	YES	
Operating temperature within calibration range (+/- 2.5°)	YES	<b>SIGNATURE</b>
Continuous Drift Correction	YES	Click here to enter text.
Continuous Misalignment Correction	YES	
Depth Control	YES	
Individual Station Report	YES	
<p><b>Note :</b> Any modifications or amendments to this sheet must be reported to the client representative and the Gyrodata survey focal point.</p>		
<hr/> <div><div>SURV-Q163 – Rev 3 - September 2017</div><div>Page 2 of 2 Created: 8-Apr-19 14:04</div><div>BZ0419GVC039</div></div> <hr/>		



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Survey QC – Vertical Continuous Analysis Sheet

gyrodata

SURVEY QUALITY CONTROL – SPECIFICATION DATA

PRE-JOB CALIBRATION VERIFICATION (ROLL TEST)

System Parameter	dGx	dGy	dmbo	Mean Gravity Error	Stdev Gravity Error
Standard Deviation	0.006	0.006	0.006	0.00015	0.00001
Tolerance	0.033	0.033	0.087	0.00591	0.00720

CALIBRATION

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

OPERATING TEMPERATURE

Calibration range	From	30.03	To	120.04	
Gyro operating range for Job	From	52.49	To	64.31	In-Spec If +/- 2.5 °C of Calibration

INCLINATION DIFFERENCE TEST

Chi-square test value	2.6
Tolerance	34.4
Number of overlapping survey stations used	15.0

CO-ORDINATE DIFFERENCE TEST

	North	East	Vertical
Chi-square test value	18.5	5.0	0.4
Tolerance	34.4	34.4	34.4
Number of overlapping survey stations used	15.0	15.0	15.0

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



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6.0 RELATÓRIO CRONOLÓGICO DA OPERAÇÃO

08 de abril de 2019

- 00:20 Chegada da equipe na mina 19
- 00:45 Conexão gyrodata/flodim
- 01:00 Início de corrida mina 19
- 06:00 Desmontagem de equipamentos
- 06:15 Pós calibração

09 de abril de 2019

- 08:00 Aguardando Chamada para mina 28
- 18:00 Desmobilização de equipamentos

10 de abril de 2019

- 13:00 Retorno de equipe gyrodata para Macaé


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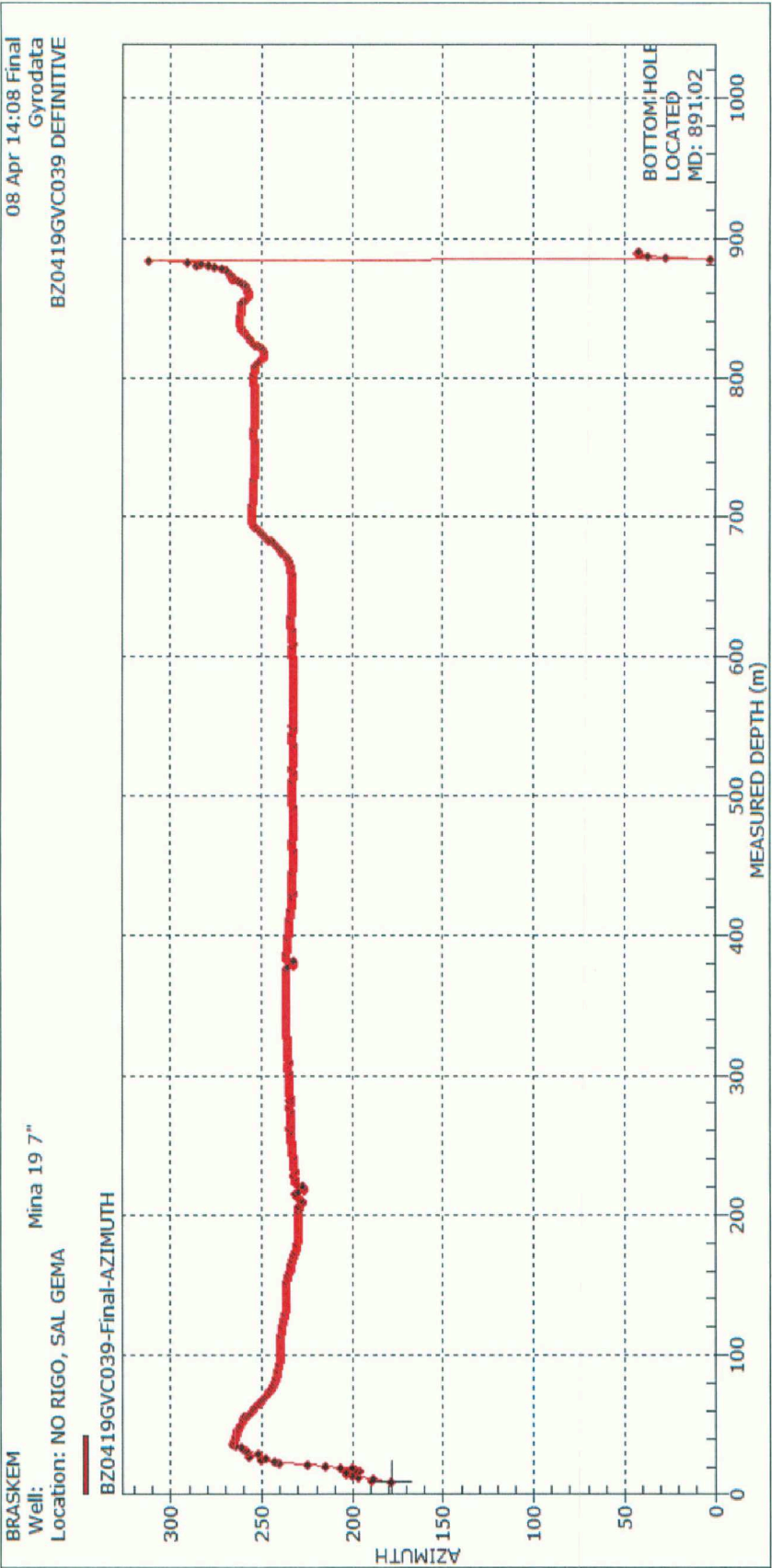
**Parte 7**  
**Gráficos**



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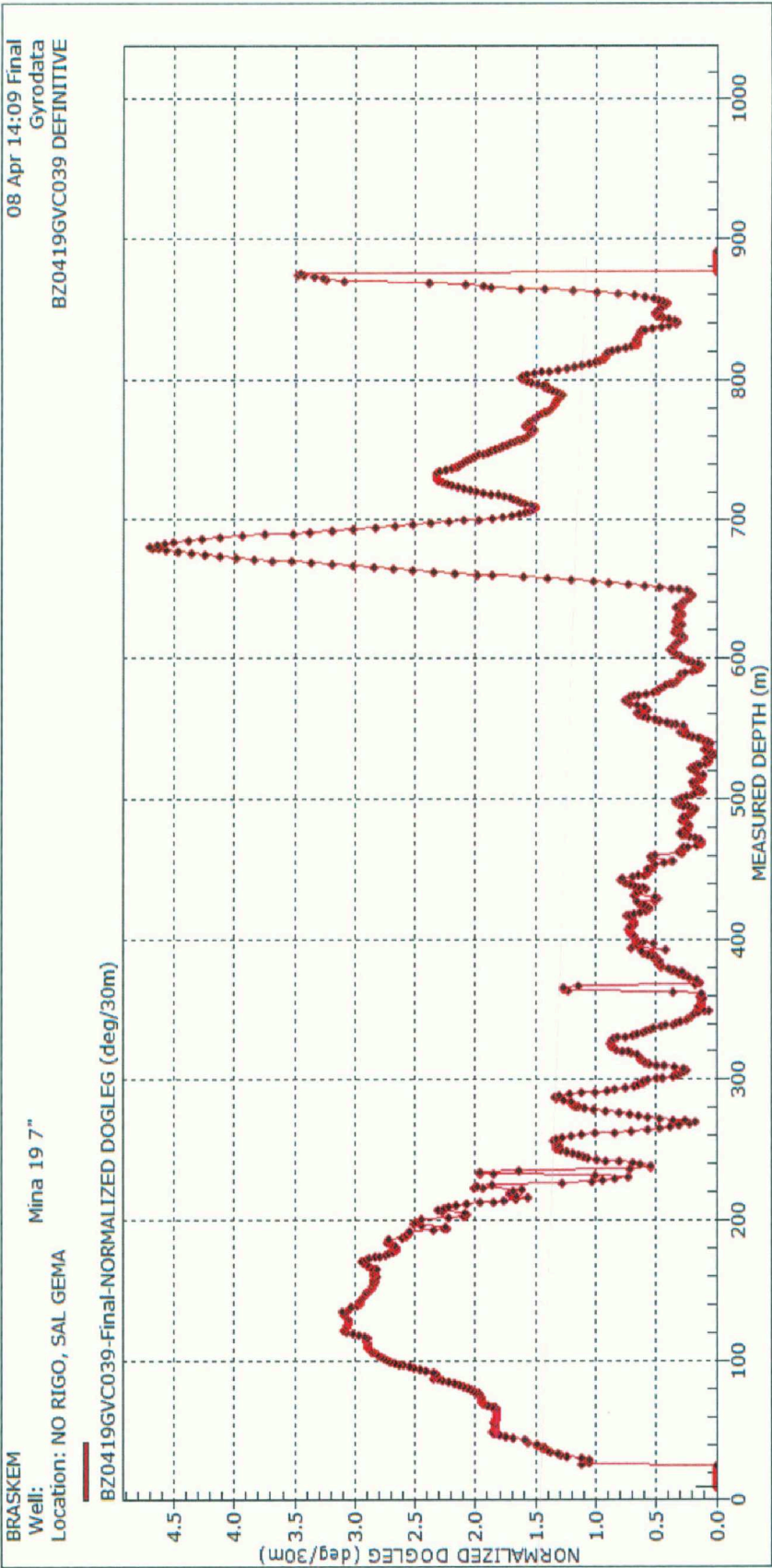


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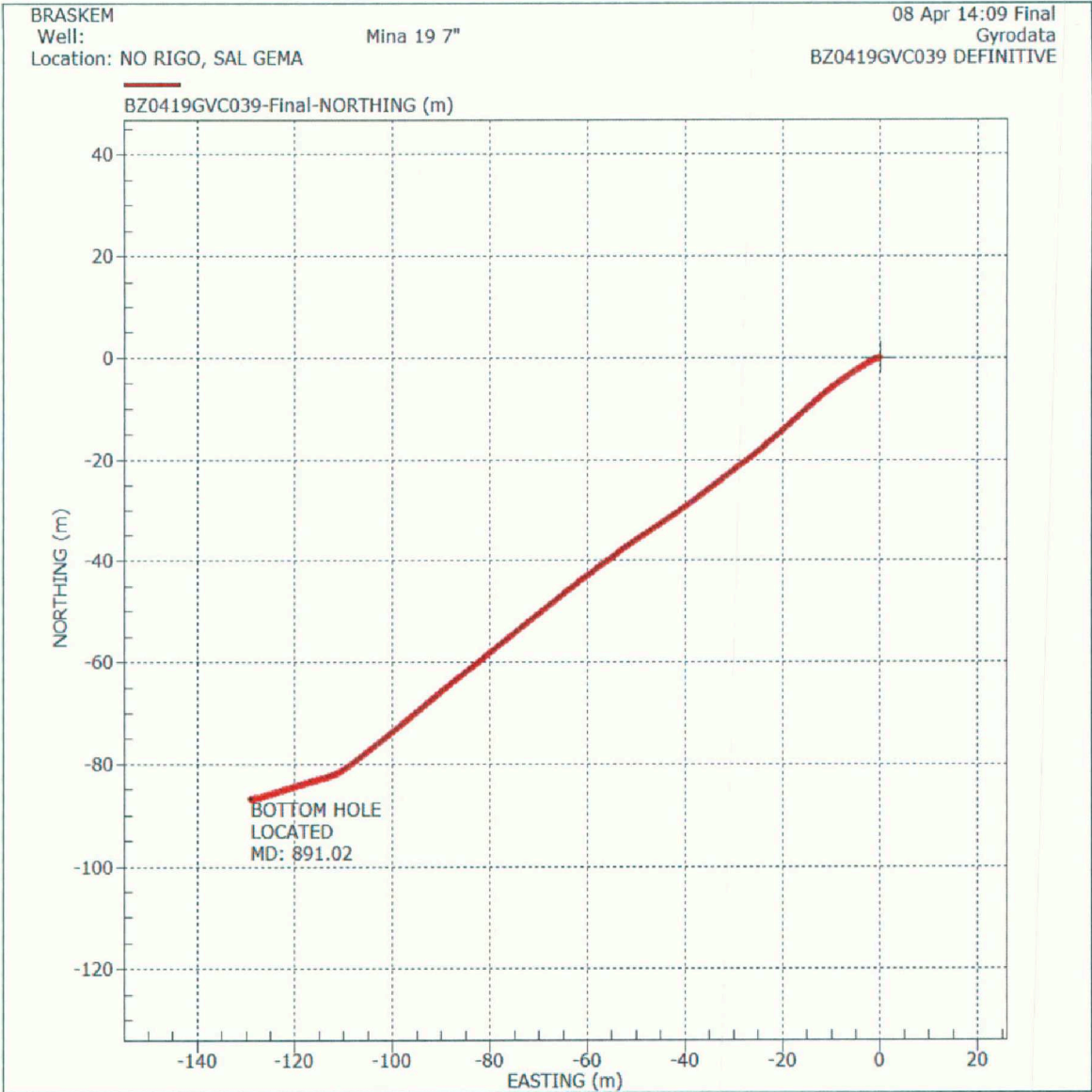




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**Braskem**

Campo: Sal Gema

Poço: Mina 37

Gyro Multshot Contínuo

Data da Amostragem: 30 de Abril de 2019 e 01 de Maio de 2019

**Número de Trabalho: BZ0519GVC044**

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**Parte 1**  
**Discussão**

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**1.0 DISCUSSÃO**

O Giroscópio F0199 foi utilizado para fazer uma amostragem na Mina 37.  
A amostragem foi coletada da superfície até 1172.00m.  
Todas as Profundidades estão referenciadas à mesa rotativa da sonda Great Oil 106.  
A referência ao norte é norte de Grid. -0.46  
Todas as Profundidades foram tomadas do cabo de perfilagem da unidade Flodim.

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