


UNPMAL  
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A Gyrodata Directional Survey

BRASKEM  
Well: MINA #37, LINER 7"  
Location: GREAT OIL 106, SAL GEMA  
Job Number: BZ0519GVC044

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
669.00	20.48	245.98	642.06	0.37	55.19 S	149.78W
670.00	20.48	245.97	642.99	0.10	55.34 S	150.10W
671.00	20.45	245.95	643.93	0.92	55.48 S	150.42W
672.00	20.41	245.96	644.87	1.20	55.62 S	150.73W
673.00	20.39	245.98	645.80	0.64	55.76 S	151.05W
674.00	20.36	245.99	646.74	0.91	55.90 S	151.37W
675.00	20.35	246.01	647.68	0.37	56.05 S	151.69W
676.00	20.34	246.01	648.62	0.30	56.19 S	152.01W
677.00	20.32	246.03	649.55	0.64	56.33 S	152.32W
678.00	20.30	246.04	650.49	0.61	56.47 S	152.64W
679.00	20.27	246.05	651.43	0.91	56.61 S	152.96W
680.00	20.24	246.05	652.37	0.90	56.75 S	153.27W
681.00	20.19	246.05	653.31	1.50	56.89 S	153.59W
682.00	20.13	246.08	654.25	1.83	57.03 S	153.90W
683.00	20.08	246.09	655.18	1.50	57.17 S	154.22W
684.00	20.03	246.14	656.12	1.59	57.31 S	154.53W
685.00	19.99	246.16	657.06	1.22	57.45 S	154.84W
686.00	19.96	246.16	658.00	0.90	57.59 S	155.16W
687.00	19.94	246.18	658.94	0.63	57.72 S	155.47W
688.00	19.93	246.18	659.88	0.30	57.86 S	155.78W
689.00	19.92	246.17	660.82	0.32	58.00 S	156.09W
690.00	19.91	246.18	661.76	0.32	58.14 S	156.40W
691.00	19.90	246.17	662.70	0.32	58.27 S	156.72W
692.00	19.90	246.15	663.64	0.20	58.41 S	157.03W
693.00	19.87	246.15	664.58	0.90	58.55 S	157.34W
694.00	19.85	246.13	665.53	0.63	58.69 S	157.65W
695.00	19.82	246.12	666.47	0.91	58.82 S	157.96W
696.00	19.81	246.10	667.41	0.36	58.96 S	158.27W
697.00	19.81	246.09	668.35	0.10	59.10 S	158.58W
698.00	19.82	246.09	669.29	0.30	59.24 S	158.89W
699.00	19.83	246.08	670.23	0.32	59.37 S	159.20W
700.00	19.83	246.08	671.17	0.00	59.51 S	159.51W
701.00	19.83	246.07	672.11	0.10	59.65 S	159.82W
702.00	19.84	246.04	673.05	0.43	59.79 S	160.13W

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703.00	19.84	246.01	673.99	0.31	59.92 S	160.44 W
704.00	19.83	245.94	674.93	0.77	60.06 S	160.75 W
705.00	19.80	245.92	675.87	0.92	60.20 S	161.06 W
706.00	19.77	245.93	676.81	0.91	60.34 S	161.37 W
707.00	19.74	245.92	677.76	0.91	60.48 S	161.68 W
708.00	19.71	245.93	678.70	0.91	60.61 S	161.98 W
709.00	19.70	245.91	679.64	0.36	60.75 S	162.29 W
710.00	19.67	245.89	680.58	0.92	60.89 S	162.60 W
711.00	19.66	245.91	681.52	0.36	61.03 S	162.91 W
712.00	19.63	245.91	682.46	0.90	61.16 S	163.21 W
713.00	19.60	245.93	683.41	0.92	61.30 S	163.52 W
714.00	19.55	245.97	684.35	1.55	61.44 S	163.83 W
715.00	19.50	246.04	685.29	1.66	61.57 S	164.13 W
716.00	19.43	246.15	686.23	2.37	61.71 S	164.44 W
717.00	19.35	246.24	687.18	2.56	61.84 S	164.74 W
718.00	19.27	246.32	688.12	2.53	61.98 S	165.04 W
719.00	19.21	246.37	689.06	1.87	62.11 S	165.35 W
720.00	19.16	246.41	690.01	1.55	62.24 S	165.65 W
721.00	19.12	246.46	690.95	1.30	62.37 S	165.95 W
722.00	19.10	246.50	691.90	0.72	62.50 S	166.25 W
723.00	19.08	246.52	692.84	0.63	62.63 S	166.55 W
724.00	19.07	246.55	693.79	0.42	62.76 S	166.85 W
725.00	19.06	246.54	694.73	0.32	62.89 S	167.15 W
726.00	19.05	246.53	695.68	0.32	63.02 S	167.45 W
727.00	19.06	246.58	696.62	0.57	63.15 S	167.75 W
728.00	19.06	246.72	697.57	1.37	63.28 S	168.05 W
729.00	19.04	246.84	698.51	1.32	63.41 S	168.35 W
730.00	19.04	246.95	699.46	1.08	63.54 S	168.65 W
731.00	19.01	246.93	700.40	0.92	63.67 S	168.95 W
732.00	19.01	246.92	701.35	0.10	63.79 S	169.24 W
733.00	19.02	246.92	702.30	0.30	63.92 S	169.54 W
734.00	19.03	246.92	703.24	0.30	64.05 S	169.84 W
735.00	19.03	246.90	704.19	0.20	64.18 S	170.14 W
736.00	19.03	246.89	705.13	0.10	64.30 S	170.44 W




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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
737.00	19.02	246.88	706.08	0.32	64.43 S	170.74W
738.00	19.01	246.91	707.02	0.42	64.56 S	171.04W
739.00	18.99	246.90	707.97	0.61	64.69 S	171.34W
740.00	18.96	246.92	708.91	0.92	64.82 S	171.64W
741.00	18.94	246.91	709.86	0.61	64.94 S	171.94W
742.00	18.93	246.92	710.81	0.32	65.07 S	172.24W
743.00	18.92	246.93	711.75	0.32	65.20 S	172.54W
744.00	18.92	246.94	712.70	0.10	65.32 S	172.84W
745.00	18.93	246.93	713.64	0.32	65.45 S	173.13W
746.00	18.94	246.94	714.59	0.32	65.58 S	173.43W
747.00	18.95	246.94	715.53	0.30	65.71 S	173.73W
748.00	18.97	246.94	716.48	0.60	65.83 S	174.03W
749.00	18.98	246.96	717.43	0.36	65.96 S	174.33W
750.00	18.99	246.97	718.37	0.32	66.09 S	174.63W
751.00	19.00	247.01	719.32	0.49	66.21 S	174.93W
752.00	19.02	247.02	720.26	0.61	66.34 S	175.23W
753.00	19.01	247.01	721.21	0.32	66.47 S	175.53W
754.00	19.00	247.03	722.15	0.36	66.60 S	175.83W
755.00	19.00	247.02	723.10	0.10	66.72 S	176.13W
756.00	19.01	247.07	724.04	0.57	66.85 S	176.43W
757.00	19.04	247.05	724.99	0.92	66.98 S	176.73W
758.00	19.06	247.04	725.94	0.61	67.10 S	177.03W
759.00	19.08	247.04	726.88	0.60	67.23 S	177.33W
760.00	19.10	247.03	727.83	0.61	67.36 S	177.63W
761.00	19.12	247.05	728.77	0.63	67.49 S	177.93W
762.00	19.14	247.06	729.72	0.61	67.62 S	178.23W
763.00	19.17	247.11	730.66	1.03	67.74 S	178.54W
764.00	19.17	247.17	731.60	0.59	67.87 S	178.84W
765.00	19.17	247.22	732.55	0.49	68.00 S	179.14W
766.00	19.16	247.26	733.49	0.50	68.12 S	179.44W
767.00	19.15	247.24	734.44	0.36	68.25 S	179.75W
768.00	19.16	247.24	735.38	0.30	68.38 S	180.05W
769.00	19.18	247.24	736.33	0.60	68.51 S	180.35W
770.00	19.18	247.23	737.27	0.10	68.63 S	180.66W
771.00	19.19	247.25	738.22	0.36	68.76 S	180.96W

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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
772.00	19.18	247.25	739.16	0.30	68.89 S	181.26W
773.00	19.16	247.27	740.11	0.63	69.01 S	181.56W
774.00	19.14	247.30	741.05	0.67	69.14 S	181.87W
775.00	19.09	247.34	741.99	1.55	69.27 S	182.17W
776.00	19.03	247.39	742.94	1.87	69.39 S	182.47W
777.00	18.99	247.43	743.89	1.26	69.52 S	182.77W
778.00	18.95	247.45	744.83	1.22	69.64 S	183.07W
779.00	18.94	247.51	745.78	0.66	69.77 S	183.37W
780.00	18.90	247.57	746.72	1.33	69.89 S	183.67W
781.00	18.88	247.60	747.67	0.67	70.01 S	183.97W
782.00	18.86	247.59	748.62	0.61	70.14 S	184.27W
783.00	18.85	247.54	749.56	0.57	70.26 S	184.57W
784.00	18.86	247.48	750.51	0.65	70.38 S	184.87W
785.00	18.86	247.47	751.45	0.10	70.51 S	185.17W
786.00	18.86	247.45	752.40	0.19	70.63 S	185.46W
787.00	18.85	247.45	753.35	0.30	70.76 S	185.76W
788.00	18.82	247.41	754.29	0.98	70.88 S	186.06W
789.00	18.78	247.36	755.24	1.29	71.00 S	186.36W
790.00	18.75	247.30	756.19	1.07	71.13 S	186.65W
791.00	18.73	247.27	757.13	0.67	71.25 S	186.95W
792.00	18.71	247.27	758.08	0.60	71.38 S	187.25W
793.00	18.71	247.25	759.03	0.19	71.50 S	187.54W
794.00	18.72	247.21	759.98	0.49	71.62 S	187.84W
795.00	18.73	247.21	760.92	0.30	71.75 S	188.13W
796.00	18.74	247.17	761.87	0.49	71.87 S	188.43W
797.00	18.75	247.16	762.82	0.32	72.00 S	188.73W
798.00	18.77	247.15	763.76	0.61	72.12 S	189.02W
799.00	18.79	247.09	764.71	0.83	72.25 S	189.32W
800.00	18.78	247.14	765.66	0.57	72.37 S	189.62W
801.00	18.76	247.20	766.60	0.83	72.50 S	189.91W
802.00	18.74	247.24	767.55	0.71	72.62 S	190.21W
803.00	18.75	247.27	768.50	0.42	72.75 S	190.51W
804.00	18.77	247.20	769.44	0.90	72.87 S	190.80W
805.00	18.79	247.15	770.39	0.77	73.00 S	191.10W



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MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
806.00	18.81	247.13	771.34	0.63	73.12 S	191.40W
807.00	18.82	247.08	772.28	0.57	73.25 S	191.69W
808.00	18.84	247.04	773.23	0.71	73.37 S	191.99W
809.00	18.85	247.02	774.18	0.36	73.50 S	192.29W
810.00	18.85	246.99	775.12	0.29	73.62 S	192.59W
811.00	18.85	247.04	776.07	0.48	73.75 S	192.88W
812.00	18.84	247.05	777.02	0.32	73.88 S	193.18W
813.00	18.82	247.07	777.96	0.63	74.00 S	193.48W
814.00	18.81	247.06	778.91	0.32	74.13 S	193.77W
815.00	18.81	247.02	779.86	0.39	74.25 S	194.07W
816.00	18.82	247.03	780.80	0.32	74.38 S	194.37W
817.00	18.82	247.03	781.75	0.00	74.51 S	194.67W
818.00	18.83	247.05	782.70	0.36	74.63 S	194.96W
819.00	18.84	247.06	783.64	0.32	74.76 S	195.26W
820.00	18.85	247.06	784.59	0.30	74.88 S	195.56W
821.00	18.85	247.06	785.53	0.00	75.01 S	195.85W
822.00	18.85	247.06	786.48	0.00	75.14 S	196.15W
823.00	18.84	247.06	787.43	0.30	75.26 S	196.45W
824.00	18.83	247.03	788.37	0.42	75.39 S	196.75W
825.00	18.80	247.02	789.32	0.91	75.51 S	197.04W
826.00	18.78	246.96	790.27	0.83	75.64 S	197.34W
827.00	18.76	246.96	791.21	0.60	75.76 S	197.64W
828.00	18.76	246.93	792.16	0.29	75.89 S	197.93W
829.00	18.76	246.90	793.11	0.29	76.02 S	198.23W
830.00	18.74	246.89	794.05	0.61	76.14 S	198.52W
831.00	18.73	246.88	795.00	0.32	76.27 S	198.82W
832.00	18.72	246.87	795.95	0.32	76.40 S	199.11W
833.00	18.70	246.88	796.90	0.61	76.52 S	199.41W
834.00	18.65	246.87	797.84	1.50	76.65 S	199.70W
835.00	18.62	246.86	798.79	0.91	76.77 S	200.00W
836.00	18.59	246.84	799.74	0.92	76.90 S	200.29W
837.00	18.55	246.76	800.69	1.42	77.02 S	200.58W
838.00	18.53	246.68	801.63	0.97	77.15 S	200.88W
839.00	18.49	246.62	802.58	1.33	77.27 S	201.17W

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840.00	18.45	246.61	803.53	1.20	77.40 S	201.46 W
841.00	18.43	246.62	804.48	0.61	77.53 S	201.75 W
842.00	18.42	246.61	805.43	0.31	77.65 S	202.04 W
843.00	18.41	246.61	806.38	0.30	77.78 S	202.33 W
844.00	18.41	246.59	807.33	0.19	77.90 S	202.62 W
845.00	18.39	246.60	808.28	0.61	78.03 S	202.91 W
846.00	18.39	246.61	809.22	0.09	78.15 S	203.20 W
847.00	18.38	246.64	810.17	0.41	78.28 S	203.49 W
848.00	18.38	246.66	811.12	0.19	78.40 S	203.78 W
849.00	18.39	246.69	812.07	0.41	78.53 S	204.07 W
850.00	18.40	246.76	813.02	0.73	78.65 S	204.36 W
851.00	18.40	246.75	813.97	0.09	78.78 S	204.65 W
852.00	18.40	246.76	814.92	0.09	78.90 S	204.94 W
853.00	18.41	246.76	815.87	0.30	79.03 S	205.23 W
854.00	18.42	246.73	816.82	0.41	79.15 S	205.52 W
855.00	18.44	246.74	817.76	0.61	79.28 S	205.81 W
856.00	18.45	246.75	818.71	0.31	79.40 S	206.10 W
857.00	18.47	246.74	819.66	0.61	79.53 S	206.39 W
858.00	18.48	246.75	820.61	0.31	79.65 S	206.68 W
859.00	18.51	246.77	821.56	0.92	79.78 S	206.97 W
860.00	18.49	246.78	822.51	0.61	79.90 S	207.26 W
861.00	18.48	246.82	823.45	0.48	80.03 S	207.55 W
862.00	18.47	246.83	824.40	0.31	80.15 S	207.85 W
863.00	18.46	246.83	825.35	0.30	80.28 S	208.14 W
864.00	18.49	246.88	826.30	1.02	80.40 S	208.43 W
865.00	18.53	246.91	827.25	1.23	80.52 S	208.72 W
866.00	18.55	246.91	828.20	0.60	80.65 S	209.01 W
867.00	18.57	246.91	829.14	0.60	80.77 S	209.31 W
868.00	18.58	246.91	830.09	0.30	80.90 S	209.60 W
869.00	18.60	246.93	831.04	0.63	81.02 S	209.89 W
870.00	18.60	246.96	831.99	0.29	81.15 S	210.19 W
871.00	18.59	247.00	832.94	0.49	81.27 S	210.48 W
872.00	18.58	247.05	833.88	0.56	81.40 S	210.77 W
873.00	18.57	247.02	834.83	0.41	81.52 S	211.07 W




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874.00	18.56	247.02	835.78	0.30	81.65 S	211.36 W
875.00	18.55	247.02	836.73	0.30	81.77 S	211.65 W
876.00	18.55	247.06	837.68	0.38	81.90 S	211.94 W
877.00	18.55	247.10	838.62	0.38	82.02 S	212.24 W
878.00	18.56	247.13	839.57	0.41	82.14 S	212.53 W
879.00	18.57	247.15	840.52	0.36	82.27 S	212.82 W
880.00	18.58	247.17	841.47	0.36	82.39 S	213.12 W
881.00	18.59	247.23	842.42	0.65	82.51 S	213.41 W
882.00	18.59	247.27	843.36	0.38	82.64 S	213.71 W
883.00	18.61	247.35	844.31	0.97	82.76 S	214.00 W
884.00	18.61	247.38	845.26	0.29	82.88 S	214.29 W
885.00	18.61	247.42	846.21	0.38	83.01 S	214.59 W
886.00	18.61	247.43	847.15	0.10	83.13 S	214.88 W
887.00	18.61	247.51	848.10	0.77	83.25 S	215.18 W
888.00	18.63	247.57	849.05	0.83	83.37 S	215.47 W
889.00	18.65	247.65	850.00	0.97	83.49 S	215.77 W
890.00	18.67	247.73	850.94	0.97	83.62 S	216.06 W
891.00	18.68	247.80	851.89	0.74	83.74 S	216.36 W
892.00	18.68	247.89	852.84	0.86	83.86 S	216.66 W
893.00	18.68	247.97	853.79	0.77	83.98 S	216.95 W
894.00	18.68	248.03	854.73	0.58	84.10 S	217.25 W
895.00	18.69	248.09	855.68	0.65	84.22 S	217.55 W
896.00	18.70	248.17	856.63	0.83	84.34 S	217.85 W
897.00	18.71	248.26	857.58	0.92	84.46 S	218.14 W
898.00	18.71	248.34	858.52	0.77	84.57 S	218.44 W
899.00	18.69	248.41	859.47	0.90	84.69 S	218.74 W
900.00	18.68	248.45	860.42	0.49	84.81 S	219.04 W
901.00	18.67	248.49	861.36	0.49	84.93 S	219.34 W
902.00	18.65	248.54	862.31	0.77	85.04 S	219.63 W
903.00	18.64	248.58	863.26	0.49	85.16 S	219.93 W
904.00	18.61	248.63	864.21	1.02	85.28 S	220.23 W
905.00	18.57	248.68	865.16	1.29	85.39 S	220.53 W
906.00	18.55	248.85	866.10	1.73	85.51 S	220.82 W
907.00	18.51	249.05	867.05	2.25	85.62 S	221.12 W

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A Gyrodata Directional Survey

BRASKEM  
Well: MINA #37, LINER 7"  
Location: GREAT OIL 106, SAL GEMA  
Job Number: BZ0519GVC044

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
908.00	18.47	249.26	868.00	2.33	85.74 S	221.42W
909.00	18.44	249.43	868.95	1.85	85.85 S	221.71W
910.00	18.40	249.51	869.90	1.42	85.96 S	222.01W
911.00	18.36	249.57	870.85	1.33	86.07 S	222.30W
912.00	18.33	249.62	871.80	1.02	86.18 S	222.60W
913.00	18.31	249.67	872.74	0.76	86.29 S	222.89W
914.00	18.28	249.71	873.69	0.98	86.40 S	223.19W
915.00	18.25	249.75	874.64	0.98	86.51 S	223.48W
916.00	18.21	249.82	875.59	1.37	86.61 S	223.77W
917.00	18.17	249.93	876.54	1.58	86.72 S	224.07W
918.00	18.14	250.08	877.49	1.67	86.83 S	224.36W
919.00	18.12	250.22	878.44	1.44	86.93 S	224.65W
920.00	18.10	250.37	879.39	1.52	87.04 S	224.95W
921.00	18.07	250.37	880.34	0.90	87.14 S	225.24W
922.00	18.04	250.44	881.30	1.11	87.25 S	225.53W
923.00	18.01	250.46	882.25	0.92	87.35 S	225.82W
924.00	18.01	250.54	883.20	0.74	87.45 S	226.11W
925.00	18.00	250.59	884.15	0.55	87.56 S	226.40W
926.00	18.00	250.67	885.10	0.74	87.66 S	226.70W
927.00	17.99	250.75	886.05	0.80	87.76 S	226.99W
928.00	17.98	250.80	887.00	0.55	87.86 S	227.28W
929.00	17.98	250.84	887.95	0.37	87.96 S	227.57W
930.00	17.98	250.87	888.90	0.28	88.07 S	227.86W
931.00	17.98	250.85	889.86	0.19	88.17 S	228.15W
932.00	17.96	250.89	890.81	0.71	88.27 S	228.45W
933.00	17.93	250.94	891.76	1.01	88.37 S	228.74W
934.00	17.90	250.98	892.71	0.97	88.47 S	229.03W
935.00	17.88	251.02	893.66	0.70	88.57 S	229.32W
936.00	17.88	251.02	894.61	0.00	88.67 S	229.61W
937.00	17.86	251.04	895.56	0.63	88.77 S	229.90W
938.00	17.86	251.05	896.52	0.09	88.87 S	230.19W
939.00	17.84	251.08	897.47	0.66	88.97 S	230.48W
940.00	17.82	251.09	898.42	0.61	89.07 S	230.77W
941.00	17.79	251.10	899.37	0.90	89.17 S	231.06W



A Gyrodata Directional Survey

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BRASKEM  
Well: MINA #37, LINER 7"  
Location: GREAT OIL 106, SAL GEMA  
Job Number: BZ0519GVC044

MEASURED INCL	AZIMUTH	VERTICAL	DOGLEG	HORIZONTAL
DEPTH		DEPTH	SEVERITY	COORDINATES
meters	deg.	meters	deg/30m	meters
942.00	17.75	900.32	1.20	89.26 S 231.35W
943.00	17.71	901.28	1.20	89.36 S 231.63W
944.00	17.66	902.23	1.50	89.46 S 231.92W
945.00	17.63	903.18	0.92	89.56 S 232.21W
946.00	17.59	904.14	1.21	89.66 S 232.49W
947.00	17.57	905.09	0.63	89.76 S 232.78W
948.00	17.55	906.04	0.61	89.85 S 233.07W
949.00	17.54	907.00	0.35	89.95 S 233.35W
950.00	17.53	907.95	0.35	90.05 S 233.64W
951.00	17.52	908.90	0.35	90.15 S 233.92W
952.00	17.52	909.86	0.27	90.25 S 234.21W
953.00	17.52	910.81	0.09	90.34 S 234.49W
954.00	17.51	911.76	1.30	90.44 S 234.77W
955.00	17.47	912.72	1.20	90.54 S 235.06W
956.00	17.42	913.67	1.50	90.64 S 235.34W
957.00	17.37	914.63	2.14	90.73 S 235.63W
958.00	17.36	915.58	1.20	90.83 S 235.91W
959.00	17.37	916.54	0.47	90.93 S 236.19W
960.00	17.39	917.49	0.61	91.03 S 236.47W
961.00	17.40	918.44	0.35	91.12 S 236.75W
962.00	17.41	919.40	0.31	91.22 S 237.04W
963.00	17.41	920.35	0.45	91.32 S 237.32W
964.00	17.40	921.31	0.40	91.42 S 237.60W
965.00	17.39	922.26	0.35	91.52 S 237.88W
966.00	17.37	923.21	0.63	91.62 S 238.16W
967.00	17.38	924.17	0.70	91.72 S 238.45W
968.00	17.39	925.12	0.47	91.82 S 238.73W
969.00	17.39	926.08	0.27	91.91 S 239.01W
970.00	17.40	927.03	0.35	92.01 S 239.29W
971.00	17.39	927.99	0.47	92.11 S 239.58W
972.00	17.39	928.94	0.09	92.21 S 239.86W
973.00	17.38	929.89	0.30	92.31 S 240.14W
974.00	17.39	930.85	0.30	92.41 S 240.42W
975.00	17.39	931.80	0.18	92.50 S 240.70W
976.00	17.40	932.76	0.31	92.60 S 240.99W

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BRASKEM  
Well: MINA #37, LINER 7"  
Location: GREAT OIL 106, SAL GEMA  
Job Number: BZ0519GVC044

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
977.00	17.40	250.75	933.71	0.09	92.70 S	241.27W
978.00	17.39	250.81	934.67	0.62	92.80 S	241.55W
979.00	17.37	250.84	935.62	0.66	92.90 S	241.83W
980.00	17.36	250.85	936.58	0.31	93.00 S	242.12W
981.00	17.35	250.86	937.53	0.31	93.09 S	242.40W
982.00	17.36	250.86	938.48	0.30	93.19 S	242.68W
983.00	17.37	250.90	939.44	0.47	93.29 S	242.96W
984.00	17.38	250.94	940.39	0.47	93.39 S	243.24W
985.00	17.40	250.96	941.35	0.63	93.48 S	243.53W
986.00	17.42	250.96	942.30	0.60	93.58 S	243.81W
987.00	17.44	250.96	943.26	0.60	93.68 S	244.09W
988.00	17.46	250.94	944.21	0.63	93.78 S	244.37W
989.00	17.48	250.92	945.16	0.63	93.88 S	244.66W
990.00	17.50	250.88	946.12	0.70	93.97 S	244.94W
991.00	17.49	250.85	947.07	0.40	94.07 S	245.23W
992.00	17.49	250.79	948.02	0.54	94.17 S	245.51W
993.00	17.49	250.68	948.98	0.99	94.27 S	245.79W
994.00	17.49	250.58	949.93	0.90	94.37 S	246.08W
995.00	17.49	250.49	950.89	0.81	94.47 S	246.36W
996.00	17.50	250.41	951.84	0.78	94.57 S	246.64W
997.00	17.51	250.34	952.79	0.70	94.67 S	246.93W
998.00	17.51	250.22	953.75	1.08	94.77 S	247.21W
999.00	17.50	250.12	954.70	0.95	94.88 S	247.49W
1000.00	17.49	250.00	955.65	1.12	94.98 S	247.78W
1001.00	17.47	249.85	956.61	1.48	95.08 S	248.06W
1002.00	17.43	249.67	957.56	2.02	95.18 S	248.34W
1003.00	17.42	249.51	958.52	1.47	95.29 S	248.62W
1004.00	17.39	249.34	959.47	1.77	95.39 S	248.90W
1005.00	17.36	249.18	960.42	1.69	95.50 S	249.18W
1006.00	17.33	249.02	961.38	1.69	95.61 S	249.46W
1007.00	17.29	248.83	962.33	2.08	95.71 S	249.74W
1008.00	17.27	248.63	963.29	1.88	95.82 S	250.01W
1009.00	17.26	248.47	964.24	1.46	95.93 S	250.29W
1010.00	17.26	248.30	965.20	1.51	96.04 S	250.56W



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BRASKEM  
Well: MINA #37, LINER 7"  
Location: GREAT OIL 106, SAL GEMA  
Job Number: BZ0519GVC044

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
1011.00	17.25	248.14	966.15	1.46	96.15 S	250.84W
1012.00	17.26	247.98	967.11	1.46	96.26 S	251.12W
1013.00	17.26	247.81	968.06	1.51	96.37 S	251.39W
1014.00	17.26	247.65	969.02	1.42	96.48 S	251.66W
1015.00	17.23	247.67	969.97	0.92	96.60 S	251.94W
1016.00	17.19	247.64	970.93	1.23	96.71 S	252.21W
1017.00	17.14	247.62	971.88	1.51	96.82 S	252.49W
1018.00	17.10	247.56	972.84	1.31	96.93 S	252.76W
1019.00	17.09	247.37	973.80	1.70	97.05 S	253.03W
1020.00	17.08	247.27	974.75	0.93	97.16 S	253.30W
1021.00	17.07	247.14	975.71	1.18	97.27 S	253.57W
1022.00	17.04	247.02	976.66	1.39	97.39 S	253.84W
1023.00	17.01	246.91	977.62	1.32	97.50 S	254.11W
1024.00	16.97	246.79	978.58	1.60	97.62 S	254.38W
1025.00	16.92	246.69	979.53	1.74	97.73 S	254.65W
1026.00	16.85	246.60	980.49	2.24	97.85 S	254.91W
1027.00	16.78	246.50	981.45	2.27	97.96 S	255.18W
1028.00	16.72	246.42	982.40	1.93	98.08 S	255.44W
1029.00	16.66	246.34	983.36	1.93	98.19 S	255.71W
1030.00	16.59	246.30	984.32	2.13	98.31 S	255.97W
1031.00	16.53	246.25	985.28	1.85	98.42 S	256.23W
1032.00	16.49	246.20	986.24	1.27	98.54 S	256.49W
1033.00	16.45	246.18	987.20	1.21	98.65 S	256.75W
1034.00	16.41	246.15	988.16	1.23	98.77 S	257.01W
1035.00	16.38	246.13	989.12	0.92	98.88 S	257.27W
1036.00	16.34	246.14	990.08	1.20	98.99 S	257.52W
1037.00	16.29	246.11	991.03	1.52	99.11 S	257.78W
1038.00	16.21	246.09	991.99	2.41	99.22 S	258.04W
1039.00	16.13	246.04	992.96	2.44	99.33 S	258.29W
1040.00	16.06	245.97	993.92	2.18	99.45 S	258.54W
1041.00	16.01	245.92	994.88	1.56	99.56 S	258.80W
1042.00	15.97	245.92	995.84	1.20	99.67 S	259.05W
1043.00	15.92	245.92	996.80	1.50	99.78 S	259.30W
1044.00	15.86	245.92	997.76	1.80	99.90 S	259.55W

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A Gyrodata Directional Survey

BRASKEM  
Well: MINA #37, LINER 7"  
Location: GREAT OIL 106, SAL GEMA  
Job Number: BZ0519GVC044

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
1045.00	15.81	245.91	998.72	1.50	100.01 S	259.80 W
1046.00	15.75	245.91	999.69	1.80	100.12 S	260.05 W
1047.00	15.67	245.91	1000.65	2.40	100.23 S	260.29 W
1048.00	15.59	245.87	1001.61	2.42	100.34 S	260.54 W
1049.00	15.50	245.82	1002.58	2.73	100.45 S	260.78 W
1050.00	15.40	245.80	1003.54	3.00	100.56 S	261.03 W
1051.00	15.28	245.78	1004.50	3.60	100.67 S	261.27 W
1052.00	15.17	245.82	1005.47	3.32	100.77 S	261.51 W
1053.00	15.05	245.84	1006.43	3.60	100.88 S	261.75 W
1054.00	14.96	245.82	1007.40	2.70	100.99 S	261.98 W
1055.00	14.87	245.81	1008.37	2.70	101.09 S	262.22 W
1056.00	14.79	245.78	1009.33	2.41	101.20 S	262.45 W
1057.00	14.71	245.76	1010.30	2.40	101.30 S	262.68 W
1058.00	14.64	245.74	1011.27	2.11	101.40 S	262.91 W
1059.00	14.57	245.71	1012.23	2.11	101.51 S	263.14 W
1060.00	14.49	245.67	1013.20	2.42	101.61 S	263.37 W
1061.00	14.41	245.63	1014.17	2.42	101.71 S	263.60 W
1062.00	14.33	245.61	1015.14	2.40	101.82 S	263.82 W
1063.00	14.24	245.61	1016.11	2.70	101.92 S	264.05 W
1064.00	14.17	245.61	1017.08	2.10	102.02 S	264.27 W
1065.00	14.12	245.61	1018.05	1.50	102.12 S	264.50 W
1066.00	14.08	245.62	1019.02	1.20	102.22 S	264.72 W
1067.00	14.04	245.62	1019.99	1.20	102.32 S	264.94 W
1068.00	14.01	245.63	1020.96	0.90	102.42 S	265.16 W
1069.00	13.97	245.61	1021.93	1.21	102.52 S	265.38 W
1070.00	13.94	245.63	1022.90	0.91	102.62 S	265.60 W
1071.00	13.91	245.58	1023.87	0.97	102.72 S	265.82 W
1072.00	13.86	245.60	1024.84	1.51	102.82 S	266.04 W
1073.00	13.81	245.55	1025.81	1.54	102.92 S	266.25 W
1074.00	13.76	245.49	1026.78	1.56	103.02 S	266.47 W
1075.00	13.71	245.50	1027.75	1.50	103.12 S	266.69 W
1076.00	13.67	245.45	1028.73	1.25	103.21 S	266.90 W
1077.00	13.63	245.45	1029.70	1.20	103.31 S	267.12 W
1078.00	13.58	245.43	1030.67	1.51	103.41 S	267.33 W




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A Gyrodata Directional Survey

BRASKEM  
Well: MINA #37, LINER 7"  
Location: GREAT OIL 106, SAL GEMA  
Job Number: BZ0519GVC044

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEGG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
1079.00	13.53	245.43	1031.64	1.50	103.51 S	267.54W
1080.00	13.48	245.40	1032.61	1.51	103.60 S	267.76W
1081.00	13.41	245.41	1033.59	2.10	103.70 S	267.97W
1082.00	13.36	245.42	1034.56	1.50	103.80 S	268.18W
1083.00	13.31	245.42	1035.53	1.50	103.89 S	268.39W
1084.00	13.27	245.39	1036.51	1.22	103.99 S	268.60W
1085.00	13.24	245.26	1037.48	1.27	104.09 S	268.81W
1086.00	13.21	245.11	1038.45	1.37	104.18 S	269.01W
1087.00	13.17	245.02	1039.43	1.35	104.28 S	269.22W
1088.00	13.15	245.00	1040.40	0.62	104.37 S	269.43W
1089.00	13.13	245.00	1041.37	0.60	104.47 S	269.63W
1090.00	13.11	245.01	1042.35	0.60	104.57 S	269.84W
1091.00	13.10	245.01	1043.32	0.30	104.66 S	270.04W
1092.00	13.09	244.99	1044.30	0.33	104.76 S	270.25W
1093.00	13.08	244.94	1045.27	0.45	104.85 S	270.45W
1094.00	13.07	244.89	1046.24	0.45	104.95 S	270.66W
1095.00	13.07	244.87	1047.22	0.14	105.04 S	270.86W
1096.00	13.07	244.81	1048.19	0.41	105.14 S	271.07W
1097.00	13.06	244.83	1049.17	0.33	105.24 S	271.27W
1098.00	13.06	244.91	1050.14	0.54	105.33 S	271.48W
1099.00	13.05	245.01	1051.11	0.74	105.43 S	271.68W
1100.00	13.06	245.07	1052.09	0.51	105.52 S	271.89W
1101.00	13.06	245.11	1053.06	0.27	105.62 S	272.09W
1102.00	13.07	245.09	1054.04	0.33	105.71 S	272.30W
1103.00	13.07	245.10	1055.01	0.07	105.81 S	272.50W
1104.00	13.06	245.11	1055.98	0.31	105.90 S	272.71W
1105.00	13.02	245.14	1056.96	1.22	106.00 S	272.91W
1106.00	12.98	245.18	1057.93	1.23	106.09 S	273.12W
1107.00	12.94	245.34	1058.91	1.61	106.19 S	273.32W
1108.00	12.91	245.50	1059.88	1.40	106.28 S	273.52W
1109.00	12.89	245.65	1060.86	1.17	106.37 S	273.73W
1110.00	12.88	245.76	1061.83	0.79	106.47 S	273.93W
1111.00	12.83	245.76	1062.81	1.50	106.56 S	274.13W
1112.00	12.80	245.75	1063.78	0.90	106.65 S	274.34W

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A Gyrodata Directional Survey

BRASKEM  
Well: MINA #37, LINER 7"  
Location: GREAT OIL 106, SAL GEMA  
Job Number: BZ0519GVC044

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
1113.00	12.76	245.72	1064.76	1.22	106.74 S	274.54W
1114.00	12.73	245.65	1065.73	1.01	106.83 S	274.74W
1115.00	12.70	245.56	1066.71	1.08	106.92 S	274.94W
1116.00	12.66	245.51	1067.68	1.24	107.01 S	275.14W
1117.00	12.62	245.49	1068.66	1.21	107.10 S	275.34W
1118.00	12.59	245.50	1069.64	0.90	107.19 S	275.54W
1119.00	12.54	245.51	1070.61	1.50	107.28 S	275.73W
1120.00	12.50	245.50	1071.59	1.20	107.37 S	275.93W
1121.00	12.46	245.51	1072.56	1.20	107.46 S	276.13W
1122.00	12.41	245.55	1073.54	1.52	107.55 S	276.32W
1123.00	12.35	245.64	1074.52	1.89	107.64 S	276.52W
1124.00	12.30	245.78	1075.49	1.75	107.73 S	276.71W
1125.00	12.24	245.93	1076.47	2.04	107.81 S	276.91W
1126.00	12.17	246.09	1077.45	2.33	107.90 S	277.10W
1127.00	12.11	246.22	1078.43	1.98	107.99 S	277.29W
1128.00	12.05	246.33	1079.40	1.93	108.07 S	277.48W
1129.00	11.98	246.43	1080.38	2.19	108.15 S	277.68W
1130.00	11.90	246.54	1081.36	2.50	108.24 S	277.87W
1131.00	11.78	246.75	1082.34	3.83	108.32 S	278.05W
1132.00	11.66	247.07	1083.32	4.09	108.40 S	278.24W
1133.00	11.52	247.48	1084.30	4.87	108.47 S	278.43W
1134.00	11.38	247.94	1085.28	5.01	108.55 S	278.61W
1135.00	11.28	248.33	1086.26	3.78	108.62 S	278.79W
1136.00	11.18	248.64	1087.24	3.50	108.69 S	278.97W
1137.00	11.10	248.89	1088.22	2.80	108.76 S	279.15W
1138.00	11.02	249.08	1089.20	2.64	108.83 S	279.33W
1139.00	10.96	249.22	1090.18	1.97	108.90 S	279.51W
1140.00	10.92	249.34	1091.17	1.38	108.97 S	279.69W
1141.00	10.89	249.42	1092.15	1.01	109.03 S	279.86W
1142.00	10.85	249.51	1093.13	1.30	109.10 S	280.04W
1143.00	10.84	249.60	1094.11	0.59	109.17 S	280.22W
1144.00	10.81	249.69	1095.09	1.03	109.23 S	280.39W
1145.00	10.78	249.69	1096.08	0.90	109.30 S	280.57W
1146.00	10.77	249.67	1097.06	0.32	109.36 S	280.74W




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A Gyrodata Directional Survey

BRASKEM  
Well: MINA #37, LINER 7"  
Location: GREAT OIL 106, SAL GEMA  
Job Number: BZ0519GVC044

MEASURED DEPTH meters	INCL deg.	AZIMUTH deg.	VERTICAL DEPTH meters	DOGLEG SEVERITY deg/30m	HORIZONTAL COORDINATES meters	
1147.00	10.75	249.55	1098.04	0.90	109.43 S	280.92W
1148.00	10.74	249.52	1099.02	0.34	109.49 S	281.09W
1149.00	10.72	249.58	1100.01	0.69	109.56 S	281.27W
1150.00	10.71	249.70	1100.99	0.73	109.62 S	281.44W
1151.00	10.68	249.77	1101.97	0.98	109.69 S	281.62W
1152.00	10.65	249.83	1102.95	0.96	109.75 S	281.79W
1153.00	10.60	249.87	1103.94	1.52	109.81 S	281.96W
1154.00	10.56	249.88	1104.92	1.20	109.88 S	282.14W
1155.00	10.52	249.86	1105.90	1.21	109.94 S	282.31W
1156.00	10.48	249.81	1106.89	1.23	110.00 S	282.48W
1157.00	10.44	249.72	1107.87	1.30	110.07 S	282.65W
1158.00	10.40	249.63	1108.85	1.30	110.13 S	282.82W
1159.00	10.37	249.67	1109.84	0.93	110.19 S	282.99W
1160.00	10.34	249.76	1110.82	1.02	110.25 S	283.16W
1161.00	10.31	249.91	1111.80	1.21	110.31 S	283.32W
1162.00	10.29	250.05	1112.79	0.96	110.38 S	283.49W
1163.00	10.28	250.08	1113.77	0.34	110.44 S	283.66W
1164.00	10.27	250.09	1114.76	0.30	110.50 S	283.83W
1165.00	10.26	250.08	1115.74	0.30	110.56 S	284.00W
1166.00	10.23	250.07	1116.72	0.90	110.62 S	284.16W
1167.00	10.19	250.21	1117.71	1.41	110.68 S	284.33W
1168.00	10.13	250.14	1118.69	1.84	110.74 S	284.50W
1169.00	10.10	249.98	1119.68	1.23	110.80 S	284.66W
1170.00	10.08	249.78	1120.66	1.21	110.86 S	284.83W
1171.00	10.07	249.52	1121.65	1.40	110.92 S	284.99W
1172.00	10.04	249.48	1122.63	0.92	110.98 S	285.15W

Final Station Closure: Distance: 305.99 m Az: 248.73 deg.

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



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Survey QC - RGS-CT Continuous Specification Sheet	gyrodata
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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	0.008	0.008	0.008	-0.00030	0.00003
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	0.017	0.004	0.003	0.000	0.20
Tolerance	0.141	0.033	0.033	0.087	0.43
Initialisation inclination standard deviation					0.08
Initialisation azimuth standard deviation					0.21
Initialisation azimuth uncertainty in percent of error model - Tolerance < 100%					36%

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

G-Total Test Parameter	Mean Gravity Error	Mean Gravity Error Standard Deviation
Error	0.00108	0.00001
Tolerance	0.00592	0.01809

CALIBRATION

Tool Number	F0199	Calibration Date	30 Jul 2014
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OPERATING TEMPERATURE

Calibration range	From	49.99	To	119.77	
Gyro operating range	From	61.67	To	69.53	In-Spec if +/- 2.5 °C of Calibration

CONTINUOUS DRIFT CORRECTION

Linear Drift Uncertainty	0.21	Random Walk Uncertainty	0.02
Tolerance	0.46	Tolerance	0.23

CONTINUOUS MISALIGNMENT CORRECTION

Misalignment Parameter	dMx	dMy	Cross corr coef
Standard Deviation	0.00	0.00	0.03
Tolerance	0.12	0.12	0.70

DEPTH CONTROL

Wireline Company		Line type		Encoder SF	
Max Depth (TD)		CCL Corrected			
Zero Depth (Rig up)		Rezero Depth			
Given pup joint depth		Measured PJ			
Stretch cor. At TD divided by TD/1000					Spec' - 1.5/1000
Dif. Between rigup and rezero depths divided by TD/1000					Spec' - 2.0/1000
Dif. Between given and meas depth divided by meas/1000					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		Rig down	
Start Inrun		Field Survey Presented	
End outrun		Lost Time	
Comments			



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Survey QC - RGS-CT Continuous Specification Sheet	
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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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Survey QC – Vertical Continuous Analysis Sheet	gyrodata
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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	0.008	0.008	0.008	-0.00030	0.00003
Tolerance	0.033	0.033	0.087	0.00591	0.00720

CALIBRATION

Tool Number	F0199	Calibration Date	30 Jul 2014
-------------	-------	------------------	-------------

OPERATING TEMPERATURE

Calibration range	From	49.99	To	119.77	
Gyro operating range for Job	From	61.67	To	69.53	In-Spec if +/- 2.5 °C of Calibration

INCLINATION DIFFERENCE TEST

Chi-square test value	0.7
Tolerance	34.4
Number of overlapping survey stations used	15

CO-ORDINATE DIFFERENCE TEST

	North	East	Vertical
Chi-square test value	4.6	4.5	1.0
Tolerance	34.4	34.4	34.4
Number of overlapping survey stations used	15	15	15

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



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[assinatura]

## 6.0 RELATÓRIO CRONOLÓGICO DA OPERAÇÃO

### 30 de abril de 2019

16:00 Chegada na braskem;  
16:30 Montagem de ferramenta;  
17:30 Testando ferramenta;  
19:20 Chegada na sonda Great Oil 106;  
20:00 RigUp  
20:45 Fazendo o zero e inicio de corrida;  
22:40 Ferramenta no fundo.

### 01 de maio de 2019

00:55 Fazendo Re-zero e inicio do RigDown;  
01:20 Final do RigDown;  
01:50 Saindo do poço  
08:00 Stand By aguardando chamada para o trabalho na mina 13

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**Parte 7**  
**Gráficos**

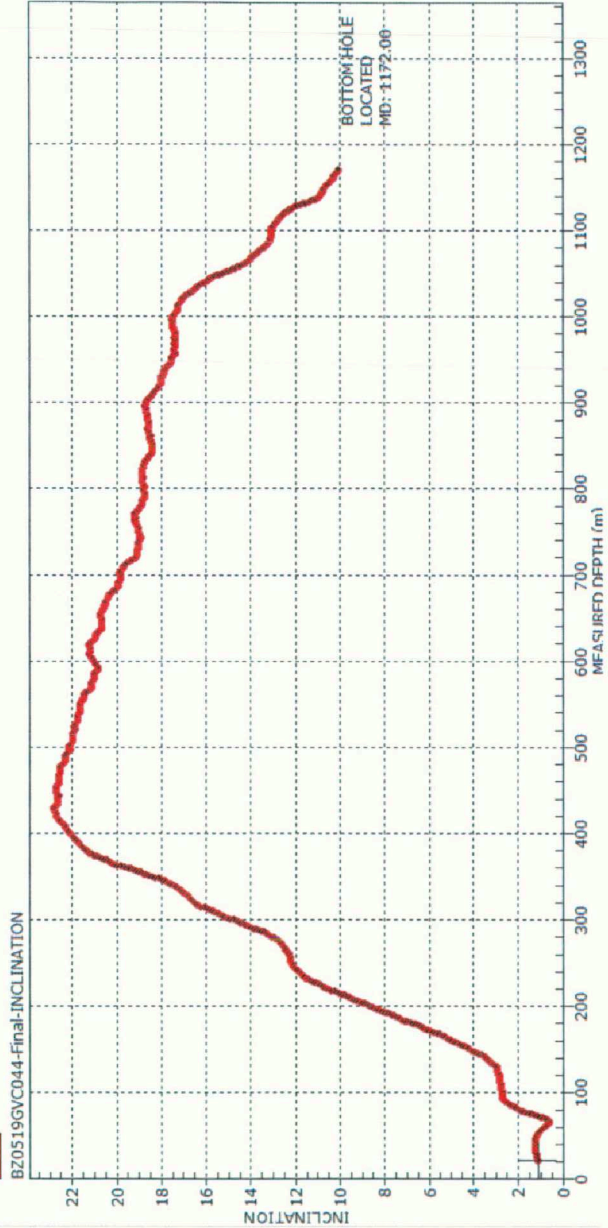


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15 7.565  
[Signature]

**INCLINATION**

Well: MINA #37 LINER 7"  
Location: GREAT OIL 106, SAL GEMA

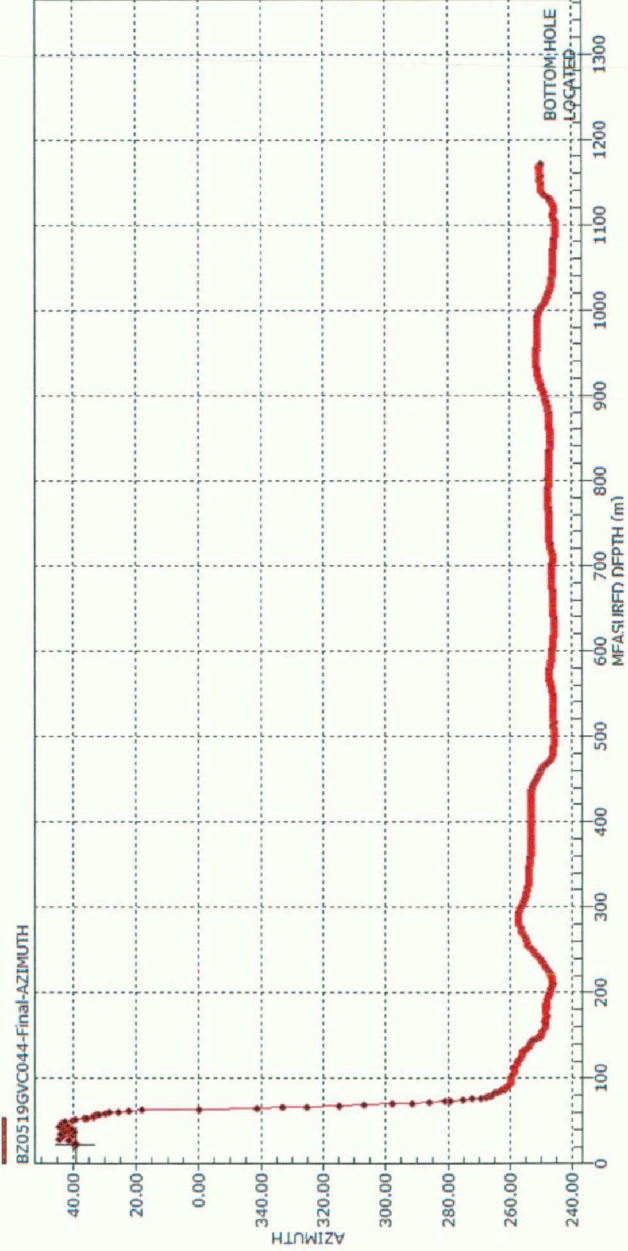
Gyrodata  
BZ0519GVC044 DEFINITIVE



**AZIMUTH**

Well: MINA #37 LINER 7"  
Location: GREAT OIL 106, SAL GEMA

Gyrodata  
BZ0519GVC044 DEFINITIVE



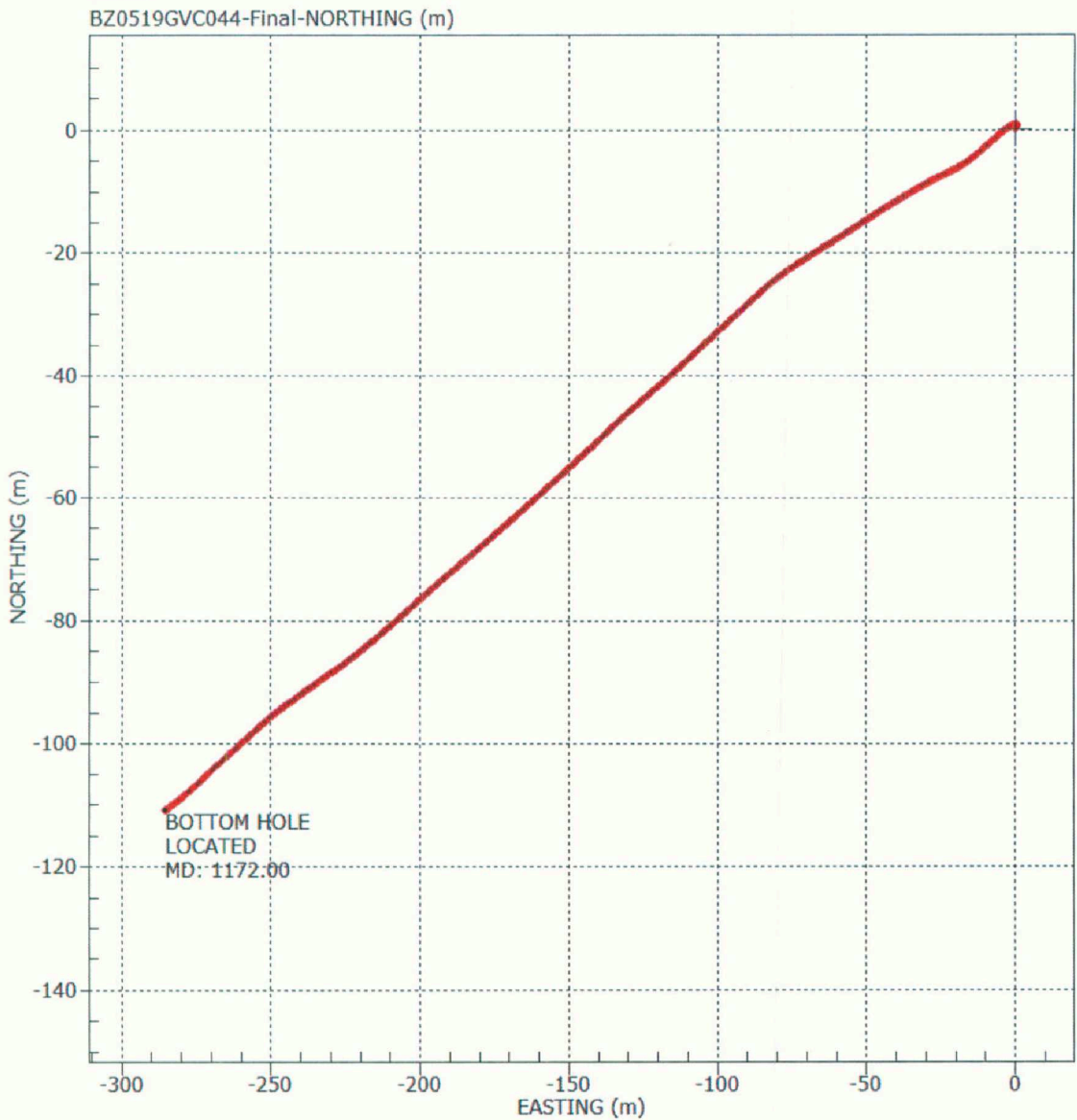
NORTE / LESTE

UNPM/AL

13.566

Well: MINA #37 LINER 7"  
Location: GREAT OIL 106, SAL GEMA

Gyrodata  
BZ0519GVC044 DEFINITIVE





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**Braskem**

Campo: Sal Gema

Poço: Mina 13

Gyro Multshot Contínuo

Data da Amostragem: 05 de Maio de 2019

**Número de Trabalho: BZ0519GVC045**