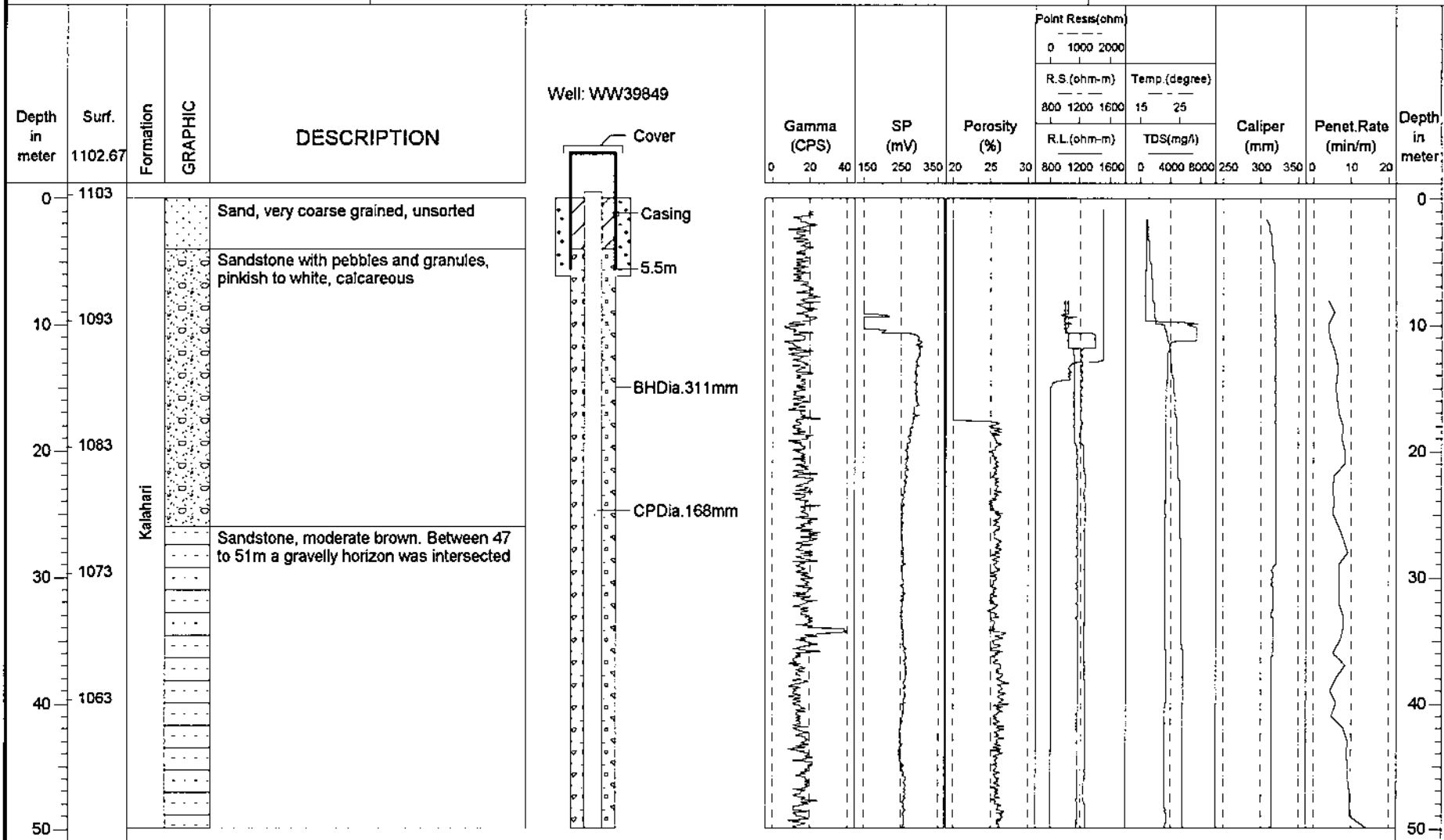


The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.80009
Longitude : E 19.33483
Elevation : 1,102.67mASL
Drilling Depth : 168.5m
SWL : 101.93mBGL

Commenced : 25/Jun/2000
Completed : 28/Jun/2000
Pumping Test Date : 23 - 30/Jul/2000
Yield : 3.0 m³/hr
Farm Name : Cobra(R349)

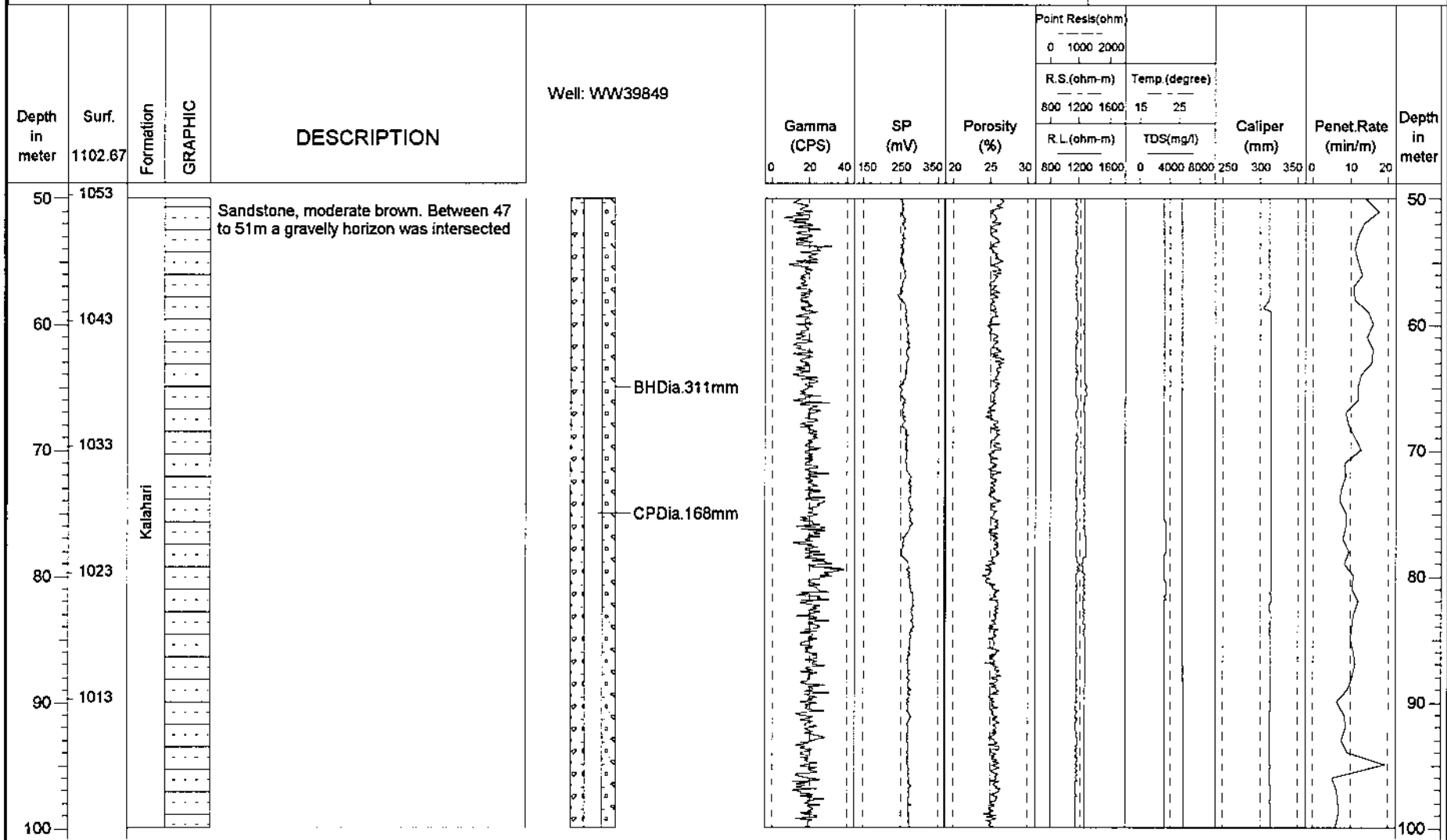


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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.80009
Longitude : E 19.33483
Elevation : 1,102.67mASL
Drilling Depth : 168.5m
SWL : 101.93mBGL

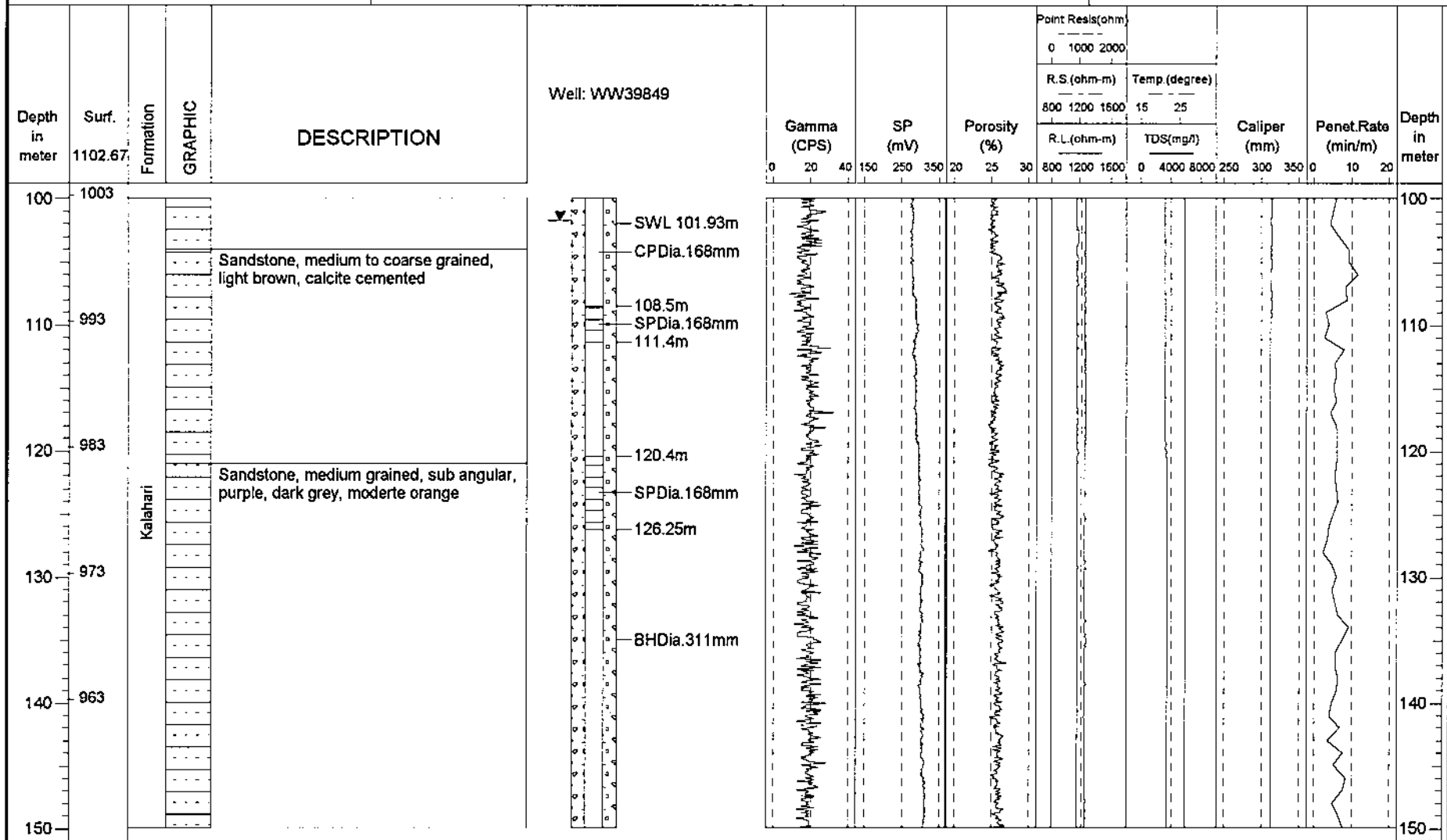
Commenced : 25/Jun/2000
Completed : 28/Jun/2000
Pumping Test Date : 23 - 30/Jul/2000
Yield : 3.0 m3/hr
Farm Name : Cobra(R349)



The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stamriet) Artesian Basin

Latitude : S 24.80009
Longitude : E 19.33483
Elevation : 1,102.67mASL
Drilling Depth : 168.5m
SWL : 101.93mBGL

Commenced : 25/Jun/2000
Completed : 28/Jun/2000
Pumping Test Date : 23 - 30/Jul/2000
Yield : 3.0 m3/hr
Farm Name : Cobra(R349)



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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.80009
Longitude : E 19.33483
Elevation : 1,102.67mASL
Drilling Depth : 168.5m
SWL : 101.93mBGL

Commenced : 25/Jun/2000
Completed : 26/Jun/2000
Pumping Test Date : 23 - 30/Jul/2000
Yield : 3.0 m3/hr
Farm Name : Cobra(R349)

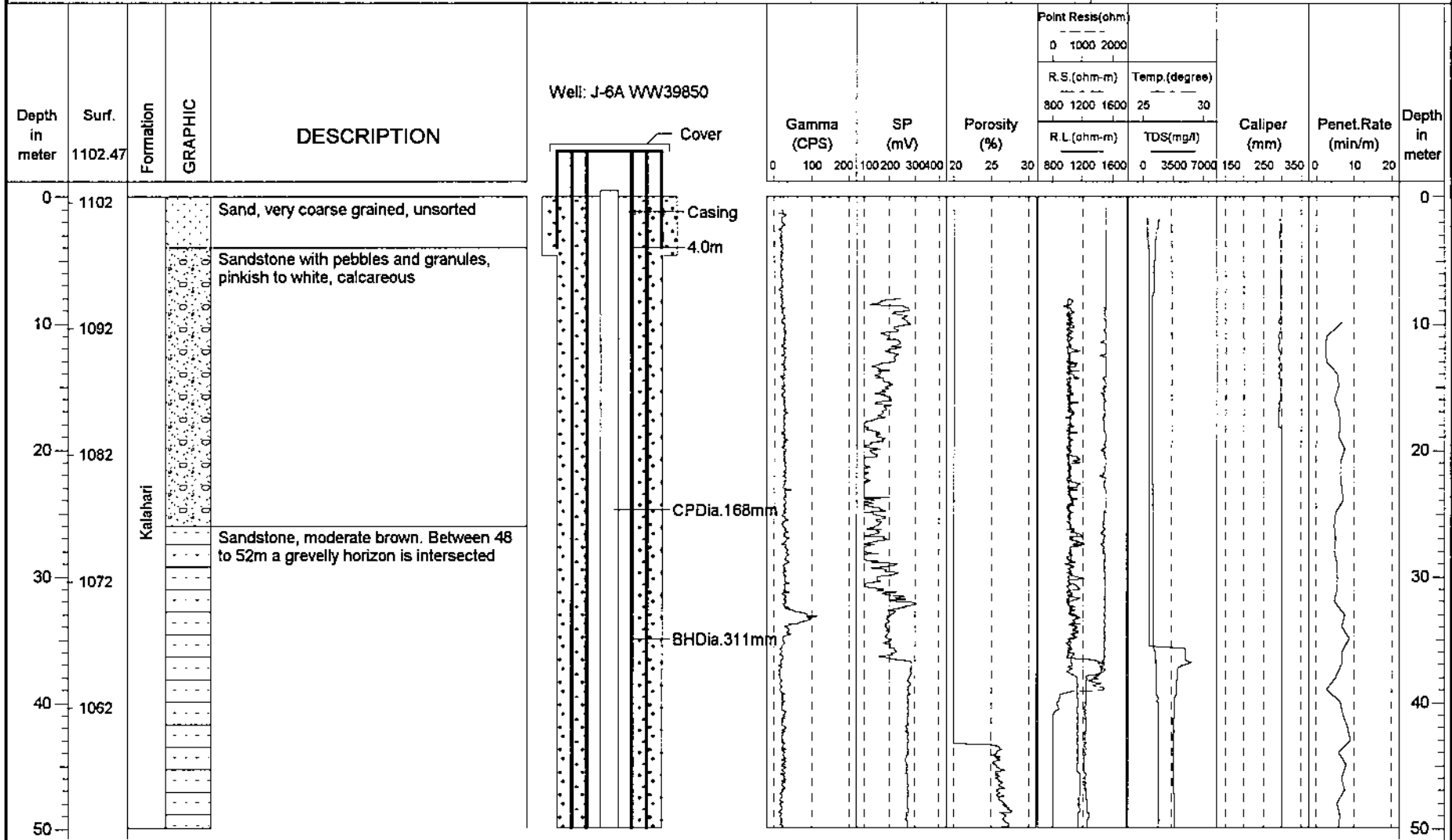
Depth in meter	Surf. 1102.67	Formation	GRAPHIC	DESCRIPTION	Well: WW39849	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resis(ohm)		Caliper (mm)	Penet. Rate (min/m)	Depth in meter
									800 1200 1600	Temp.(degree)			
						0 20 40	150 250 350	20 25 30	800 1200 1600	TDS(mg/l)	250 300 350	0 10 20	
150	953	Kalahari		Sandstone, medium to coarse grained, moderate red brown, with FeO staining between 156 and 158									150
160	943			Sandstone, dark yellowish brown,									160
170	933	U.Rietmond											170
180	923												180
190	913												190
200													200

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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.80059
Longitude : E 19.33520
Elevation : 1,102.47mASL
Drilling Depth : 273.0m
SWL : 104.41mBGL

Commenced : 28/Jun/2000
Completed : 10/Jul/2000
Pumping Test Date : 31/Jul - 7/Aug/2000
Yield : 4.0 m3/hr
Farm Name : Cobra(R349)



BOREHOLE LOG J-6A WW39850

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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.80059
Longitude : E 19.33520
Elevation : 1,102.47mASL
Drilling Depth : 273.0m
SWL : 104.41mBGL

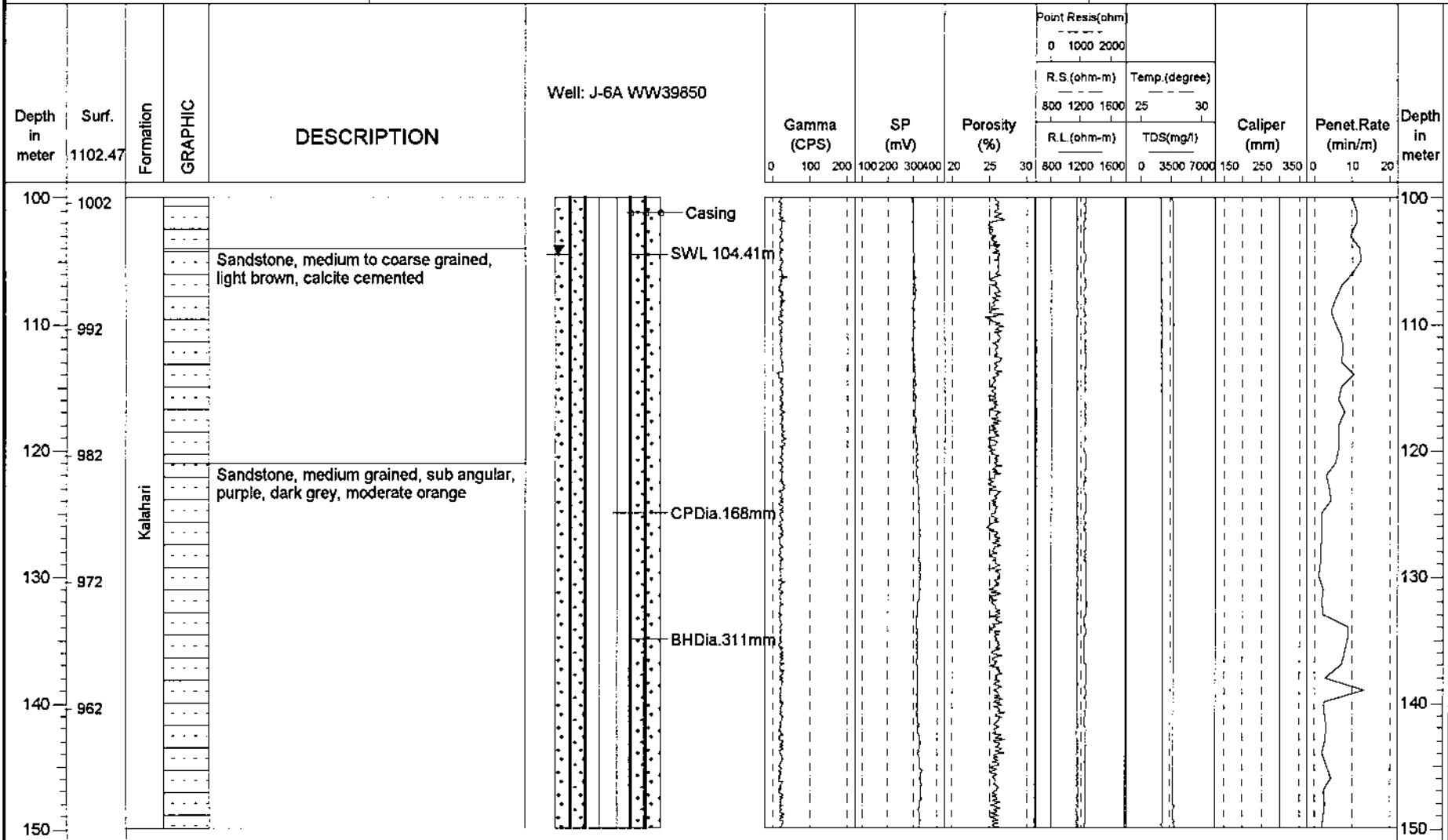
Commenced : 28/Jun/2000
Completed : 10/Jul/2000
Pumping Test Date : 31/Jul - 7/Aug/2000
Yield : 4.0 m3/hr
Farm Name : Cobra(R349)

Depth in meter	Surf. 1102.47	Formation	GRAPHIC	DESCRIPTION	Well: J-6A WW39850	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resis(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter
									R.S.(ohm-m)	Temp.(degree)			
						0 100 200	100 200 300 400	20 25 30	0 1000 2000	25 30	0 250 350	0 10 20	
						0 100 200	100 200 300 400	20 25 30	R.L.(ohm-m)	TDS(mg/l)	150 250 350	0 10 20	
50	1052	Kalahari		Sandstone, moderate brown. Between 48 to 52m a gravelly horizon is intersected									50
60	1042			60									
70	1032			70									
80	1022			80									
90	1012			90									
100													100

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.80059
Longitude : E 19.33520
Elevation : 1,102.47mASL
Drilling Depth : 273.0m
SWL : 104.41mBGL

Commenced : 28/Jun/2000
Completed : 10/Jul/2000
Pumping Test Date : 31/Jul - 7/Aug/2000
Yield : 4.0 m3/hr
Farm Name : Cobra(R349)

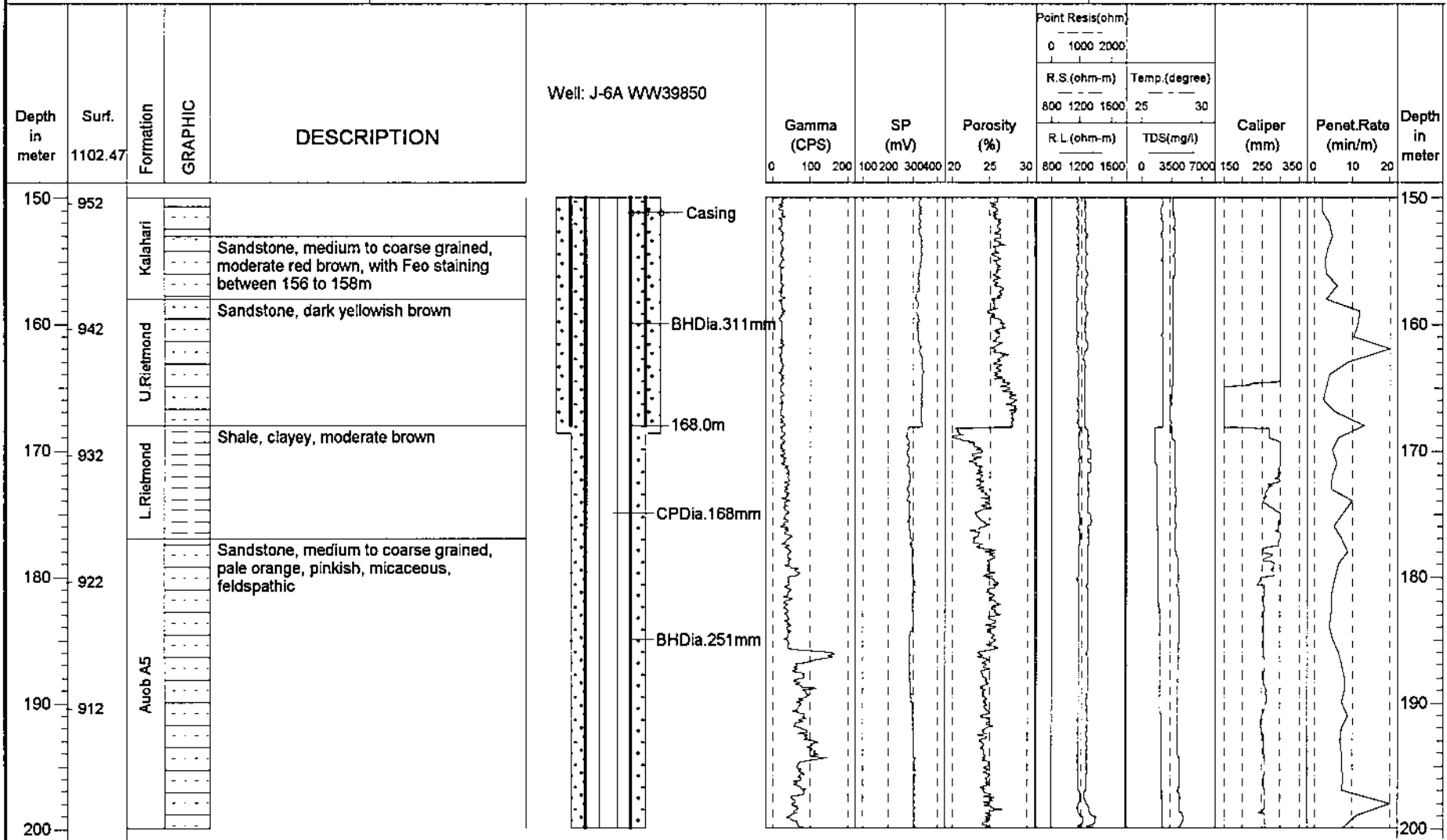


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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.80059
Longitude : E 19.33520
Elevation : 1,102.47mASL
Drilling Depth : 273.0m
SWL : 104.41mBGL

Commenced : 28/Jun/2000
Completed : 10/Jul/2000
Pumping Test Date : 31/Jul - 7/Aug/2000
Yield : 4.0 m3/hr
Farm Name : Cobra(R349)

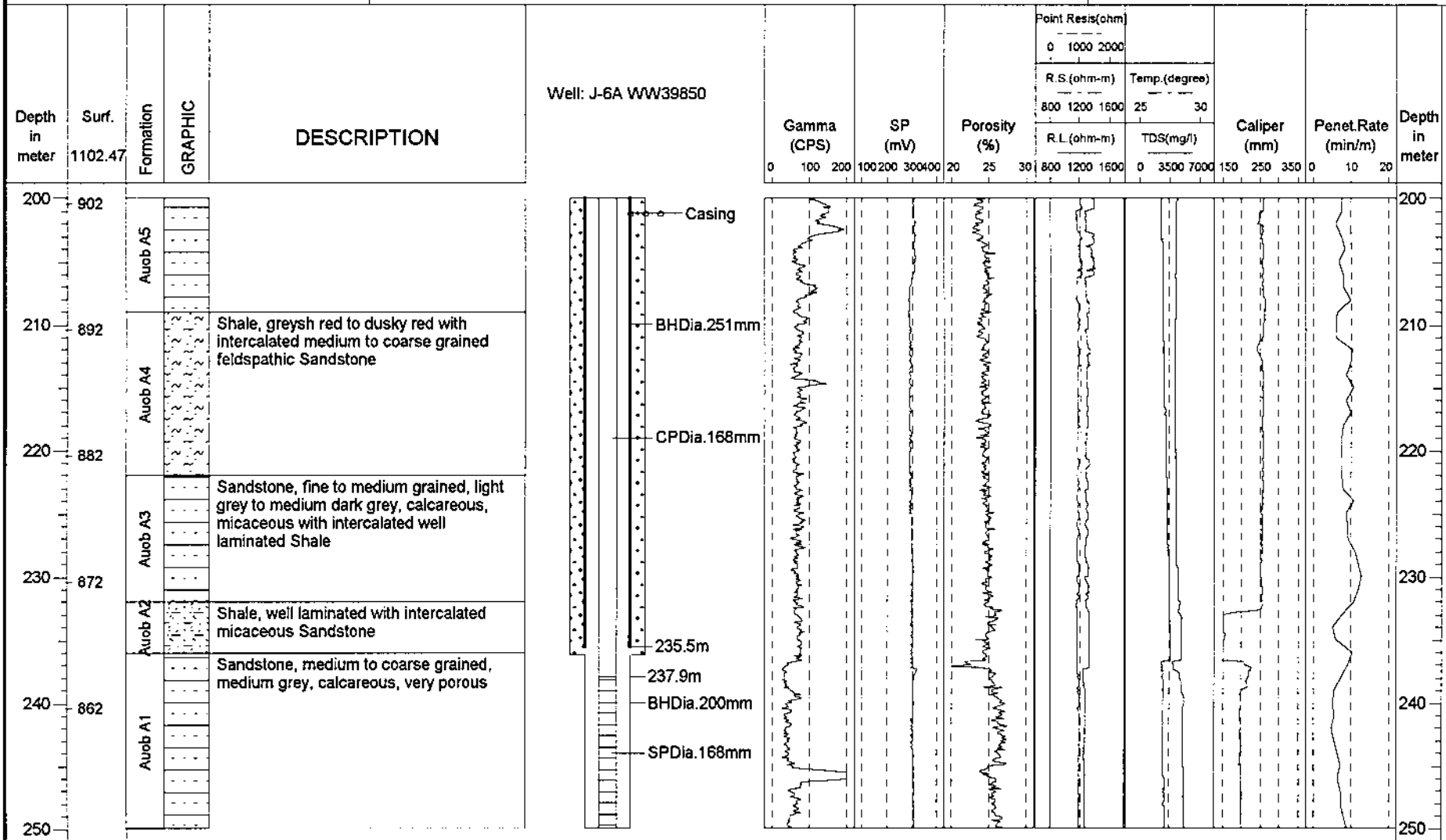


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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.80059
Longitude : E 19.33520
Elevation : 1,102.47mASL
Drilling Depth : 273.0m
SWL : 104.41mBGL

Commenced : 28/Jun/2000
Completed : 10/Jul/2000
Pumping Test Date : 31/Jul - 7/Aug/2000
Yield : 4.0 m3/hr
Farm Name : Cobra(R349)

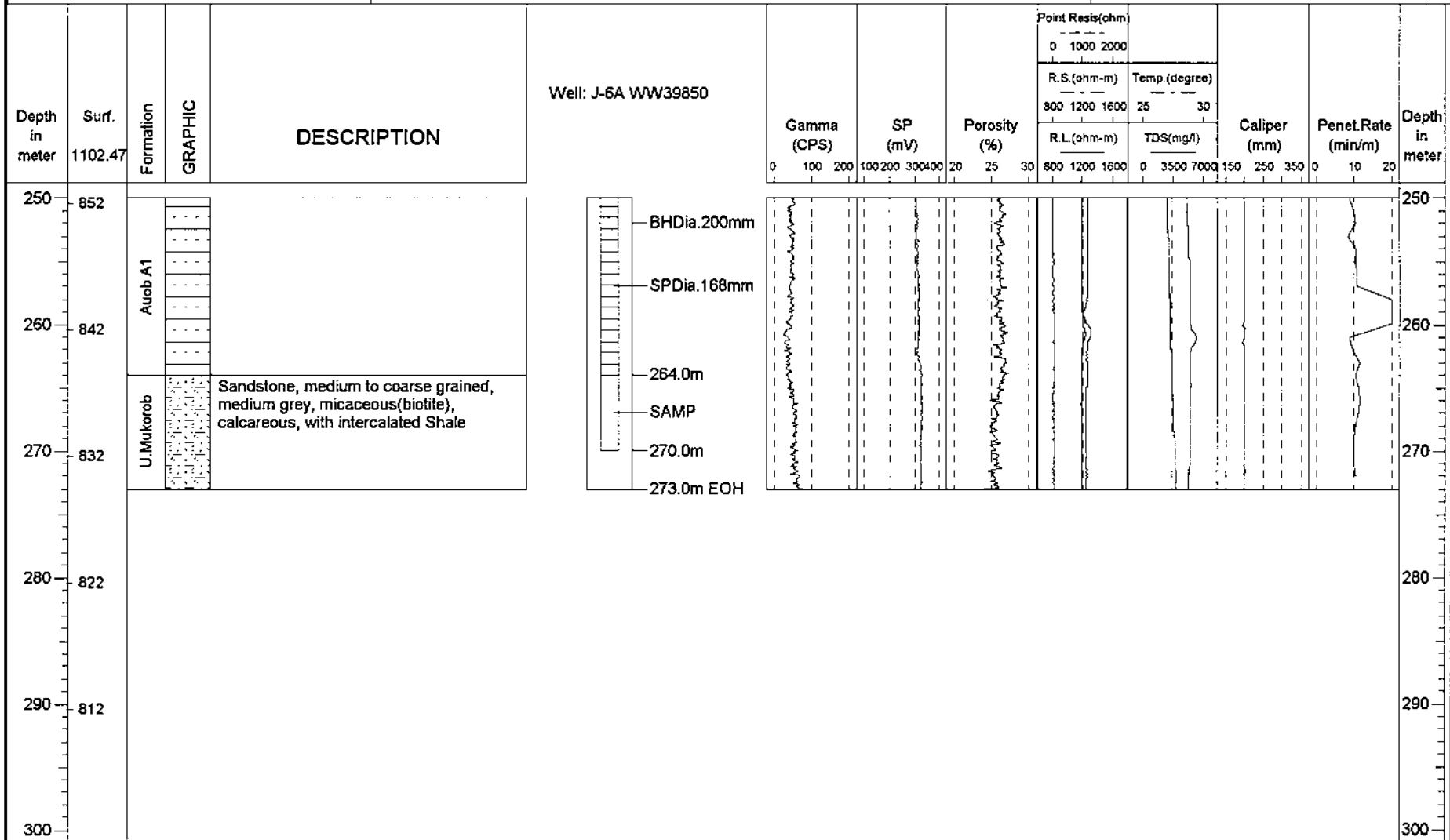


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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.80059
Longitude : E 19.33520
Elevation : 1,102.47mASL
Drilling Depth : 273.0m
SWL : 104.41mBGL

Commenced : 28/Jun/2000
Completed : 10/Jul/2000
Pumping Test Date : 31/Jul - 7/Aug/2000
Yield : 4.0 m3/hr
Farm Name : Cobra(R349)



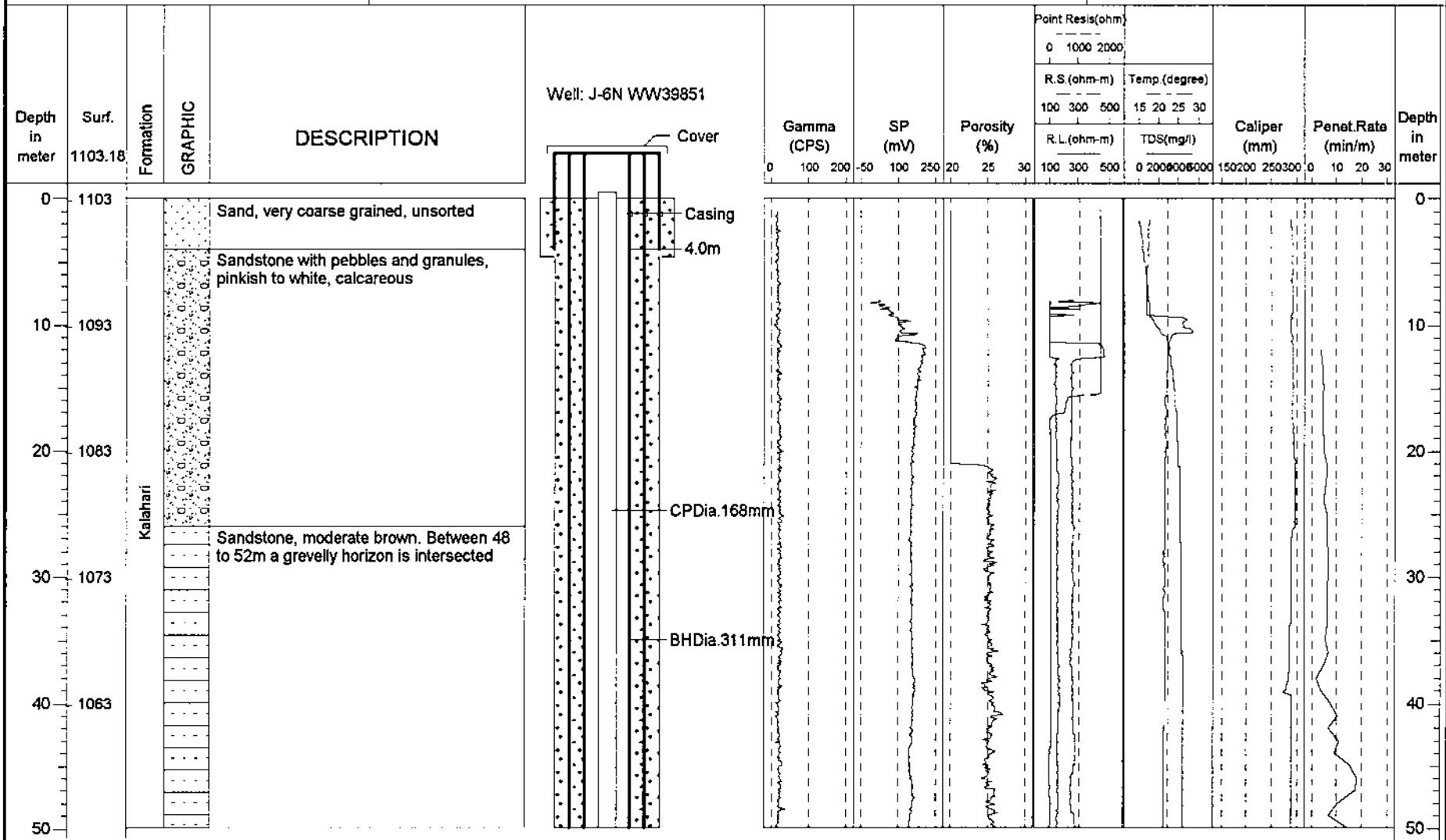
BOREHOLE LOG J-6N WW39851

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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.79963
Longitude : E 19.33457
Elevation : 1,103.18mASL
Drilling Depth : 385.0m
SWL :

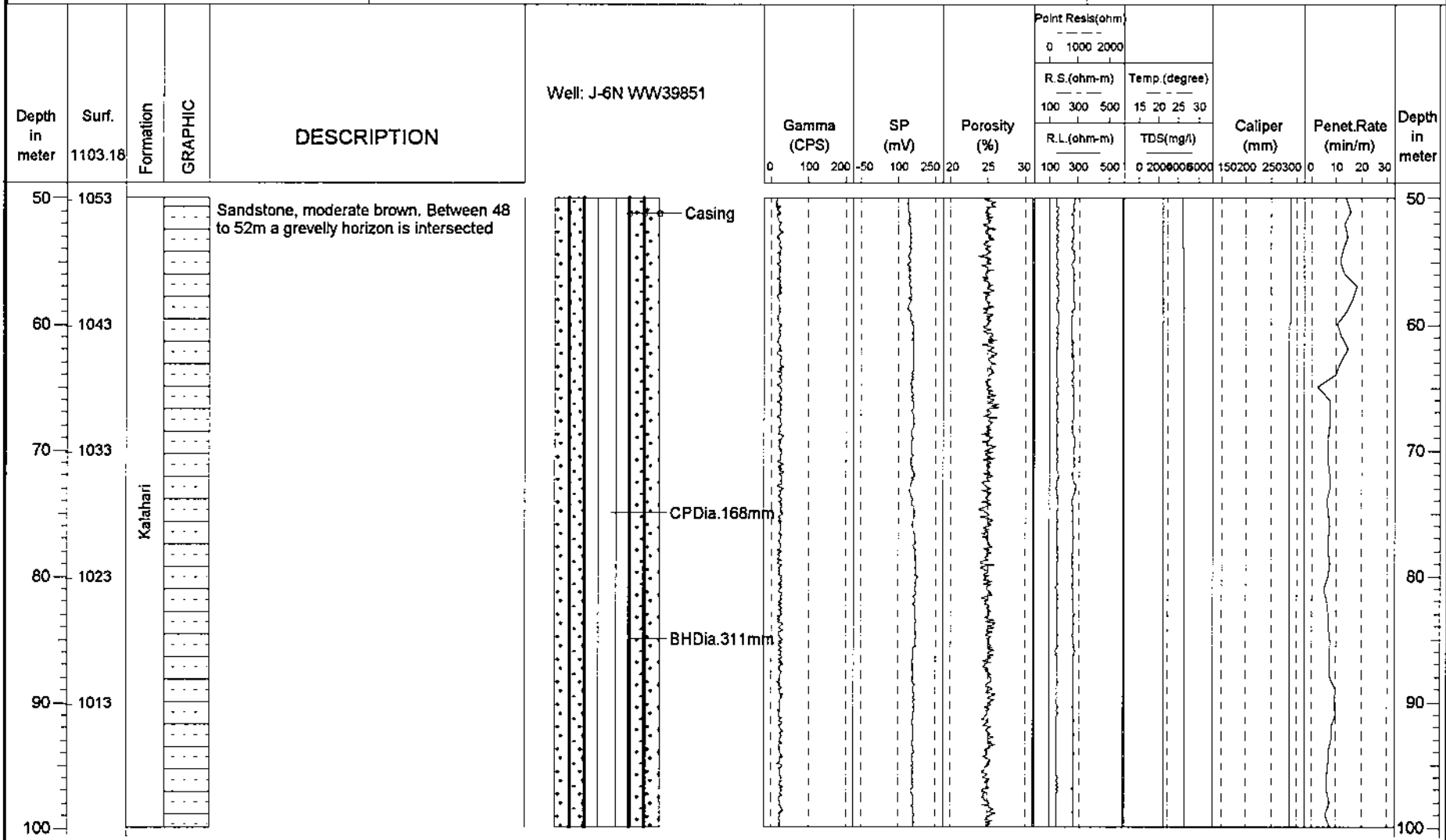
Commenced : 09/Jun/2000
Completed : 26/Jun/2000
Pumping Test Date : 04/Oct/2000
Yield : Inextractable
Farm Name : Cobra(R349)



The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.79963
Longitude : E 19.33457
Elevation : 1,103.18mASL
Drilling Depth : 385.0m
SWL :

Commenced : 09/Jun/2000
Completed : 26/Jun/2000
Pumping Test Date : 04/Oct/2000
Yield : Inextractable
Farm Name : Cobra(R349)



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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.79963
Longitude : E 19.33457
Elevation : 1,103.18mASL
Drilling Depth : 385.0m
SWL :

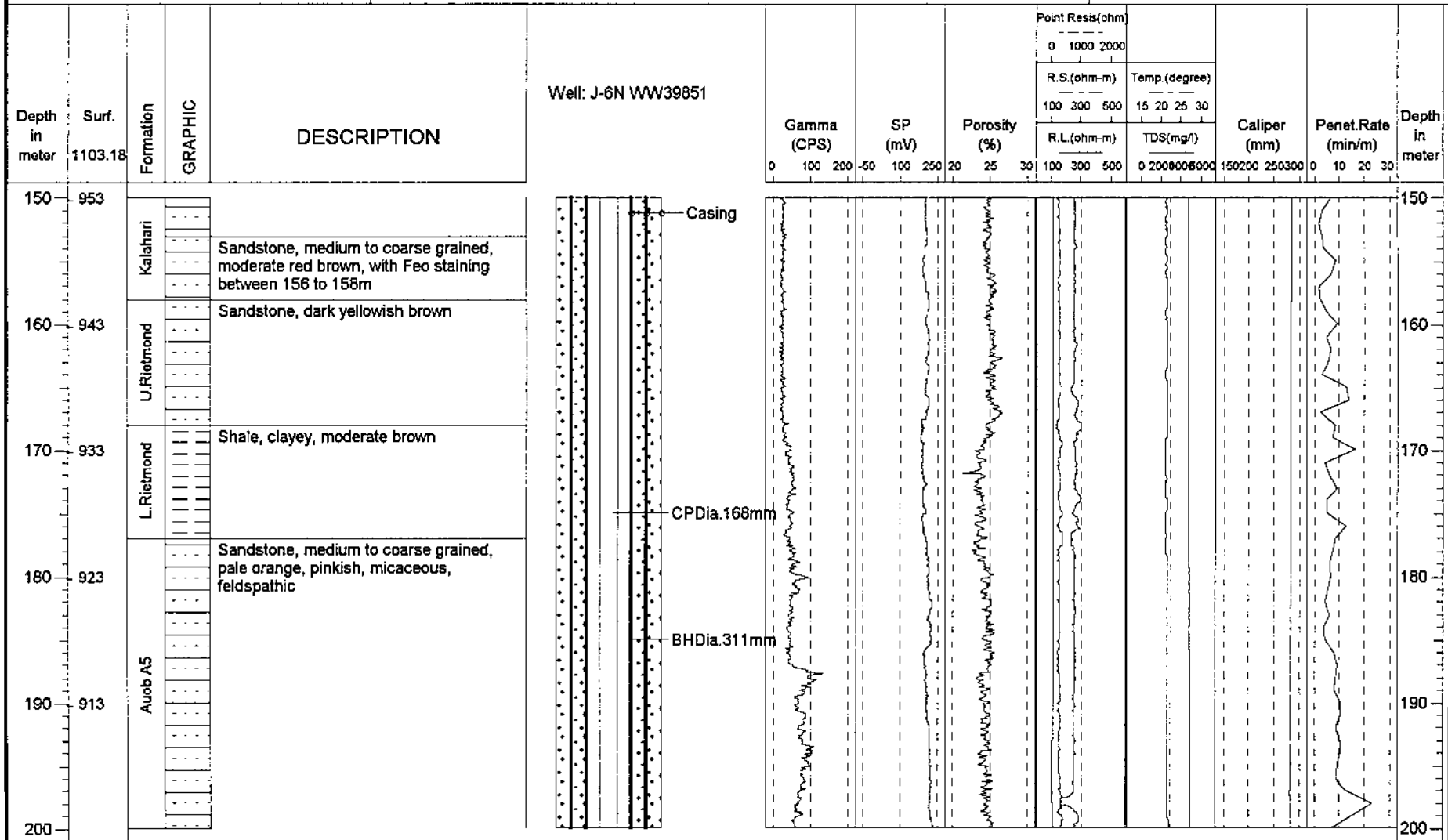
Commenced : 09/Jun/2000
Completed : 26/Jun/2000
Pumping Test Date : 04/Oct/2000
Yield : Inextractable
Farm Name : Cobra(R349)

Depth in meter	Surf. 1103.18	Formation	GRAPHIC	DESCRIPTION	Well: J-6N WW39851										Depth in meter													
					Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)		Temp.(degree)		Caliper (mm)	Penet.Rate (min/m)															
					100	300	500	15	20	25	30																	
					0	100	200	-50	100	250	20	25	30	100	300	500	0	200	000	000	150	200	250	300	0	10	20	30
100	1003	Kalahari		Sandstone, medium to coarse grained, light brown, calcite cemented									100	110	120	130	140	150	100	110	120	130	140	150				
110	993			Sandstone, medium grained, sub angular, purple, dark grey, moderate orange											110	120	130	140	150	100	110	120	130	140	150			
120	983														120	130	140	150	100	110	120	130	140	150				
130	973			130									140	150	100	110	120	130	140	150								
140	963	140	150	100	110	120	130	140	150																			
150		150	100	110	120	130	140	150																				

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.79963
Longitude : E 19.33457
Elevation : 1,103.18mASL
Drilling Depth : 385.0m
SWL :

Commenced : 09/Jun/2000
Completed : 26/Jun/2000
Pumping Test Date : 04/Oct/2000
Yield : Inextractable
Farm Name : Cobra(R349)



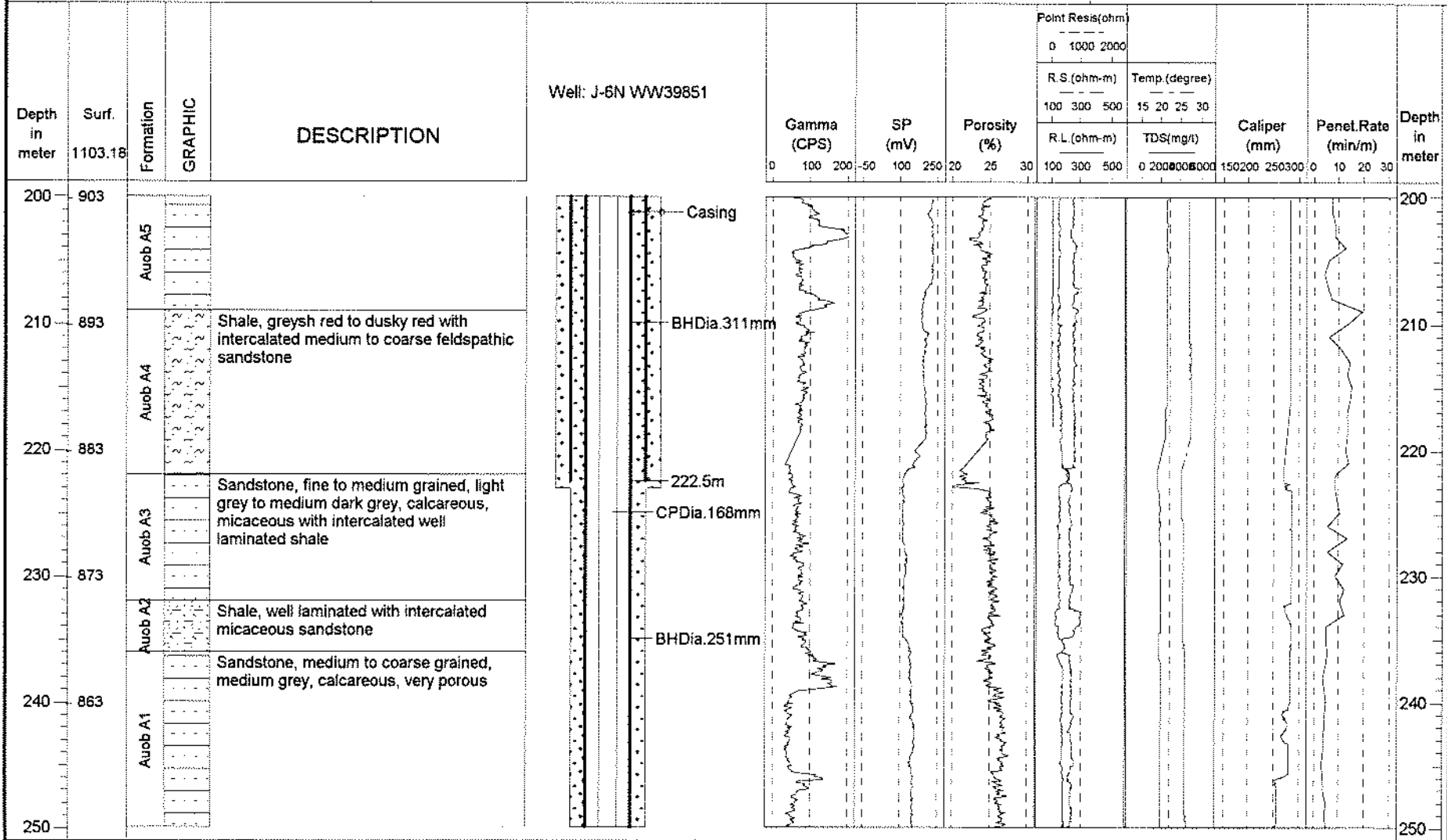
BOREHOLE LOG J-6N WW39851

(Page 5 of 8)

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.79963
Longitude : E 19.33457
Elevation : 1,103.18mASL
Drilling Depth : 385.0m
SWL :

Commenced : 09/Jun/2000
Completed : 26/Jun/2000
Pumping Test Date : 04/Oct/2000
Yield : Inextractable
Farm Name : Cobra(R349)



The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.79963
Longitude : E 19.33457
Elevation : 1,103.18mASL
Drilling Depth : 385.0m
SWL :

Commenced : 09/Jun/2000
Completed : 26/Jun/2000
Pumping Test Date : 04/Oct/2000
Yield : Inextractable
Farm Name : Cobra(R349)

Depth in meter	Surf. 1103.18	Formation	GRAPHIC	DESCRIPTION	Well: J-6N WW39851		Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter
					0 100 200	0 1000 2000				R.S (ohm-m)	Temp (degree)			
										100 300 500	15 20 25 30			
										R.L (ohm-m)	TDS(mg/l)			
										0 100 300 500	0 2000000000	150 200 250 300	0 10 20 30	
250	853	Auob A1		Sandstone, medium to coarse grained, medium grey, micaceous(biotite), calcareous, with intercalated shale									250	
260	843												260	
270	833	U.Mukorob										270		
280	823											280		
290	813	L.Mukorob		Shale, grey to dark grey, carbonaceous dark grey below 330m								290		
300													300	

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.79963
Longitude : E 19.33457
Elevation : 1,103.18mASL
Drilling Depth : 385.0m
SWL :

Commenced : 09/Jun/2000
Completed : 26/Jun/2000
Pumping Test Date : 04/Oct/2000
Yield : Inextractable
Farm Name : Cobra(R349)

Depth in meter	Surf. 1103.18	Formation	GRAPHIC	DESCRIPTION	Well: J-6N WW39851	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resis(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter	
									0 1000 2000	Temp.(degree)				
						0 100 200	-50 100 250	20 25 30	100 300 500	15 20 25 30	150200 250300	0 10 20 30		
						0 100 200	-50 100 250	20 25 30	100 300 500	0 2000000000	150200 250300	0 10 20 30		
300	803	L. Mukorob		Shale, grey to dark grey, carbonaceous dark grey below 330m									300	
310	793			310										
320	783			320										
330	773			330										
340	763			340										
350													350	

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.79963
Longitude : E 19.33457
Elevation : 1,103.18mASL
Drilling Depth : 385.0m
SWL :

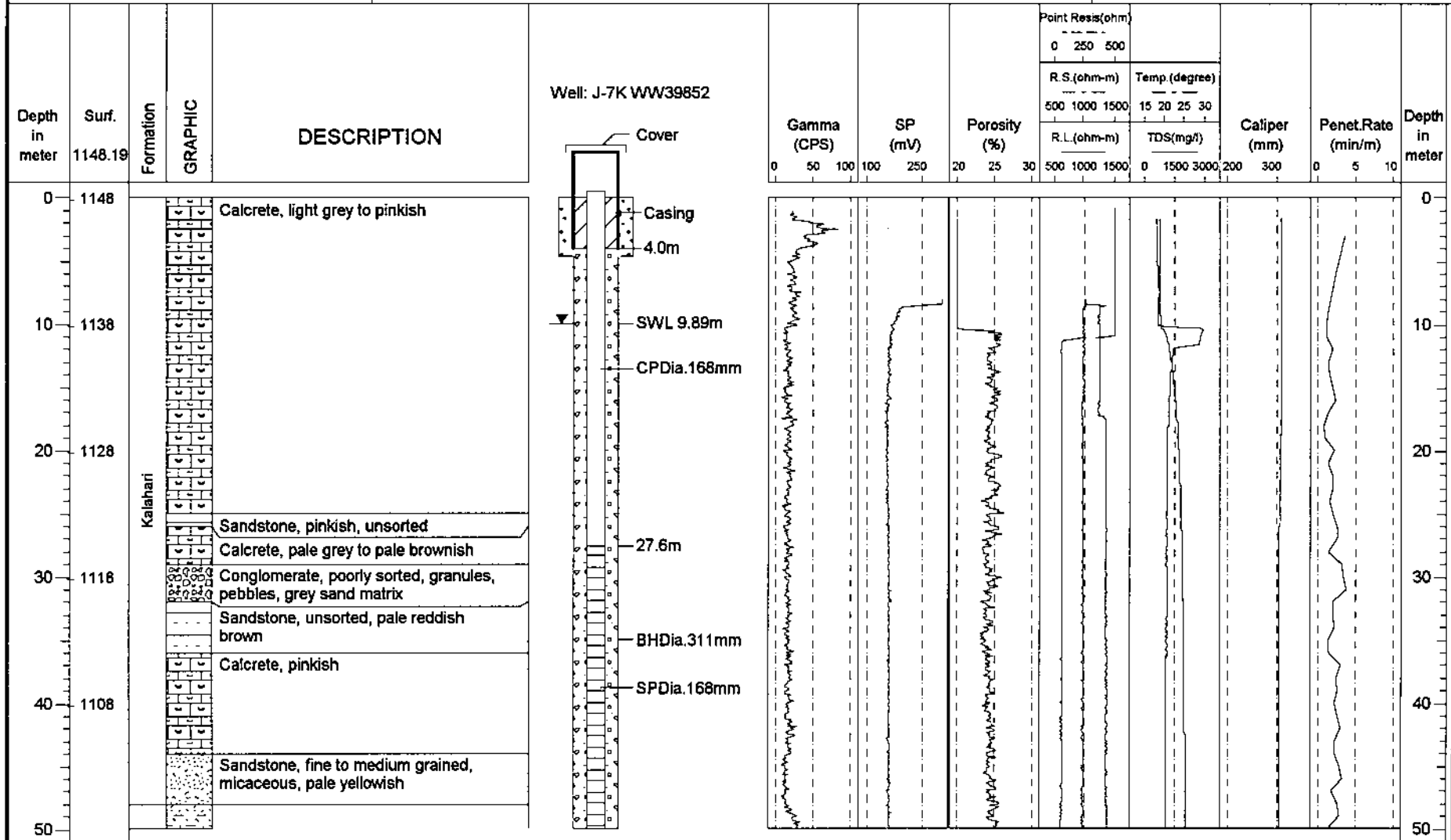
Commenced : 09/Jun/2000
Completed : 26/Jun/2000
Pumping Test Date : 04/Oct/2000
Yield : Inextractable
Farm Name : Cobra(R349)

Depth in meter	Surf. 1103.18	Formation	GRAPHIC	DESCRIPTION	Well: J-6N WW39851	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resis(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter	
									R.S.(ohm-m)	Temp.(degree)				
						0 100 200	-50 100 250	20 25 30	100 300 500	15 20 25 30	0 200 400 600	150 200 250 300	0 10 20 30	
						0 100 200	-50 100 250	20 25 30	100 300 500	0 200 400 600	150 200 250 300	0 10 20 30		
350	753	Nossob		Sandstone, coarsening upwards from very fine to fine to medium grained, grey									350	
360	743			Sandstone, coarsening upwards from very fine to fine grained, light grey to grey									360	
370	733	Dwyka		Shale, grey, dropstones									370	
380	723			380										
390	713												390	
400													400	

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.29163
Longitude : E 18.41678
Elevation : 1,148.19mASL
Drilling Depth : 55.0m
SWL : 9.89mBGL



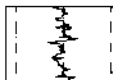


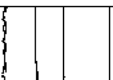



Commenced : 03/Aug/2000
Completed : 05/Aug/2000
Pumping Test Date : 21 - 28/Aug/2000
Yield : 7.0m³/h
Farm Name : Jakkalsdraai(R228)



The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.29163
Longitude : E 18.41678
Elevation : 1,148.19mASL
Drilling Depth : 55.0m
SWL : 9.89mBGL

Commenced : 03/Aug/2000
Completed : 05/Aug/2000
Pumping Test Date : 21 - 28/Aug/2000
Yield : 7.0m³/h
Farm Name : Jakkalsdraai(R228)

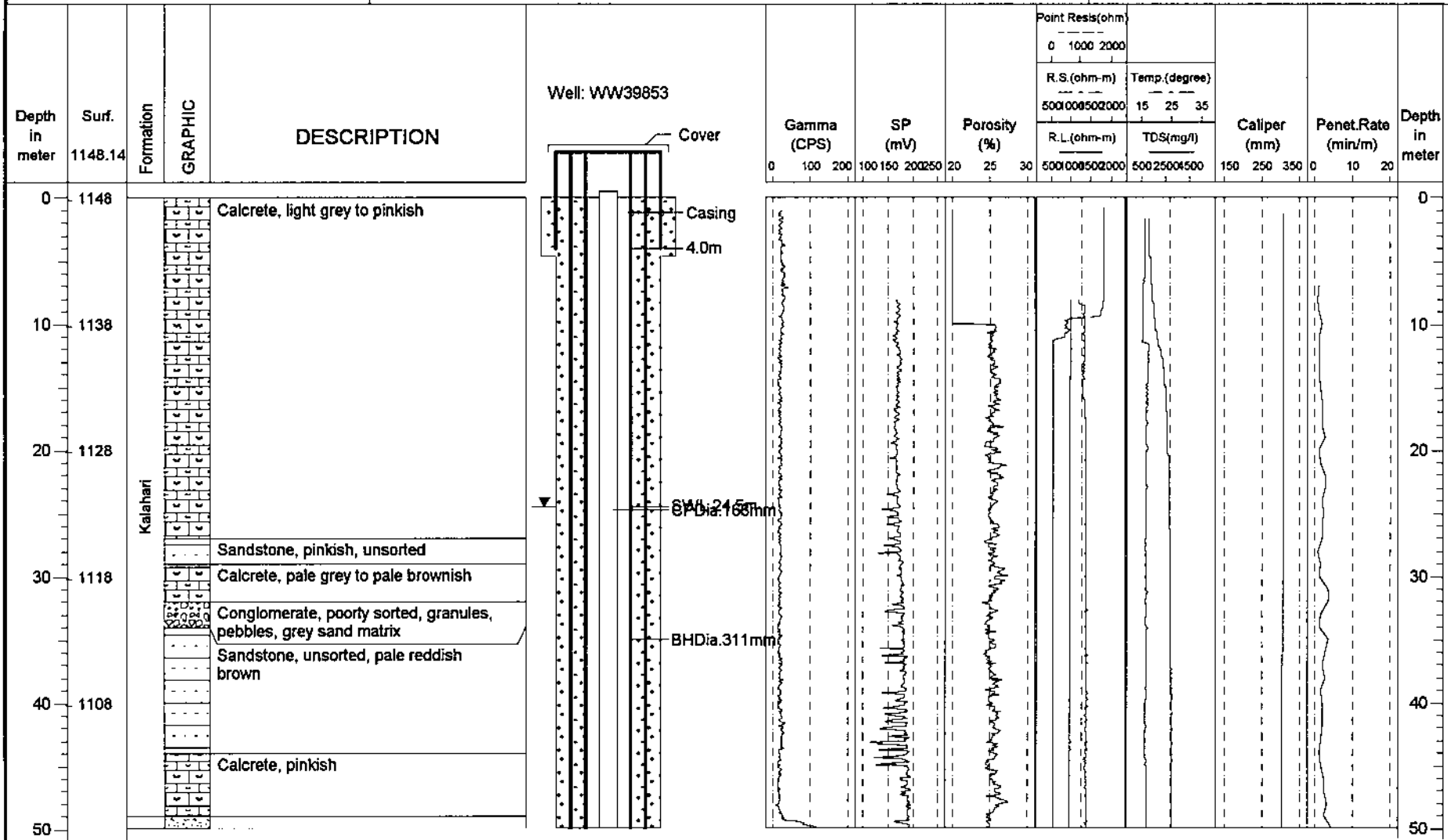
Depth in meter	Surf. 1148.19	Formation	GRAPHIC	DESCRIPTION	Well: J-7K WW39852	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)			Caliper (mm)	Penet.Rate (min/m)	Depth in meter				
									0	250	500							
									R.S.(ohm-m)						Temp.(degree)			
									500	1000	1500				15	20	25	30
R.L.(ohm-m)			TDS(mg/l)															
0	50	100	100	250	20	25	30	500	1000	1500	0	1500	3000	200	300	0	5	10
50	1098	U.Rietmond		Sandstone, medium grained, pale yellowish brown, with intercalated yellowish Shale	 SP Dia 168mm 51.0m SAMP 54.0m 55.0m EOH								50					
60	1088												60					
70	1078												70					
80	1068												80					
90	1058												90					
100													100					

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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.29117
Longitude : E 18.41650
Elevation : 1,148.14mASL
Drilling Depth : 250.0m
SWL : 21.665mBGL

Commenced : 27/Jul/2000
Completed : 05/Aug/2000
Pumping Test Date : 30/Aug - 04/Sep/2000
Yield : 0.3m³/hr
Farm Name : Jakkalsdraai(R228)



The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.29117
Longitude : E 18.41650
Elevation : 1,148.14mASL
Drilling Depth : 250.0m
SWL : 21.665mBGL

Commenced : 27/Jul/2000
Completed : 05/Aug/2000
Pumping Test Date : 30/Aug - 04/Sep/2000
Yield : 0.3m³/hr
Farm Name : Jakkalsdraai(R228)

Depth in meter	Surf. 1148.14	Formation	GRAPHIC	DESCRIPTION	Well: WW39853	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter
									0 1000 2000	R.S.(ohm-m)			
						0 100 200	100 150 200 250	20 25 30	500 1000 5000 20000	500 2500 4500	150 250 350	0 10 20	
50	1098	U.Rielmond		Sandstone, fine to medium grained, micaceous, pale yellowish									50
				Sandstone, fine to medium grained, micaceous, pale yellowish, with pale yellowish Shale									60
60	1088			Sandstone, medium grained, pale yellowish brown									60
70	1078	Auob A5		Sandstone, fine to medium grained, light grey. Moderately porous.									70
				Sandstone, fine grained, grey									80
80	1068	Auob A4		Siltstone, grey, bitite rich									80
90	1058			Shale, dark grey to light grey, micaceous									90
100													100

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BOREHOLE LOG J-7N WW39853

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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.29117
Longitude : E 18.41650
Elevation : 1,148.14mASL
Drilling Depth : 250.0m
SWL : 21.665mBGL

Commenced : 27/Jul/2000
Completed : 05/Aug/2000
Pumping Test Date : 30/Aug - 04/Sep/2000
Yield : 0.3m³/hr
Farm Name : Jakkalsdraai(R228)

Depth in meter	Surf. 1148.14	Formation	GRAPHIC	DESCRIPTION	Well: WW39853	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resis(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter									
									0 1000 2000	R.S.(ohm-m)				Temp.(degree)	R.L.(ohm-m)	TDS(mg/l)						
100	1048	Auob A4		Shale, grey to dark grey									100									
110	1038			110																		
120	1028			120																		
130	1018	Auob A3		Sandstone, coarse grained, white to very pale grey, porous									130									
																						130
140	1008			140																		
150													150									

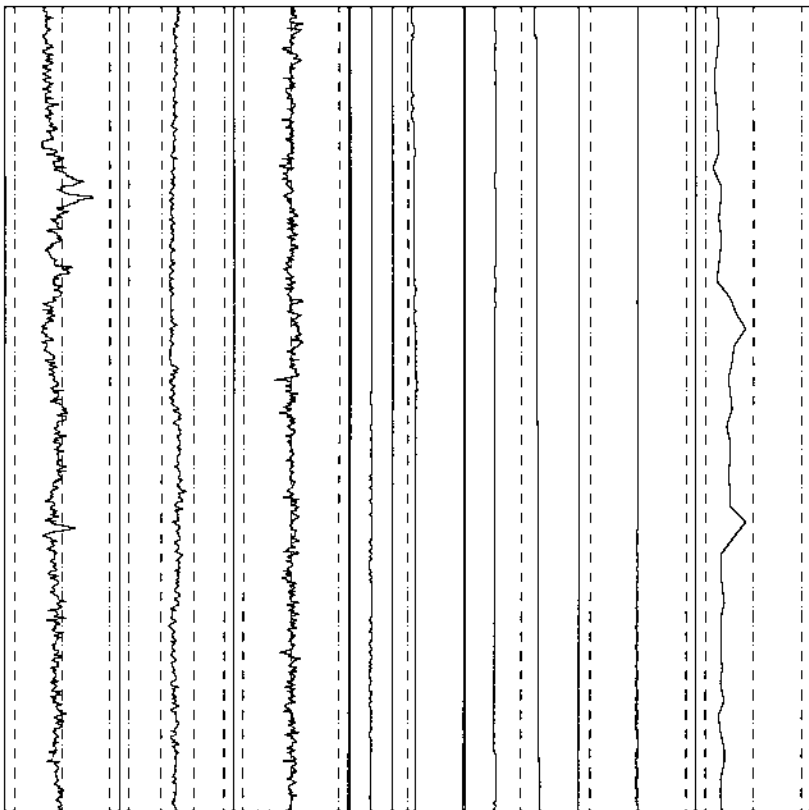
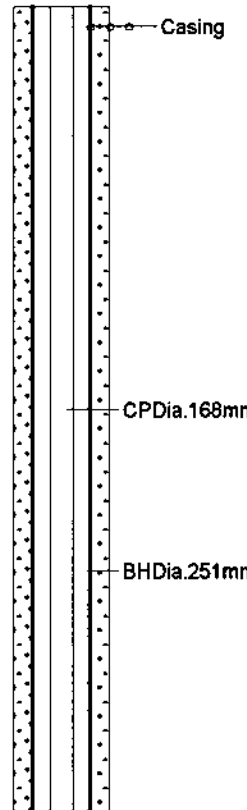
h6

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.29117
Longitude : E 18.41650
Elevation : 1,148.14mASL
Drilling Depth : 250.0m
SWL : 21.665mBGL

Commenced : 27/Jul/2000
Completed : 05/Aug/2000
Pumping Test Date : 30/Aug - 04/Sep/2000
Yield : 0.3m3/hr
Farm Name : Jakkalsdraai(R228)

Depth in meter	Surf. 1148.14	Formation	GRAPHIC	DESCRIPTION	Well: WW39853	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resis(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter
									0 1000 2000	R.S.(ohm-m)			
150	998	Auob A3											150
				Shale, very thin, dark grey, Auob A2									
160	988	Auob A1		Sandstone, very fine to fine grained, grey to dark grey									160
170	978	U.Mukorob		Shale with intercalated Siltstone									170
180	968	L.Mukorob		Shale, grey to dark grey, bituminous at 204-209m. dropstones at 216m									180
190	958												190
200													200



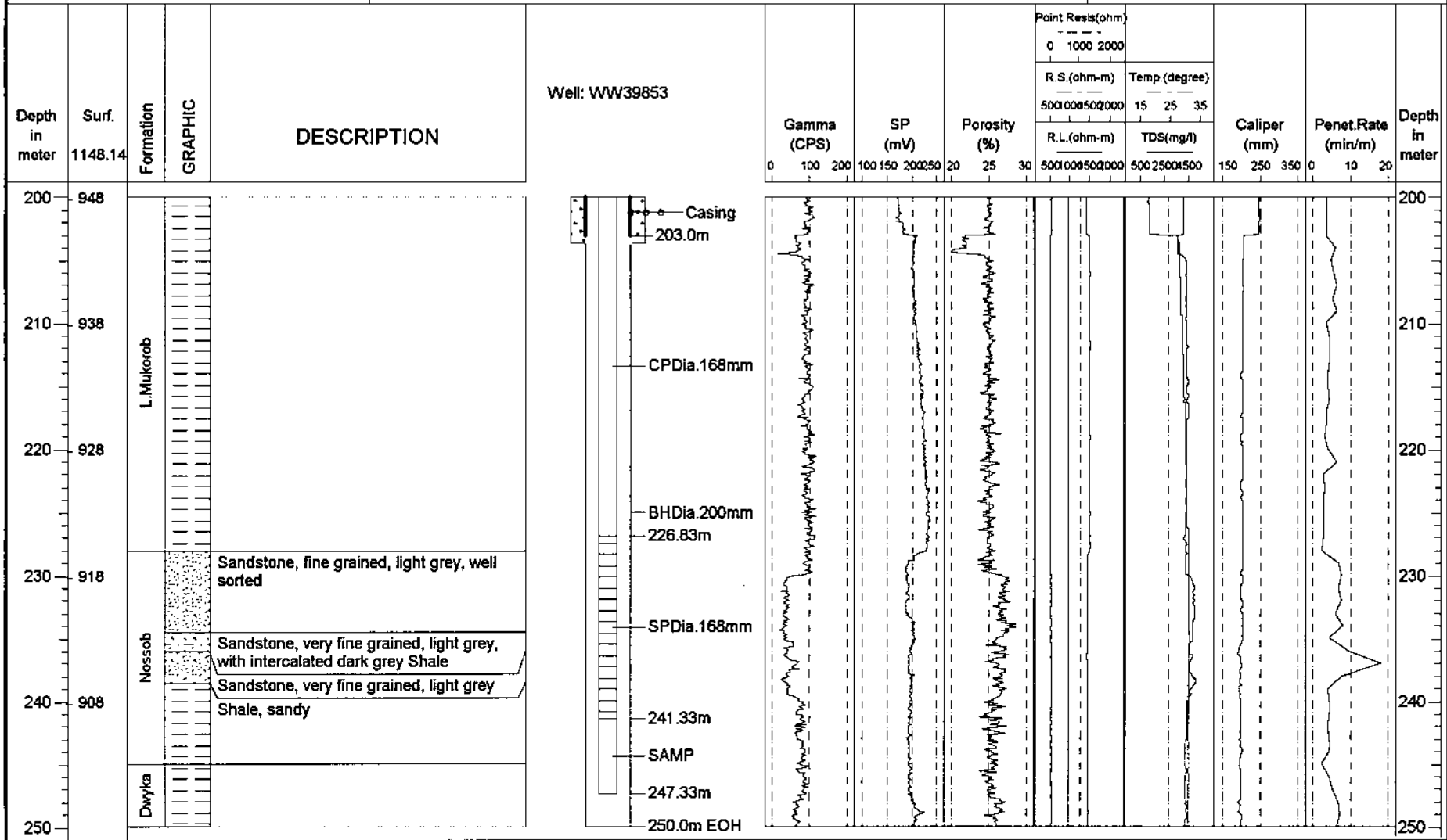
BOREHOLE LOG J-7N WW39853

(Page 5 of 5)

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.29117
Longitude : E 18.41650
Elevation : 1,148.14mASL
Drilling Depth : 250.0m
SWL : 21.665mBGL

Commenced : 27/Jul/2000
Completed : 05/Aug/2000
Pumping Test Date : 30/Aug - 04/Sep/2000
Yield : 0.3m³/hr
Farm Name : Jakkalsdraai(R228)

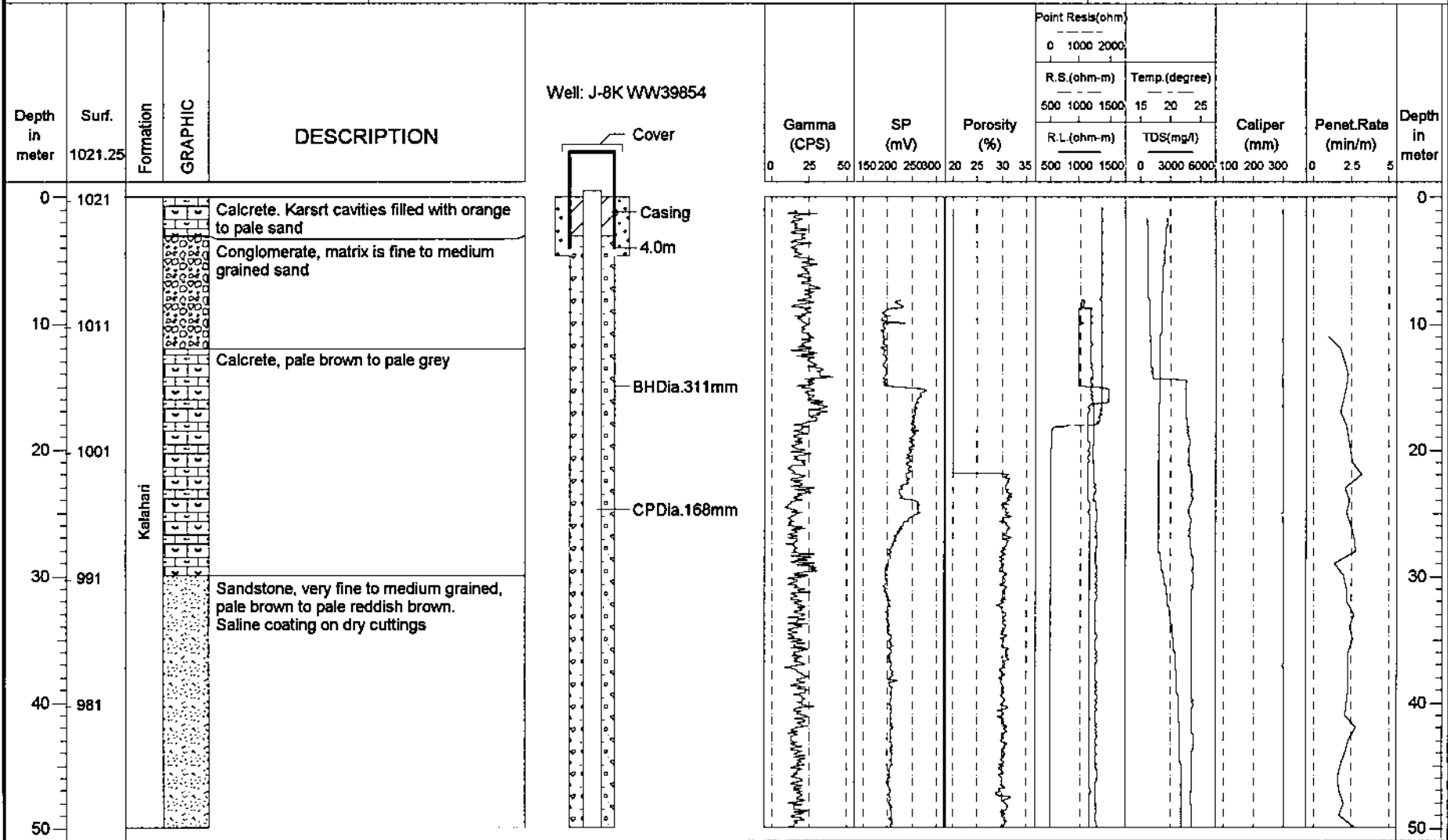


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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46122
Longitude : E 19.43266
Elevation : 1,021.25mASL
Drilling Depth : 129.0m
SWL : 59.75mASL

Commenced : 17/Jul/2000
Completed : 21/Jul/2000
Pumping Test Date : 11 - 18/Aug/2000
Yield : 0.25m³/h
Farm Name : Tweerivier(R481)



66

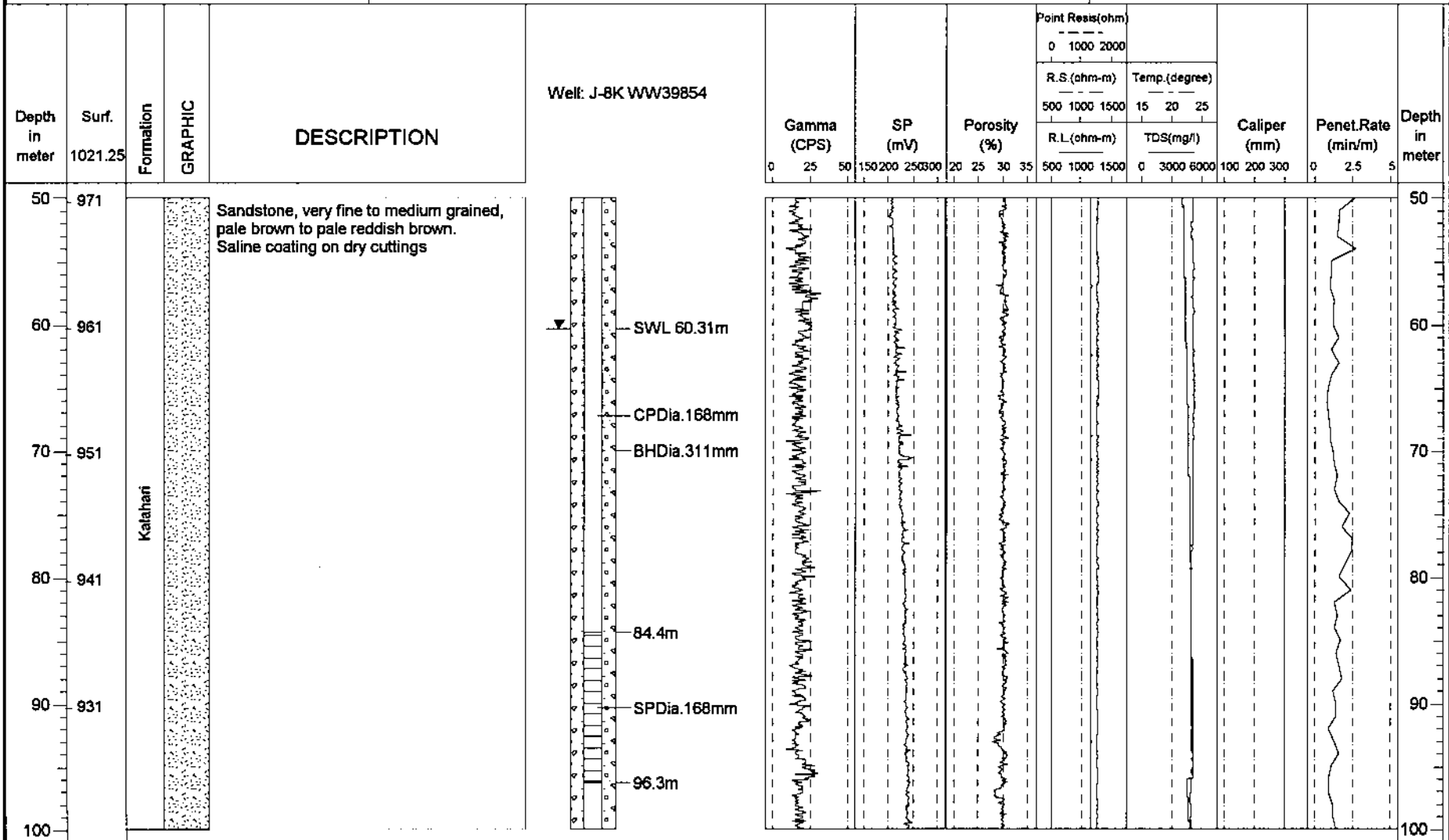
BOREHOLE LOG J-8K WW39854

(Page 2 of 3)

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46122
Longitude : E 19.43266
Elevation : 1,021.25mASL
Drilling Depth : 129.0m
SWL : 59.75mASL

Commenced : 17/Jul/2000
Completed : 21/Jul/2000
Pumping Test Date : 11 - 18/Aug/2000
Yield : 0.25m3/h
Farm Name : Tweerivier(R481)



26


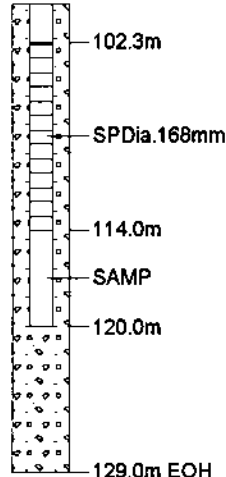
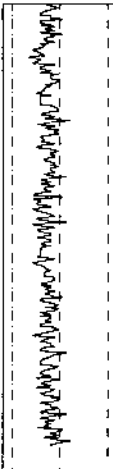
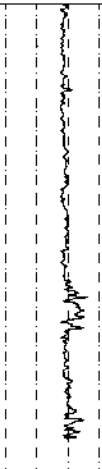

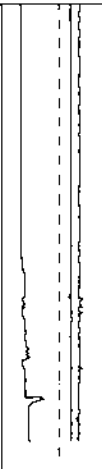
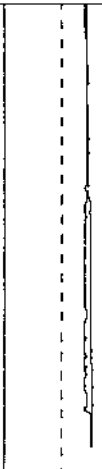

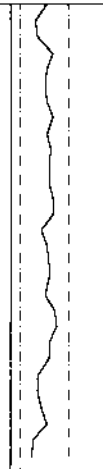
BOREHOLE LOG J-8K WW39854

(Page 3 of 3)

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46122
Longitude : E 19.43266
Elevation : 1,021.25mASL
Drilling Depth : 129.0m
SWL : 59.75mASL

Commenced : 17/Jul/2000
Completed : 21/Jul/2000
Pumping Test Date : 11 - 18/Aug/2000
Yield : 0.25m³/h
Farm Name : Tweerivier(R481)

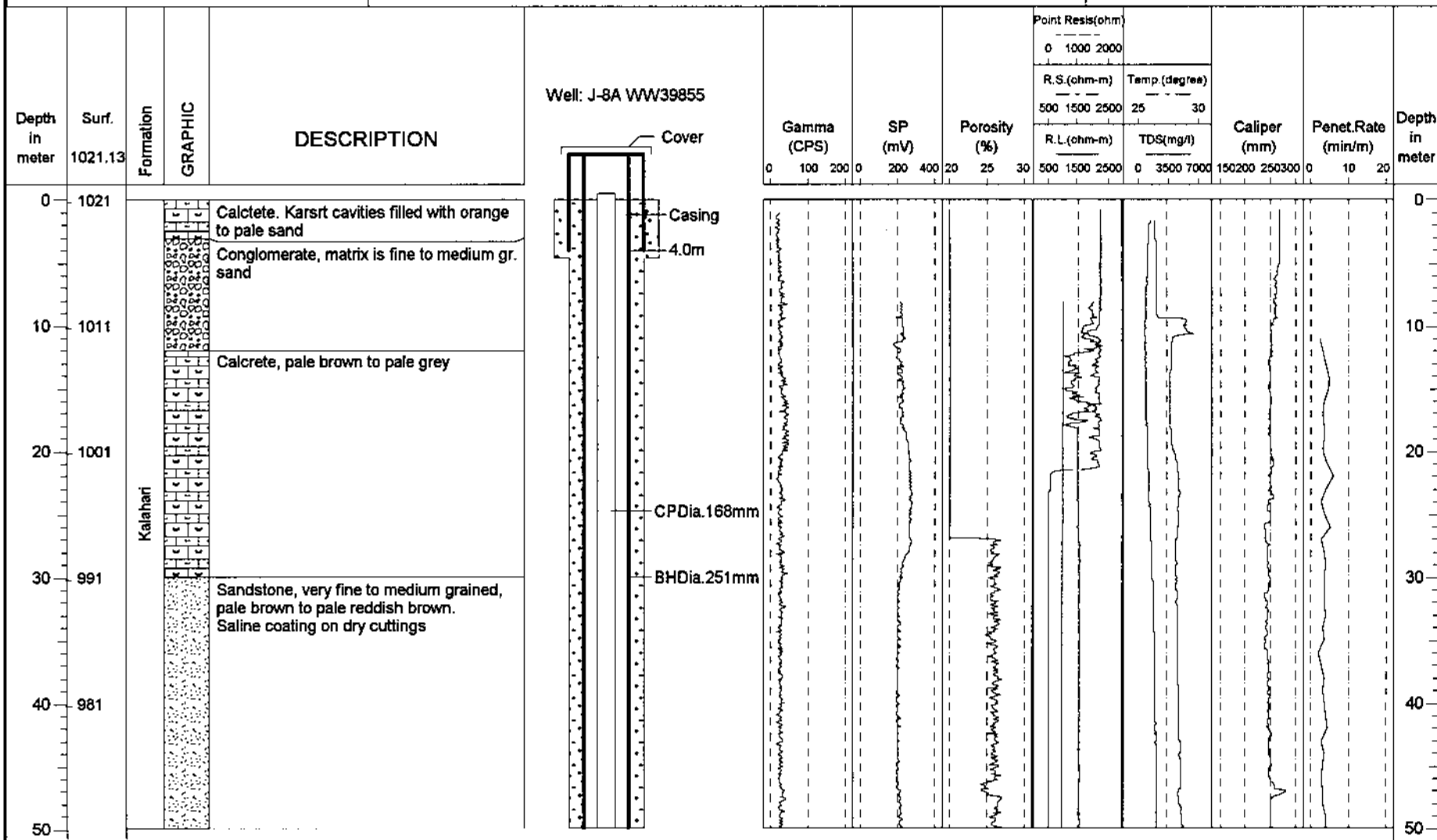
Depth in meter	Surf. 1021.25	Formation	GRAPHIC	DESCRIPTION	Well: J-8K WW39854	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter				
									R.S.(ohm-m)	Temp.(degree)							
									0 1000 2000	15 20 25							
									500 1000 1500	500 1000 1500	0 3000 6000	100 200 300	0 2.5 5				
									0 25 50	150 200 250 300	20 25 30 35	R.L.(ohm-m)	TDS(mg/l)				
100	921	Kalahari											100				
110	911												110				
120	901												120				
130	891												130				
140	881											140					
150													150				

66

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46174
Longitude : E 19.43373
Elevation : 1,021.13mASL
Drilling Depth : 250.0m
SWL : 172.32mBGL

Commenced : 23/Jul/2000
Completed : 29/Jul/2000
Pumping Test Date : 7 - 12/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)



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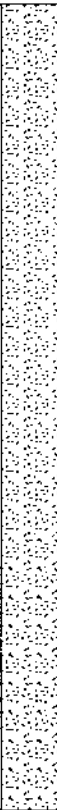
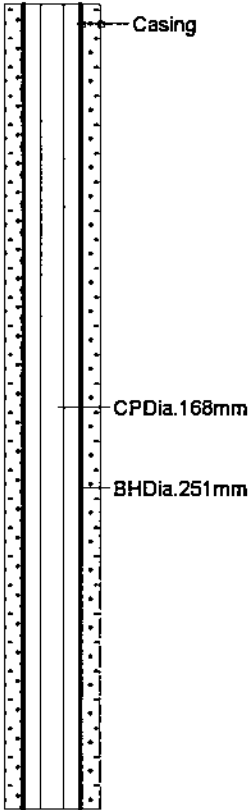
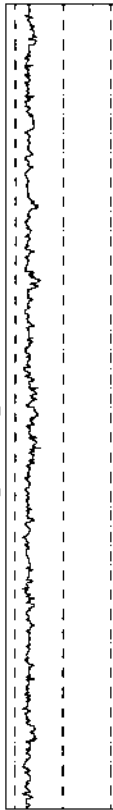
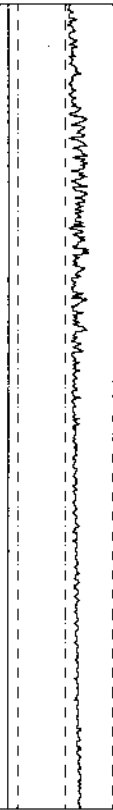
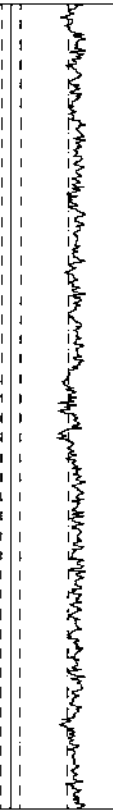
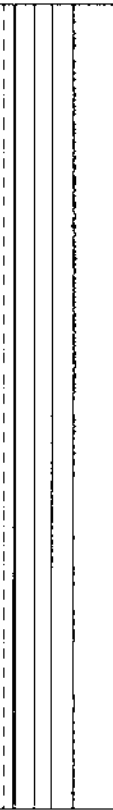
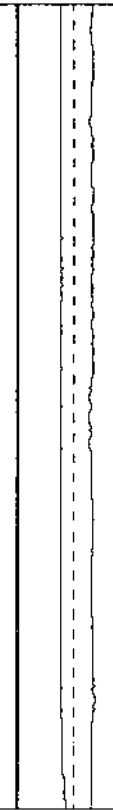

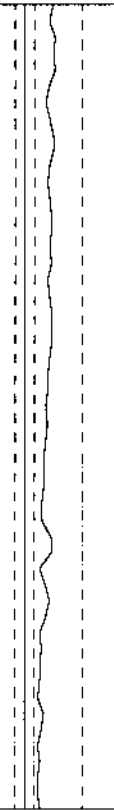
BOREHOLE LOG J-8A WW39855

(Page 2 of 5)

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46174
Longitude : E 19.43373
Elevation : 1,021.13mASL
Drilling Depth : 250.0m
SWL : 172.32mBGL

Commenced : 23/Jul/2000
Completed : 29/Jul/2000
Pumping Test Date : 7 - 12/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)

Depth in meter	Surf. 1021.13	Formation	GRAPHIC	DESCRIPTION	Well: J-8A WW39855	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter
									0 1000 2000	R.S.(ohm-m)			
						0 100 200	0 200 400	20 25 30	500 1500 2500	25 30	150200 250300	0 10 20	
50	971	Kalahari		Sandstone, very fine to medium grained, pale brown to pale reddish brown. Saline coating on dry cuttings									50
60	961												60
70	951												70
80	941												80
90	931												90
100													100

18

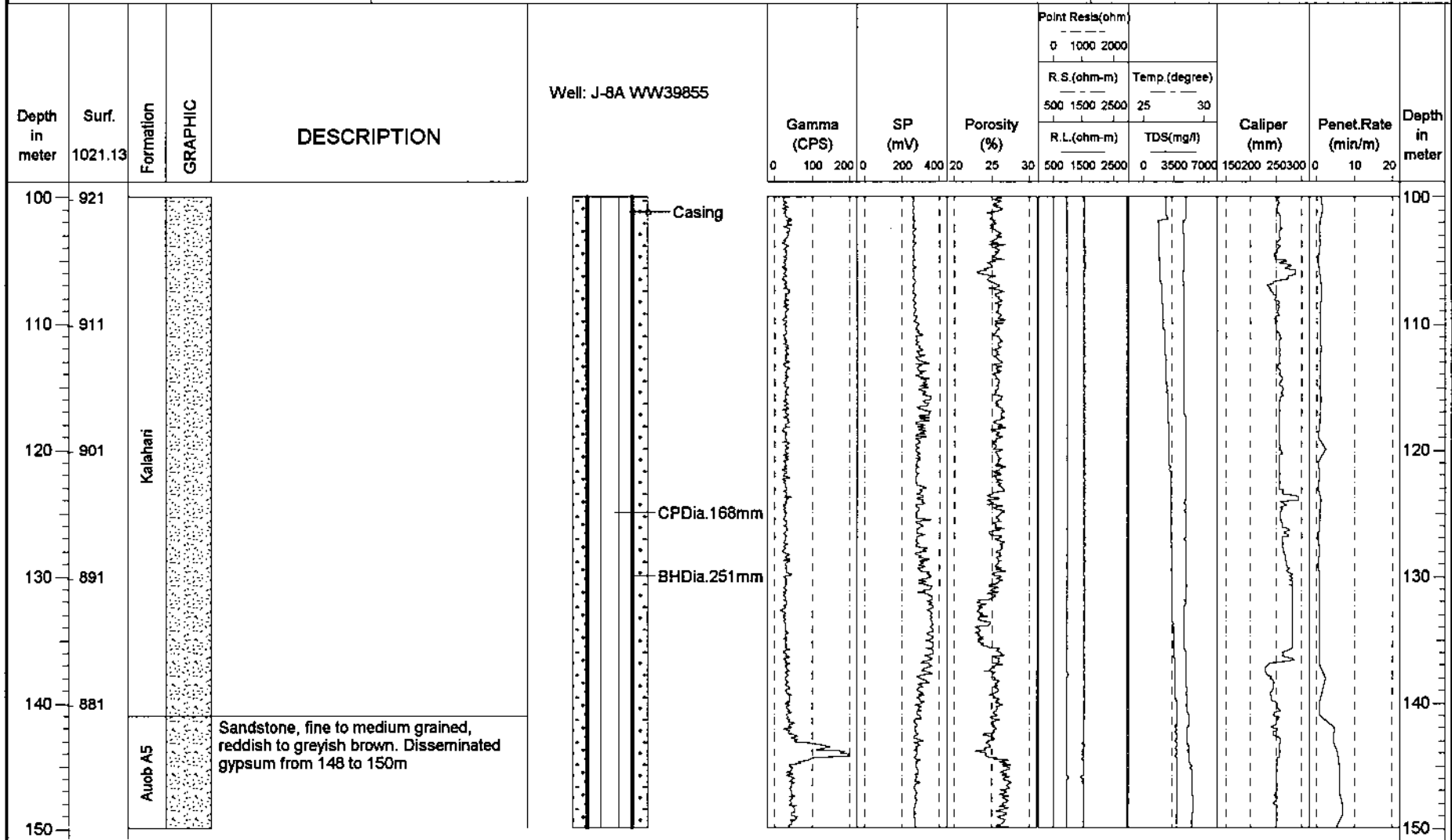
BOREHOLE LOG J-8A WW39855

(Page 3 of 5)

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46174
Longitude : E 19.43373
Elevation : 1,021.13mASL
Drilling Depth : 250.0m
SWL : 172.32mBGL

Commenced : 23/Jul/2000
Completed : 29/Jul/2000
Pumping Test Date : 7 - 12/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)

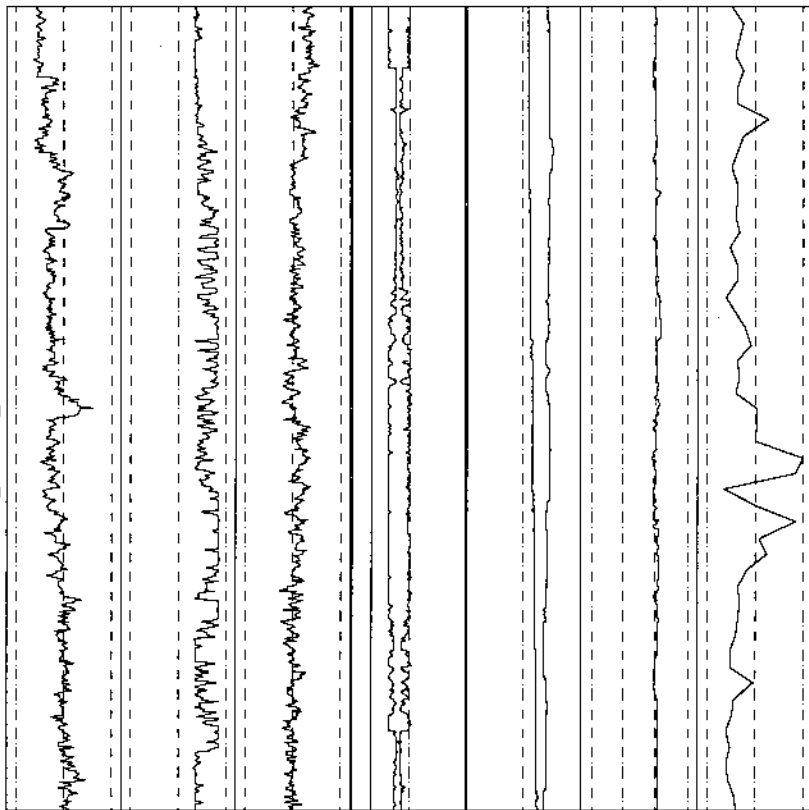
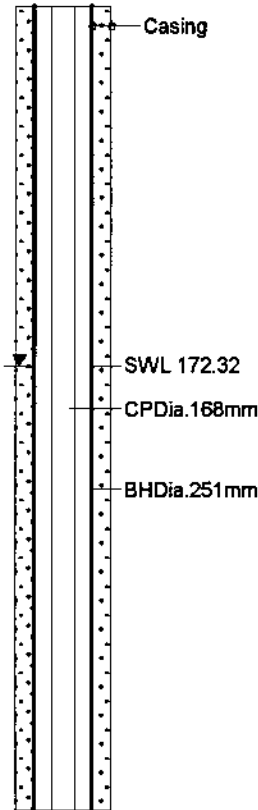


The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46174
Longitude : E 19.43373
Elevation : 1,021.13mASL
Drilling Depth : 250.0m
SWL : 172.32mBGL

Commenced : 23/Jul/2000
Completed : 29/Jul/2000
Pumping Test Date : 7 - 12/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)

Depth in meter	Surf. 1021.13	Formation	GRAPHIC	DESCRIPTION	Well: J-8A WW39855										Depth in meter					
					Gamma (CPS)	SP (mV)	Porosity (%)	R.S.(ohm-m)	Temp.(degree)	R.L.(ohm-m)	TDS(mg/l)	Caliper (mm)	Penet.Rate (min/m)							
150	871	Aurb A5		Basalt, very thin, 1 meter of thickness														150		
				Sandstone, very hard baked, purplish brown																
160	861			Sandstone, medium to coarse grained, purplish brown																160
				Sandstone, coarse grained, with minor intercalated red Shale																
170	851	Aurb A5		Sandstone, purplish to purplish brown, abundant muscovite, slightly feldspathic														170		
180	841	Aurb A4		Shale, purplish with intercalated lamination well developed Sandstone														180		
190	831			Shale, dark grey. Regular pyrite in cuttings																190
200																		200		



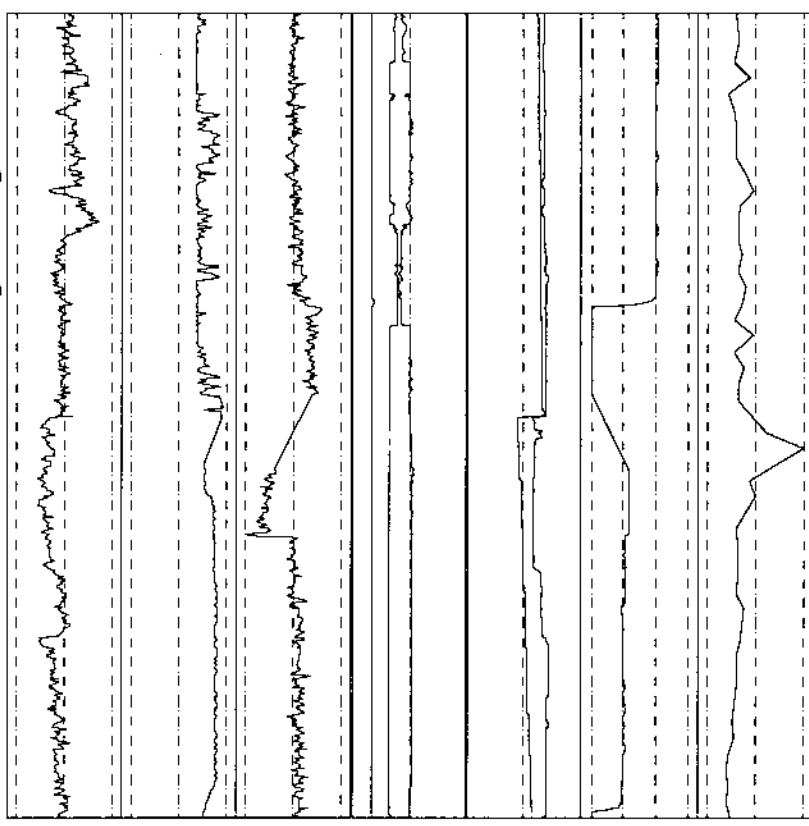
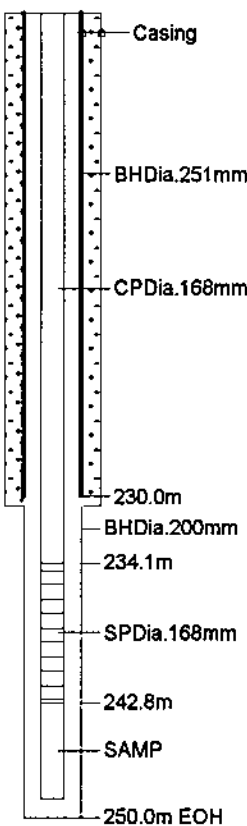
88

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46174
Longitude : E 19.43373
Elevation : 1,021.13mASL
Drilling Depth : 250.0m
SWL : 172.32mBGL

Commenced : 23/Jul/2000
Completed : 29/Jul/2000
Pumping Test Date : 7 - 12/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)

Depth in meter	Surf. 1021.13	Formation	GRAPHIC	DESCRIPTION	Well: J-8A WW39855	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter
									0 1000 2000	R.S.(ohm-m)			
						0 100 200 0	200 400 20	20 25 30	500 1500 2500	0 3500 7000	150200 250300	0 10 20	
200	821	Auob A4											200
210	811	Auob A3		Sandstone, fine to medium grained, grey, with intercalated dark grey Siltstone. Abundant pyrite at 214m.									210
220	801	Auob A2		Shale, grey to dark grey, with minor piritiferous Sandstone									220
230	791	Auob A1		Sandstone, medium grained, pale grey, muscovite									230
240	781	U. Mukorob		Shale, pale grey, with intercalated Siltstone									240
250													250



h9

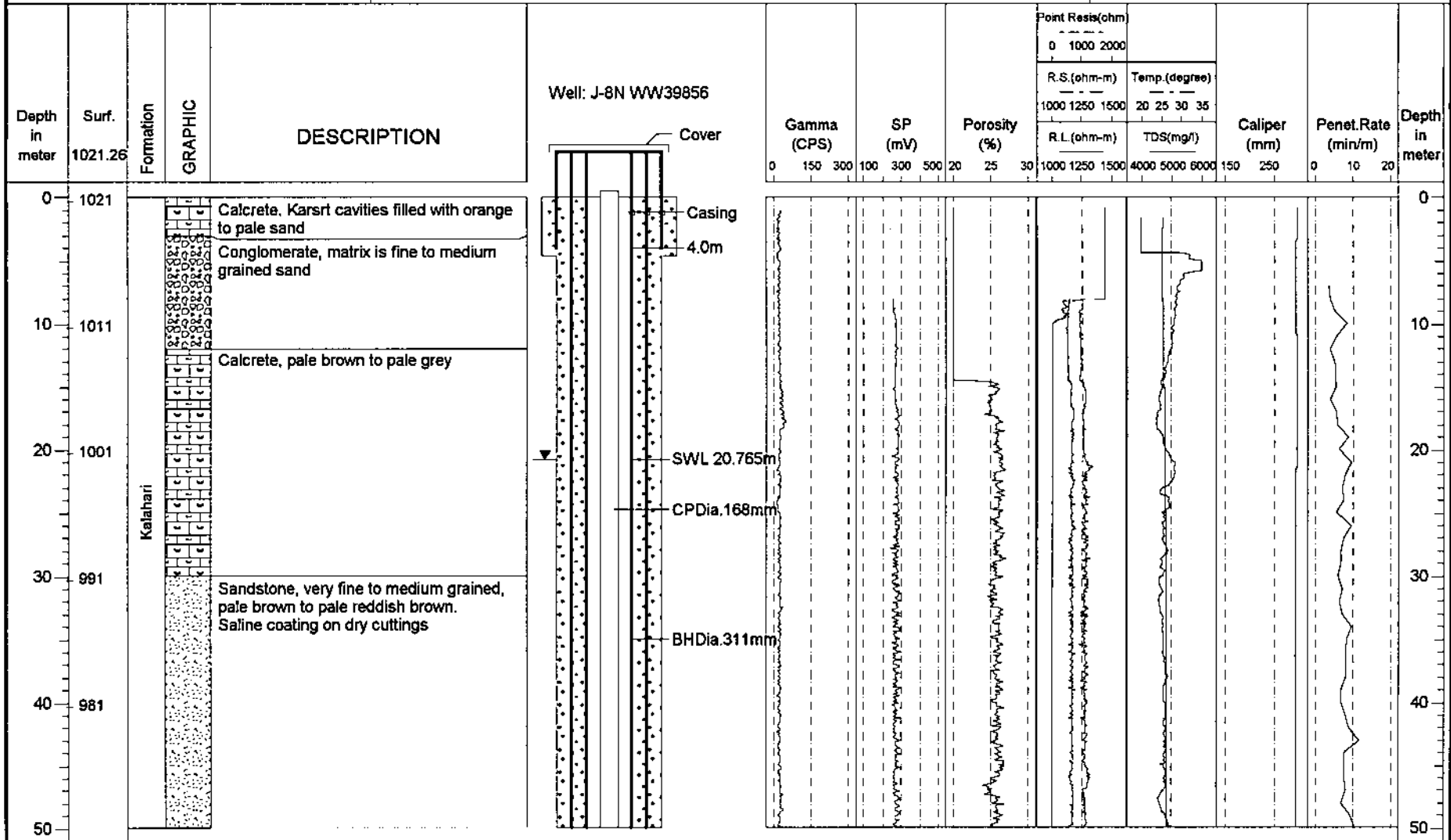
BOREHOLE LOG J-8N WW39856

(Page 1 of 7)

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stamriet) Artesian Basin

Latitude : S 25.46148
Longitude : E 19.43324
Elevation : 1,021.26mASL
Drilling Depth : 346.0m
SWL : 20.765mBGL

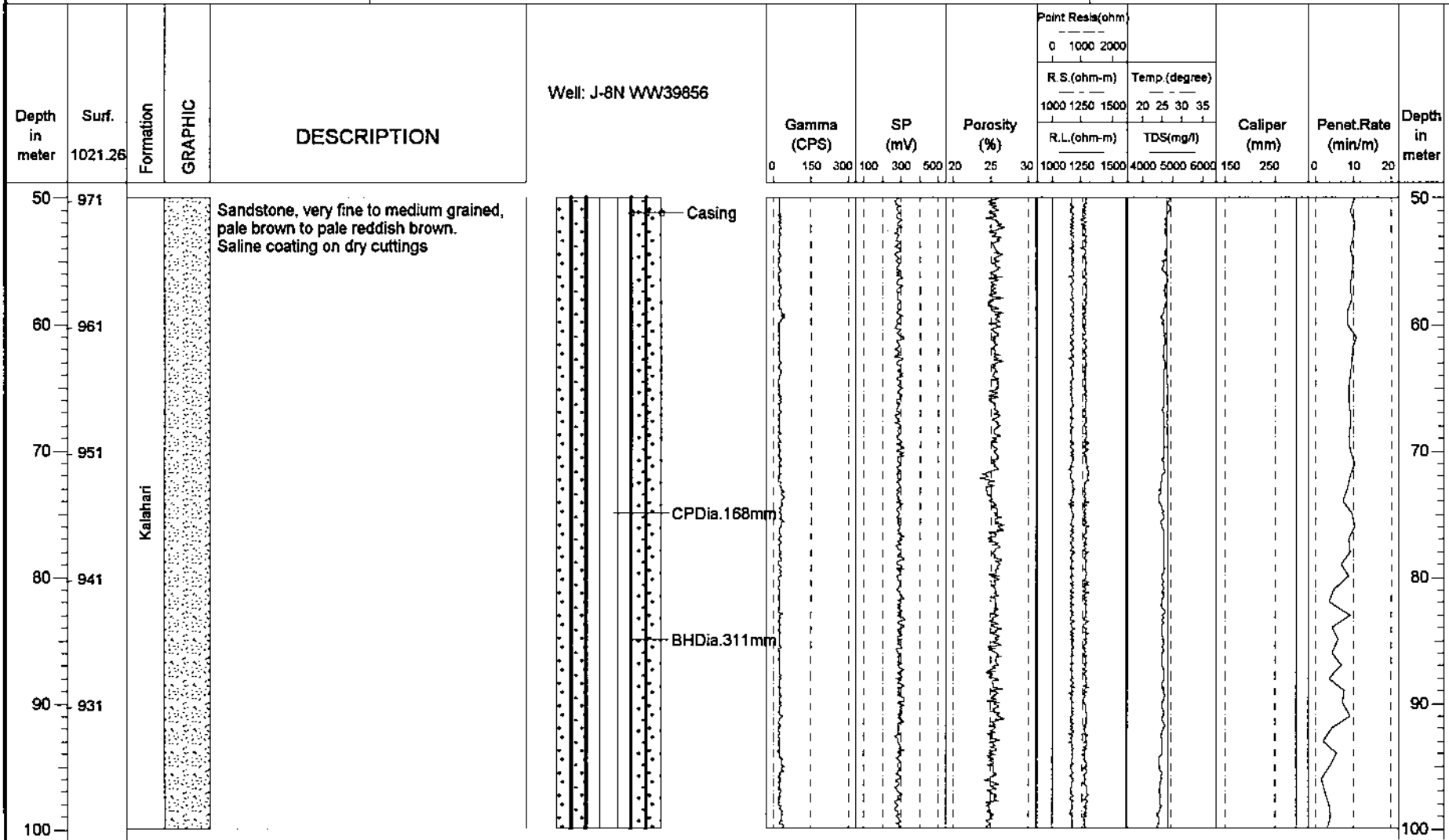
Commenced : 09/Jul/2000
Completed : 27/Jul/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : inextractable
Farm Name : Tweerivier(R481)



The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46148
Longitude : E 19.43324
Elevation : 1,021.26mASL
Drilling Depth : 346.0m
SWL : 20.765mBGL

Commenced : 09/Jul/2000
Completed : 27/Jul/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)




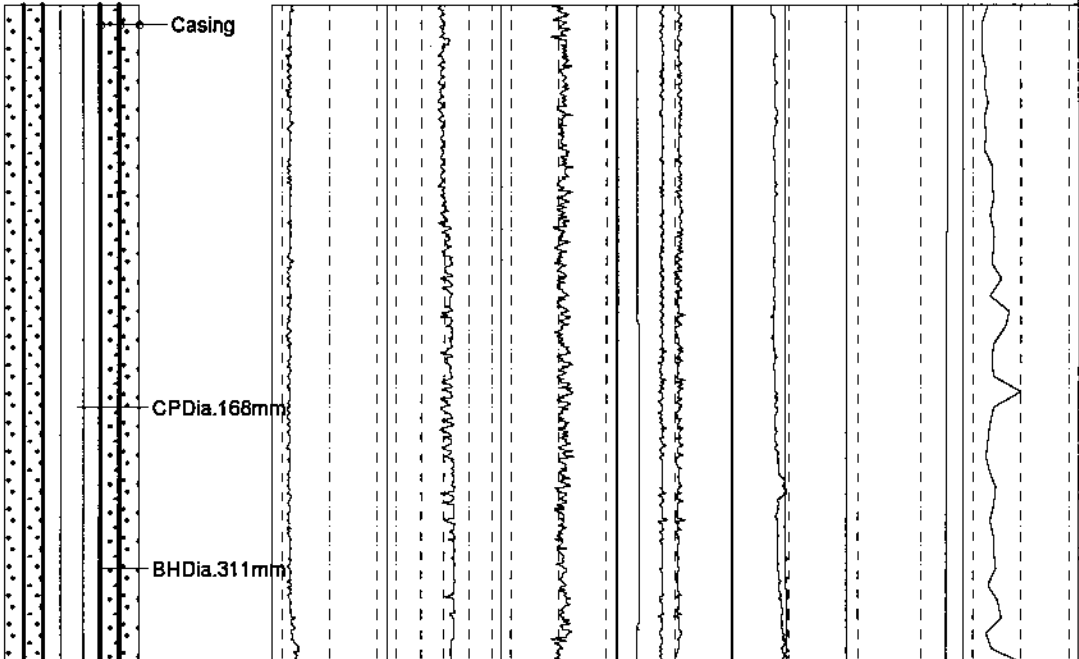

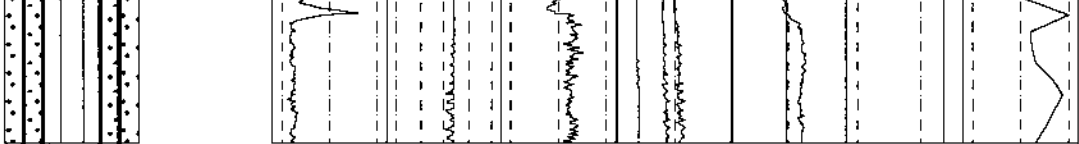
BOREHOLE LOG J-8N WW39856

(Page 3 of 7)

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46148
Longitude : E 19.43324
Elevation : 1,021.26mASL
Drilling Depth : 346.0m
SWL : 20.765mBGL

Commenced : 09/Jul/2000
Completed : 27/Jul/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)

Depth in meter	Surf. 1021.26	Formation	GRAPHIC	DESCRIPTION	Well: J-8N WW39856										Depth in meter											
					Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)			Caliper (mm)	Penet.Rate (min/m)														
								R.S.(ohm-m)	Temp.(degree)				R.L.(ohm-m)	TDS(mg/l)												
0	150	300	100	300	500	20	25	30	1000	1250	1500	20	25	30	35	1000	1250	1500	4000	5000	6000	150	250	0	10	20
100	921	Kalahari													100											
110	911				110																					
120	901				120																					
130	891				130																					
140	881	Autob A5		Sandstone, fine to medium grained, reddish to greyish brown. Disseminated gypsum from 148 to 150m											140											
150															150											

Casing

CPDia.168mm

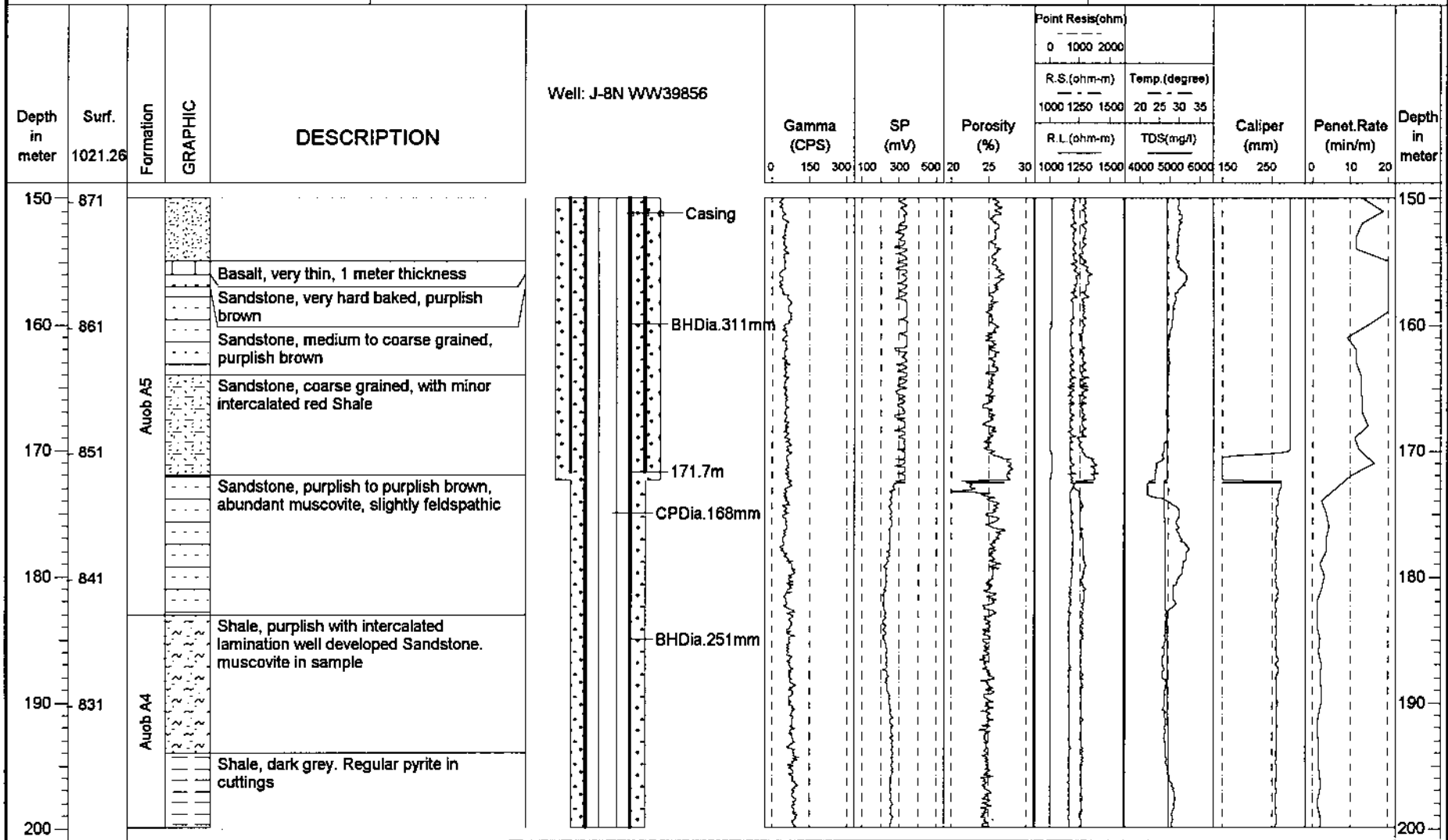
BHDia.311mm

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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46148
Longitude : E 19.43324
Elevation : 1,021.26mASL
Drilling Depth : 346.0m
SWL : 20.765mBGL

Commenced : 09/Jul/2000
Completed : 27/Jul/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)



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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46148
Longitude : E 19.43324
Elevation : 1,021.26mASL
Drilling Depth : 346.0m
SWL : 20.765mBGL

Commenced : 09/Jul/2000
Completed : 27/Jul/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)

Depth in meter	Surf. 1021.26	Formation	GRAPHIC	DESCRIPTION	Well: J-8N WW39856		Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter															
					0	1000				2000	R.S.(ohm-m)				Temp.(degree)														
										1000	1250	1500	20	25	30	35													
										R.L.(ohm-m)		TDS(mg/l)																	
										0	150	300	100	300	500	20	25	30	1000	1250	1500	4000	5000	6000	150	250	0	10	20
200	821	Auob A4												200															
210	811	Auob A3		Sandstone, fine to medium grained, grey, with intercalated dark grey Siltstone. Abundant pyrite at 214m.										210															
220	801	Auob A2		Shale, grey to dark grey, with minor piritiferous Sandstone										220															
230	791	Auob A1		Sandstone, medium grained, pale grey, muscovite										230															
240	781	U Mukorob		Shale, pale grey, with intercalated Siltstone										240															
250														250															

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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46148
Longitude : E 19.43324
Elevation : 1,021.26mASL
Drilling Depth : 346.0m
SWL : 20.765mBGL

Commenced : 09/Jul/2000
Completed : 27/Jul/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)

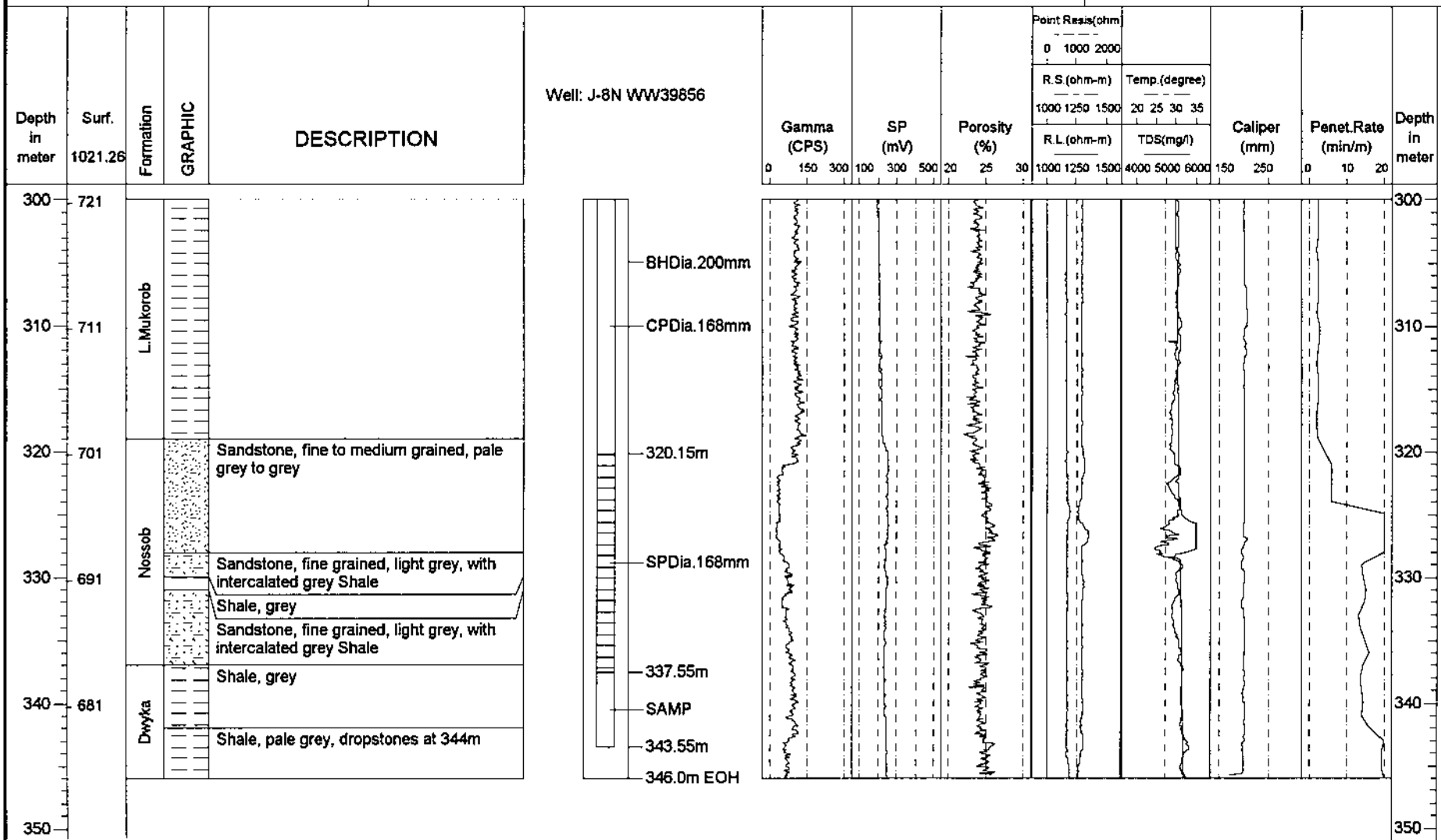
Depth in meter	Surf. 1021.26	Formation	GRAPHIC	DESCRIPTION	Well: J-8N WW39856	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resis(ohm)		Caliper (mm)	Penet. Rate (min/m)	Depth in meter				
									R.S. (ohm-m)					Temp. (degree)			
									1000	1250				1500	20	25	30
250	771	U. Mukorob		Shale, light grey to grey									250				
260	761												260				
270	751	L. Mukorob											270				
280	741												280				
290	731												290				
300													300				

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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 25.46148
Longitude : E 19.43324
Elevation : 1,021.26mASL
Drilling Depth : 346.0m
SWL : 20.765mBGL

Commenced : 09/Jul/2000
Completed : 27/Jul/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : Inextractable
Farm Name : Tweerivier(R481)

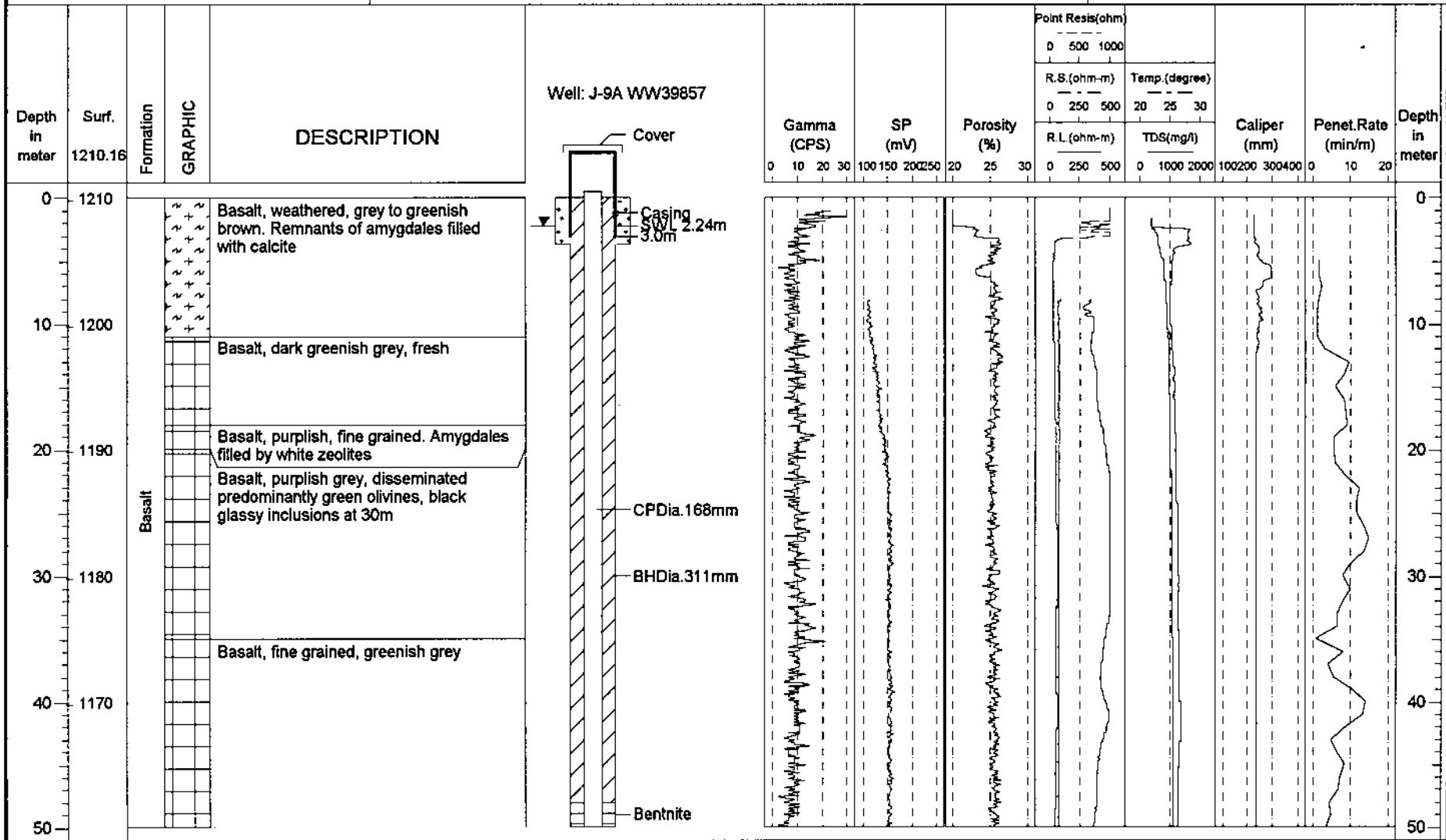


1/b

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.00182
Longitude : E 18.21529
Elevation : 1,210.16mASL
Drilling Depth : 141.5m
SWL : 2.24mBGL

Commenced : 12/Aug/2000
Completed : 16/Aug/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : 45.0m³/h
Farm Name : Klein Swarte Modder(R135)

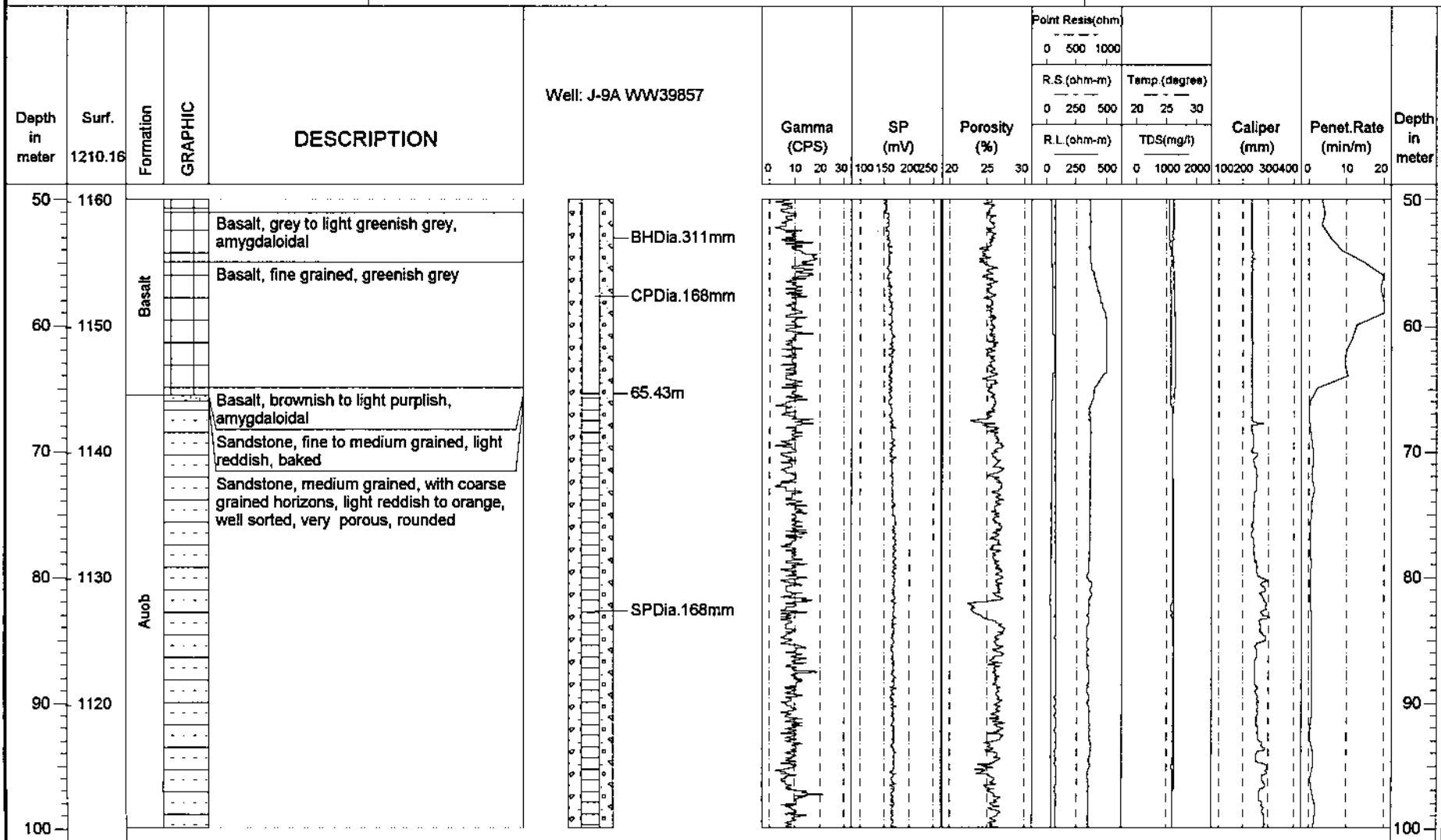


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The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.00182
Longitude : E 18.21529
Elevation : 1,210.16mASL
Drilling Depth : 141.5m
SWL : 2.24mBGL

Commenced : 12/Aug/2000
Completed : 16/Aug/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : 45.0m³/h
Farm Name : Klein Swarte Modder(R135)

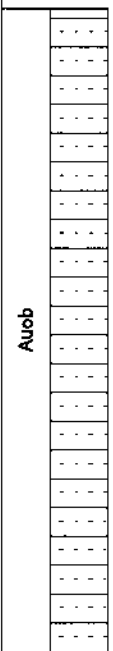
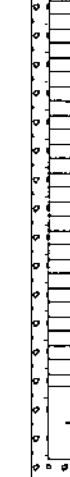
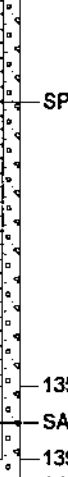


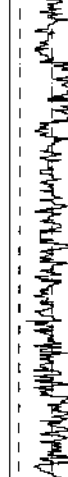




8b

The Study on
the Groundwater Potential Evaluation
and Management Plan in the Southeast
Kalahari (Stampriet) Artesian Basin

Latitude : S 24.00182
Longitude : E 18.21529
Elevation : 1,210.16mASL
Drilling Depth : 141.5m
SWL : 2.24mBGL

Commenced : 12/Aug/2000
Completed : 16/Aug/2000
Pumping Test Date : 8 - 16/Sep/2000
Yield : 45.0m3/h
Farm Name : Klein Swarte Modder(R135)

Depth in meter	Surf. 1210.16	Formation	GRAPHIC	DESCRIPTION	Well: J-9A WW39857	Gamma (CPS)	SP (mV)	Porosity (%)	Point Resist(ohm)		Caliper (mm)	Penet.Rate (min/m)	Depth in meter	
									R.S.(ohm-m)	Temp.(degree)				
						0 10 20 30	100 150 200 250	20 25 30	0 250 500	20 25 30	0 1000 2000	100 200 300 400	0 10 20	
100	1110	Auob			BHDia.311mm SPDia.168mm 135.33m SAMP 139.83m 141.5m EOH								100	
110	1100												110	
120	1090												120	
130	1080												130	
140	1070			Rhyolite, very fine to fine crystalline matrix, pale yellowish									140	
150														150

hb

APPENDIX J

Hydrocensus Format

Date of survey:/...../.....

Farm No./.....

JICA GROUNDWATER SURVEY - FARMS IN STAMPRIET ARTESIAN BASIN

I GENERAL INFORMATION

OWNER/Manager/Tenant/Other⁸: ()

ADDRESS:

TEL.:FAX:e-mail:

FARM NAME:Original Farm No.

Homestead Latitude:°S Longitude:°E
00 dddd* 00 dddd*

Area of farm [ha]:

No. of people in household(s)

Farmer:Employees:Other:

Lodges:..... (number of daily guests on average)

Are rainfall records kept? Y/NAre water levels recorded? Y/N
.....

II LIVESTOCK INDUSTRY:

Carrying capacity of farm

ha/Large stock unit ha/Small stock unit:

No. of large stock (cattle, horse, donkey, big game, etc.)

No. of small stock (sheep, goats, ostriches, small game, etc.)

Intended changes⁹:

III PRESENT WATER USE:

Domestic use [m³/d] Stock watering [m³/d]

Irrigation [m³/d] Surface water used [%]

IV GROUNDWATER INFORMATION: No. of boreholes drilled¹⁰..... in use.....

No. of groundwater points¹¹... Spring(s) dried up when

V POWER SUPPLY (at homestead):

NAMPOWER GENERATOR SOLAR OTHER

VI AGRICULTURE/LIVESTOCK

Grazing land . [ha] Irrigated land [ha] Unusable land¹² [ha]

Major irrigated crop types and area

Crop:..... Area: [ha] Crop:.....Area:[ha]

Crop:.....Area: [ha]

⁸ Delete inapplicable. (If the Respondent is not the owner note down the address of the owner separately. State YEAR of residence in brackets).

⁹ E.g. switching to game farming.

¹⁰ including dry, destroyed, unsuitable boreholes.

¹¹ including wells and springs.

¹² e.g. pans.

Intended increased irrigation area?..... [ha]

Irrigation method:

Rain gun... Sprinkler.. Flood ... Drip ... Other [ha]

Type of fertiliser..... application rate[kg/ha]

Pattening period of beef cattle..... [months](kg/head when selling)

Feed source:

Wet season: Grazing, Hay, Lucerne, Concentrate, Other...

Dry season: Grazing, Hay, Lucerne, Concentrate, Other...

Breeding method:

Artificial insemination, Natural breeding, ET, Other

Farm No.

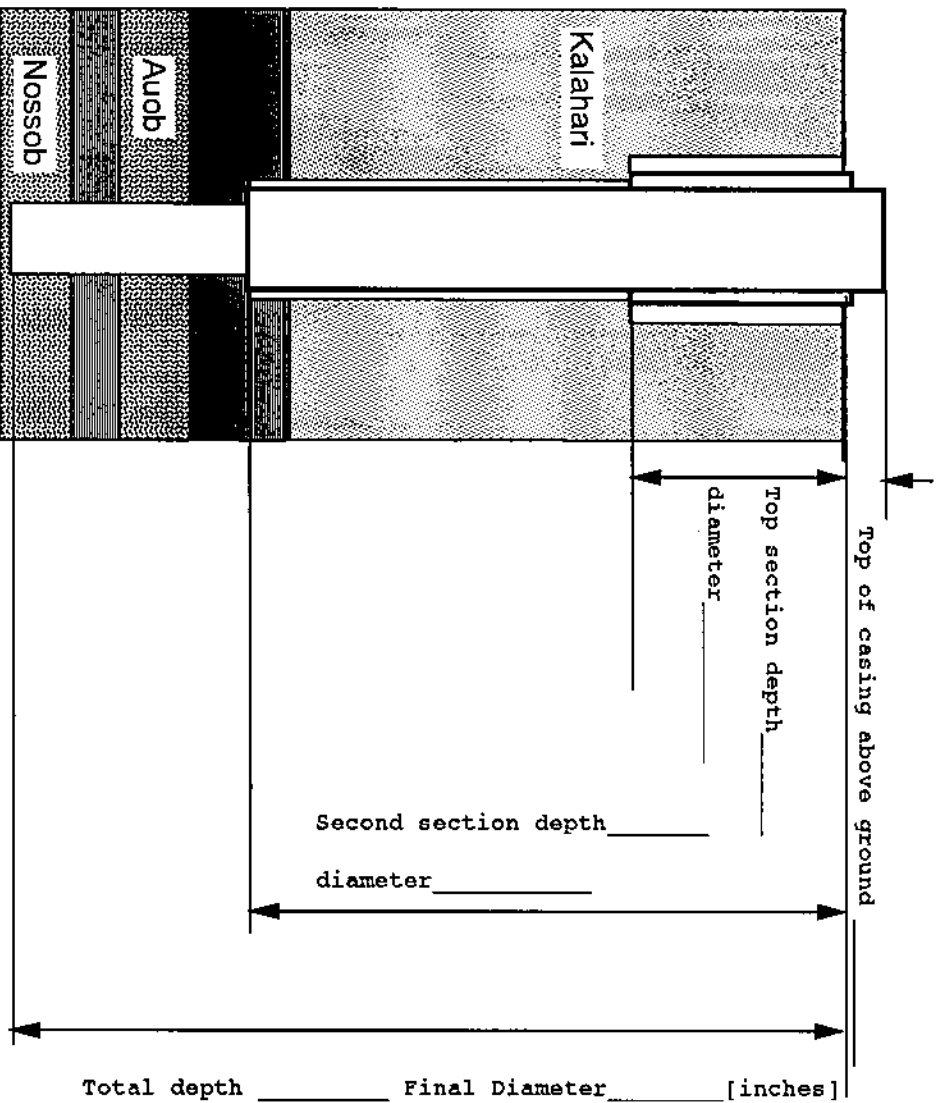
Date of survey:/...../.....

Farm No./.....

INDIVIDUAL BOREHOLE; DUG WELL; AND SPRING INFORMATION

I. IDENTIFICATION AND LOCATION Borehole, Well, Spring, Other
 Borehole No. on sketch..... Borehole Name.....
 Top- and well No.....
 Permit No. (DWA).....Drilling report available: Y/N....
 Borehole latitude:.....°S Longitude:.....°E
 Date of completion..... Approximate ground elevation.....[mamsL]

II. BOREHOLE CONSTRUCTION



Casing	Depth to top	Depth to bottom	Diameter	Thickness	Material
outer					
second					
third					
Screen	Depth to top	Depth to bottom	Diameter	Thickness	Material
(1)					
(2)					
Openings	Width	Length	Hor. Spacing	Vert. Spacing	
(1)					
(2)					

III. HYDROGEOLOGY

	Water struck		Level ¹	Yield ²	Quality ³	Aquifer
	From	To				
1st water						
2nd water						
3rd water						
4th water						

1 Rest water level when water was struck² Individual yield (indicate if cumulative)
 2 Apparent quality or Analysis number

Water level after completion³.....Check if leakage is indicated⁴
 Depth and type of seal:.....
 Description of strata, etc.¹⁵.....

IV. INSTALLATION AND OPERATION

Used, Not used, Destroyed
 Windpump, Mono, Cylinder, Submersible, WP/Power Head Other
 State Make, Model or other information regarding capacity.....

Flow meter: equipped, broken, none. Reading.....
 Depth of installation (PID).....Pumping operation: [h/d]^f
 Present water usage (average annual):
 Domestic water [m³/d]. Stock watering [m³/d].

Irrigation..... [h/d]. Unknown¹⁷ Distance to kraal..... [m]
 Direction to kraal..... [°]

V. FIELD MEASUREMENTS

Electrical conductivity:..... [ms/m] Temperature: [°C]
 Water level:[m], Rest WL, Recovering/Affected, Pump WL
 Water sample taken Bottle No:

Reservoir: Height:..... Diameter: Material: ... covered/closed
 OTHER REMARKS⁹.....

- 13 Enter 0,00 for free flowing holes and springs.
- 14 State details under Remarks.
- 15 Indicate bottom of Kalahari, upper shale. Anob, lower shale, basalt, dolerite etc.; depth at which casing was sealed. State number of Borehole completion report, if known. Use separate sheet if required.
- 16 Alternatively approximate annual abstraction.
- 17 Calculate and state under Remarks if unknown.
- 18 Effects on Humans/animals/irrigation, etc.