MORGANITE ELECTRICAL CARBON
PPC PERMIT VP3339PD

ANNUAL GROUNDWATER REPORT

JANUARY 2007

Prepared for:

MORGANITE ELECTICAL CARBON

ExCAL Limited
ExCAL House
Capel Hendre Industrial Estate
Ammanford
Carmarthenshire
SA18 3SJ

Tel No: 01269 831606
Fax No: 01269 841867

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	Prepared by	**Reviewed by**	**Approved by**
ORIGINAL	**Name** **S Burley**	**Name** **S Whitehouse**	**Name** **Dr R Prigmore**
DATE	**Signature**	**Signature**	**Signature**

REVISION	**Name**	**Name**	**Name**
DATE	**Signature**	**Signature**	**Signature**

REVISION	**Name**	**Name**	**Name**
DATE	**Signature**	**Signature**	**Signature**

REVISION	**Name**	**Name**	**Name**
DATE	**Signature**	**Signature**	**Signature**

MORGANITE

ANNUAL GROUNDWATER REPORTING

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1.0 INTRODUCTION

ExCAL have been commissioned to undertake groundwater monitoring for Morganite in accordance with their Site Protection and Monitoring Program.

The groundwater monitoring commenced in October 2006 and this report provides the sampling methodology, record forms and results of monitoring to date.

All laboratory analysis was undertaken by STL Laboratories, UKAS accredited.

2.0 GROUNDWATER MONITORING PROGRAMME

2.1 Introduction

This procedure provides guidance that is followed by all ExCAL staff when monitoring groundwater and taking samples.

2.2 Staff Responsibility

All site personnel undertaking groundwater monitoring follow this procedure. The project manager will ensure all personnel are proficient in groundwater sampling and are familiar with these procedures.

2.3 Site Equipment

The following site equipment is required to undertake groundwater monitoring: -

- Log Book
- Well Construction Details
- Site/monitoring well location Plan
- Dip Meter
- Bailers
- Decontamination Equipment
- Sampling Equipment (Bottles, Fixing Agents (if necessary) labels, chain of custody forms, icepacks)

2.4 Well Purging

Monitoring wells are always be purged prior to sampling on each and every occasion. Purging involves the removal of 'stagnant' water that has been in contact with atmospheric gases and the well casing and screen materials. This contact can affect the water chemistry and oxygen can diffuse into the water and dissolved gases can volatilise or oxidise.

Organics may be sorbed by the well casing and trace elements may be leached from the well casing. Purging ensures a representative sample is obtained from the aquifer.

2.4.1 Purging Procedure

1. Dip water Level and Well Depth and Measure Internal Well Diameter.

2. Calculate Well Volume (50mm well: 0.5m = 1L and 35mm well : 1m = 1L)

3. Remove 3 x well volume using either dedicated bailer or submersible pump positioned at the TOP of the water column[*1].

([*1]If the water level is above the screened area and the pump intake is within the screened area, it is possible for a section of stagnant water to remain within the well. It is good practice, in such cases, to commence pumping at the top of the water table and slowly lower the pump during the purging process until the pump is within the screened section, when purging will be complete).

4. If the well purges dry, the water should be allowed to recover 90% of the pre-purge water level (or for two hours, which ever occurs first) prior to sampling.

5. In the case of sampling from domestic, industrial or public supply wells where a pump is permanently fixed within the well, the well should be pumped long enough to flush any pipework. If well construction details are available, the well should be purged of three well volumes. If this information is not available, the well should be pumped for approx. 15 minutes prior to sampling or until pH, temperature and specific conductivity stabilise. Care should be taken to adjust the pumping rate if necessary to avoid pumping the well dry[*2].

([*2]Pumping a well dry would lead to aeration of the well, resulting in volatile loss or change in the chemical characteristics of the aquifer nearest to the well. This will prevent a representative sample being collected).

2.5 Sample Collection

Groundwater samples should be collected immediately on completion of purging, unless significant drawdown has occurred in which case the well should be allowed to recover. Sampling must be undertaken within 2 hours of purging to ensure a representative sample is obtained.

All samples are collected using a dedicated bailer, which can be either Teflon or polyethylene (or stainless steel).

2.5.1 Sampling Procedure

The following procedure should be followed during sample collection (following purging): -

1. Lower bailer into well using nylon cord. Nylon cord should be knotted or marked in meter lengths and the bailer should be lowered to the mid point of the screened well section. Care should be taken to minimise agitation and exposure to the atmosphere.

2. Dispose of water from the first two bailers.

3. When sampling for volatiles take from the third bailer (ensure volatiles are placed in 60ml water vials with Teflon lid).

4. Sample for other determinants thereafter (ensure use of appropriate sample containers).

5. Record date and time of sample collection, the collection method, parameters to be analysed, the number and type of sample containers and any other information that may be relevant to interpretation.

6. Ensure all sample bottles are correctly labelled with the site reference number and borehole location.

7. All samples submitted to the laboratory must be accompanied by the laboratories chain of custody form.

3.0 RECORD FORMS

Sample Collection Form						Sheet …1… of ……2
Site Name Morriston		**EA Permit Number** VP3339PD			**Survey Reference** Groundwater Survey – October 2006	
Site Operator Morganite Electrical Carbon		**Weather Conditions** Overcast, dry			**Survey Personnel** Terrance Roberts	
		Monitoring Point or Sample Reference No.				
		BH5CH2M	BHD	BHA	BH7CH2M	WS11
Strategy and Equipment Used						
Sample type	GW/L/S/O	GW	GW	GW	GW	GW
Sample objective	(Use Code)	PC	PC	PC	PC	PC
Sample equipment	(State type)	BALER	BALER	BALER	BALER	BALER
Dedicated pump?	(Y/N)	N	N	N	N	N
Purge record?	(Y/N)	Y	Y	Y	Y	Y
Sample Collection Information						
Date of sample	dd/mm/yy	17/10/2006	17/10/2006	17/10/2006	17/10/2006	17/10/2006
Time of sample	hh:min	11:01	11:15	11:23	09:47	09:59
Time since purge	min	1	1	1	1	1
Pumping rate	(l/min)	Manual	Manual	Manual	Manual	Manual
Comments	-					

Sample Containers and Field Treatment									
Ref	Type	Vol	Filt	Prsv	Label Ref No or Sample Taken (Tick Box)				
1	Glass	1l	No	No	✓	✓	✓	✓	✓
2	Plastic	1l	No	No	✓	✓	✓	✓	✓

QC Sample Information					
Tick if QC sample					
QC sample type					
Main samples referred to					
QC sample referring to main sample					

Water Quality Measurements (if applicable)						
Use flow through cell	(Y/N)					
Temp	(deg C)					
pH	-					
EC	(S/cm)					
DO	(mg/l or %)					
Eh	mV					

Quality Assurance				Data Processing Trail		
	Name	Date	Initials		Date	Initials
Survey:	Terrance Roberts	17/10/06	TR	**Schedule Completed:**	10/01/07	JMB
QC Manager:	Mark Izzard	17/10/06	MI	**Data Validated:**	10/01/07	MI
Manager:	Sarah Burley	17/10/06	SB	**Computer Updated:**	10/01/07	SB

Sample Collection Form		Sheet …2… of ……2
Site Name Morriston	**EA Permit Number** VP3339PD	**Survey Reference** Groundwater Survey –September 2006
Site Operator Morganite Electrical Carbon	**Weather Conditions** Overcast, dry	**Survey Personnel** Terrance Roberts
	Monitoring Point or Sample Reference No.	
	BH6CH2M	

Strategy and Equipment Used						
Sample type	GW/L/S/O	GW				
Sample objective	(Use Code)	PC				
Sample equipment	(State type)	BALER				
Dedicated pump?	(Y/N)	N				
Purge record?	(Y/N)	Y				

Sample Collection Information						
Date of sample	dd/mm/yy	29/09/2006				
Time of sample	hh:min	10:10				
Time since purge	min	1				
Pumping rate	(l/min)	Manual				
Comments	-					

Sample Containers and Field Treatment									
Ref	Type	Vol	Filt	Prsv	Label Ref No or Sample Taken (Tick Box)				
1	Glass	1l	No	No	✓				
2	Plastic	1l	No	No	✓				

QC Sample Information					
Tick if QC sample					
QC sample type					
Main samples referred to					
QC sample referring to main sample					

Water Quality Measurements (if applicable)						
Use flow through cell	(Y/N)					
Temp	(deg C)					
pH	-					
EC	(S/cm)					
DO	(mg/l or %)					
Eh	mV					

Quality Assurance				Data Processing Trail		
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Survey:	Terrance Roberts	17/10/06	TR	**Schedule Completed:**	10/01/07	JMB
QC Manager:	Mark Izzard	17/10/06	MI	**Data Validated:**	10/01/07	MI
Manager:	Sarah Burley	17/10/06	SB	**Computer Updated:**	10/01/07	SB

4.0 RESULTS

Test Description	Units	BH5 CH2M	BHD	BHA	BH7CH2M	WS11	BH6CH2M
pH	pH units	6.3	6.9	6.9	7	6.8	7
Chloride	mg/l	16	7	8	10	16	14
Alkalinity as CaCO3	mg/l	300	158	303	276	119	449
Ammoniacal Nitrogen as N	mg/l	1.1	<0.3	<0.3	3.3	<0.3	0.6
Nitrate	mg/l	<0.3	<0.3	<0.3	<0.3	4.5	<0.3
Iron	mg/l	71.77	49.22	27.99	27.93	28.36	69.01
Calcium	mg/l	529	65	174	344	69	242
Magnesium	mg/l	35	8	20	45	8.2	18
Sodium	mg/l	33	13	17	22	19	22
Potassium	mg/l	24	9.7	11	20	8.3	21
Total Organic Carbon	mg/l	20.6	11.7	12.9	10.1	3	3.8
TPH	mg/l	0.33	NR	0.07	0.122	NR	0.05
PAH,Total	ug/l	NR	NR	<0.01	<0.01	216	0.05
Acenaphthene	ug/l	NR	NR	<0.01	<0.01	1.32	<0.01
Anthracene	ug/l	NR	NR	<0.01	<0.01	2.55	<0.01
Acenaphthylene	ug/l	NR	NR	<0.01	<0.01	<0.01	<0.01
Benzo-a-anthracene	ug/l	NR	NR	<0.01	<0.01	15.8	<0.01
Dibenz-a-h-anthracene	ug/l	NR	NR	<0.01	<0.01	1.43	<0.01
Benzo-k-fluoranthene	ug/l	NR	NR	<0.01	<0.01	6.08	<0.01
Benzo-a-pyrene	ug/l	NR	NR	<0.01	<0.01	12	<0.01
Benzo-g,h,i perylene	ug/l	NR	NR	<0.01	<0.01	9.56	<0.01
Chrysene	ug/l	NR	NR	<0.01	<0.01	23.1	0.03
Fluorene	ug/l	NR	NR	<0.01	<0.01	2.31	<0.01
Fluoranthene	ug/l	NR	NR	<0.01	<0.01	44.1	0.01
Indeno 1,2,3-cd pyrene	ug/l	NR	NR	<0.01	<0.01	6.53	<0.01

Test Description	Units	BH5 CH2M	BHD	BHA	BH7CH2M	WS11	BH6CH2M
Benzo-b-fluoranthene	ug/l	NR	NR	<0.01	<0.01	24.4	<0.01
Naphthalene	ug/l	NR	NR	<0.01	<0.01	0.24	<0.01
Phenanthrene	ug/l	NR	NR	<0.01	<0.01	29.5	<0.01
Pyrene	ug/l	NR	NR	<0.01	<0.01	36.8	0.01
Dibromofluoromethane	% Recovery	98.1	NR	97.9	98.5	NR	99.6
Toluene-d8	% Recovery	94.5	NR	94.1	93.3	NR	98.3
4-bromofluorobenzene	% Recovery	90.3	NR	92.2	91.9	NR	91
Dichlorodifluoromethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Chloromethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Chloroethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Bromomethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Vinyl Chloride	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Trichlorofluoromethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,1-Dichloroethene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Dichloromethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Trans-1,2-dichloroethene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,1-Dichloroethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Cis-1,2-dichloroethene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
2,2-Dichloropropane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Chloroform	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Bromochloromethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,1,1-Trichloroethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,1-Dichloropropene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,2-Dichloroethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Benzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Carbon Tetrachloride	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,2-Dichloropropane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Trichloroethene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0

Test Description	Units	BH5 CH2M	BHD	BHA	BH7CH2M	WS11	BH6CH2M
Bromodichloromethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Dibromomethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Cis-1,3-dichloropropene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Toluene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Trans-1,3-dichloropropene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,1,2-trichloroethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,3-dichloropropane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Tetrachloroethene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Dibromochloromethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,2-dibromoethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Chlorobenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,1,1,2-tetrachloroethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Ethyl Benzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
m,p-xylene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
o-xylene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Styrene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Bromoform	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Isopropylbenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,1,2,2-tetrachloroethane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,2,3-trichloropropane	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
n-propylbenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Bromobenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
2-chlorotoluene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,3,5-trimethylbenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
4-chlorotoluene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
tert-butylbenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,2,4-trimethylbenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
sec-butylbenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0

Test Description	Units	BH5 CH2M	BHD	BHA	BH7CH2M	WS11	BH6CH2M
p-isopropyltoluene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,3-dichlorobenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,4-dichlorobenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
n-butylbenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,2-dichlorobenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,2-dibromo-3-chloropropane	ug/l	<1.0	NR	<2.0	<2.0	NR	<2.0
1,2,4-trichlorobenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Hexachlorobutadiene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
Naphthalene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
1,2,3-trichlorobenzene	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0
MTBE	ug/l	<1.0	NR	<1.0	<1.0	NR	<1.0

NR = Sample analysis not required