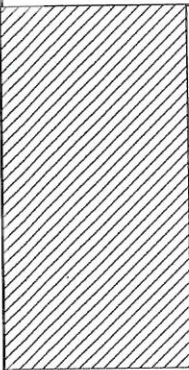
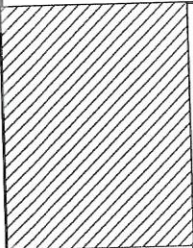


BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW030A		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 08/01/01		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 08/01/01		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: N/A	
						LOGGED BY: sc APPR'D BY:		SCREEN SLOT SIZE: N/A		
							DESCRIPTION	COMMENTS		
							Soft, dark brown, sandy SILT with rootlets (TOPSOIL)	Wet. No odour or staining	0	
							Medium soft, brown, sandy SILT with occasional gravel	Damp. No odour or staining		
							Soft, orange, slightly sandy, SILT with rootlets, occasional gravel and rare cobbles	Dry. No odour or staining	0.5	
							Soft to firm, light brown, very gravelly (sub-angular), and very sandy SILT with rootlets and occasional sub-rounded sandstone cobbles	Damp. No odour or staining		
							Becomes siltier and more orange-brown at 0.9m		1.0	
							Light grey-brown cobbly, gravelly (sub-rounded to sub-angular), silty SAND	Damp. No odour or staining		
							Borehole terminated at 1.2 mbgl on refusal		1.5	
									2.0	
									2.5	
									3.0	
									3.5	
									4.0	
									4.5	
									5.0	

LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Borehole backfilled with bentonite on completion		LEGEND  Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table	BOREHOLE LOG Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD	
		 Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun	App'd _____ Ref. SG/CR/BR5 Date MAR 2001 Job No. 39991-016-402	DRAFT

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW029B		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 09/01/01		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 09/01/01		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: N/A	
				LOGGED BY: sc APPR'D BY:		SCREEN SLOT SIZE: N/A				
							DESCRIPTION	COMMENTS	0	
							Soft, black, silty, gravelly, coarse SAND (TOPSOIL)	Damp. No odour or staining	0	
							Soft, brown, gravelly, sandy SILT with rootlets	Damp to dry. No odour or staining	0.5	
							Soft, orange, sub-rounded gravelly, sandy SILT	Damp to dry. No odour or staining	1.0	
							Loose, light brown, sandy, silty, cobbly sub-rounded sandstone GRAVEL	Dry to damp. No odour or staining	1.5	
							Soft, brown-grey, slightly silty SAND with occasional fine to medium gravel	Dry to damp. No odour or staining	2.0	
							Firm, yellow-brown, slightly clayey, friable SILT	Dry. No odour or staining	2.5	
							Soft, dark red-brown SAND Becoming pale yellow with depth	Dry. No odour or staining	3.0	
							Borehole terminated at 1.6 mbgl on refusal		3.5	
									4.0	
									4.5	
									5.0	

LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Borehole backfilled with bentonite on completion		LEGEND Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	BOREHOLE LOG Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun	App'd DRAFT Ref. SG/CR/BRS Date MAR 2001 Job No. 39991-016-402
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW029A		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 08/01/01		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 08/01/01		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: N/A	
				LOGGED BY: SC APPR'D BY:		SCREEN SLOT SIZE: N/A				
							DESCRIPTION	COMMENTS		
							0	Loose, brown, cobbly, gravelly, sandy SILT	Dry. No odour or staining	0
							0.5	Medium soft, orange-brown, gravelly, sandy SILT	Dry. No odour or staining	0.5
								Loose, yellow-brown, gravelly, sandy SILT	Dry. No odour or staining	
							2.0	Borehole terminated at 2.0 mbgl on refusal		2.0
							1.0			1.0
							1.5			1.5
							2.0			2.0
							2.5			2.5
							3.0			3.0
							3.5			3.5
							4.0			4.0
							4.5			4.5
							5.0			5.0

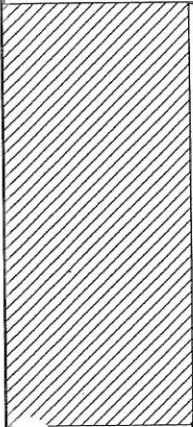
LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Borehole backfilled with bentonite on completion		LEGEND  Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table	BOREHOLE LOG Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD  App'd Ref. SG/CR/BRs Date MAR 2001 Job No. 39991-016-402	
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW028		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 09/01/01		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 09/01/01		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: N/A	
							LOGGED BY: SC APPR'D BY:		SCREEN SLOT SIZE: N/A	
							DESCRIPTION	COMMENTS		
							Soft, brown-black, sandy SILT (TOPSOIL)	Damp. No odour or staining	0	
							Loose, light brown, sandy, sub-rounded) GRAVEL with brick fragments (MADE GROUND)	Damp. No odour or staining		
							Soft, brown, slightly gravelly, sandy SILT	Damp to dry. No odour or staining	0.5	
							Medium soft, orange-brown, sandy SILT	Damp. No odour or staining		
							Soft, orange, sandy SILT	Damp to dry. No odour or staining	1.0	
							Medium soft, light brown sandy SILT	Damp. No odour or staining		
							Medium dense, light brown, very gravelly, sandy SILT	Damp. No odour or staining		
							Medium dense, grey-orange-brown, gravelly, very sandy SILT	Damp. No odour or staining	1.5	
							Sand content increases at 1.75-1.85m	Staining at 1.95m. Damp. Moderate hydrocarbon odour noted	2.0	
							Borehole terminated at 2.0 mbgl on refusal			
									2.5	
									3.0	
									3.5	
									4.0	
									4.5	
									5.0	

LOCATION / NOTES:		LEGEND		BOREHOLE LOG			
1. All measurements in m below ground level (mbgl) 2. Borehole backfilled with bentonite on completion		☒ Disturbed Sample ■ Undisturbed Sample * Headspace Analysis † Down Borehole Analysis ▽ Groundwater Table ▽ Perched Water Table		Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD URS Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun			
				App'd SG/CR/BRs Ref. MAR 2001 Date 39991-016-402 Job No.		DRAFT	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW027		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 09/01/01		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 09/01/01		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: N/A	
							LOGGED BY: SC APPR'D BY:		SCREEN SLOT SIZE: N/A	
							DESCRIPTION	COMMENTS		
						Loose, dark brown silty SAND with rootlets (TOPSOIL)	Damp. No odour or staining	0		
						Soft, brown, gravelly, sandy SILT	Damp. No odour or staining			
						Becomes slightly firmer and slightly clayey at 0.45m		0.5		
						Soft, orange, sandy SILT with occasional gravel and small cobbles	Damp. No odour or staining			
						Medium dense, sandy, silty sub-angular to sub-rounded GRAVEL with some orange-brown cobbles	Damp. No odour or staining	1.0		
*1.1 *1.2 *0.9 *1.1						Medium dense, light brown, very gravelly (sub-rounded), slightly silty SAND with occasional cobbles	Damp. No odour or staining	1.5		
						Orange-brown-yellow lens at 1.4m		2.0		
						Borehole terminated at 2.0 mbgl on refusal		2.5		
								3.0		
								3.5		
								4.0		
								4.5		
								5.0		

LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Borehole backfilled with bentonite on completion		LEGEND Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	BOREHOLE LOG Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun	App'd DRAFT Ref. SG/CR/BRS Date MAR 2001 Job No. 39991-016-402
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW026		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 09/01/01		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 09/01/01		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: N/A	
							LOGGED BY: SC APPR'D BY:		SCREEN SLOT SIZE: N/A	
							DESCRIPTION	COMMENTS		
							0	Loose, dark brown sandy SILT with rootlets (TOPSOIL)	Damp. No odour or staining	0
							0.25	Loose, soft, brown, sandy SILT with occasional gravel	Damp. No odour or staining	
							0.5	Becoming firmer towards base of unit		0.5
							0.75	Soft, orange, slightly gravelly, sandy SILT	Damp. No odour or staining	
							1.0	Loose, orange-brown, silty, sandy sub-rounded GRAVEL	Damp. No odour or staining	1.0
							1.25	Loose, light brown, sandy, cobbly sub-angular to sub-rounded GRAVEL	Damp. No odour or staining	
							1.5	Borehole terminated at 1.4 mbgl		1.5
							2.0			2.0
							2.5			2.5
							3.0			3.0
							3.5			3.5
							4.0			4.0
							4.5			4.5
							5.0			5.0

LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Borehole backfilled with bentonite on completion		LEGEND  Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table	BOREHOLE LOG Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD  Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun	App'd DRAFT Ref. SG/CR/BR5 Date MAR 2001 Job No. 39991-016-402
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BOREHOLE CONSTRUCTION		SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW024A/B		PAGE 1 of 1	
								START DATE: 21/12/00		DRILLING METHOD: DYNAMIC SAMPLING	
								FINISH DATE: 21/12/00		BOREHOLE DIAMETER: 128/113/98 mm	
								DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm	
								LOGGED BY: SG APPR'D BY:		SCREEN SLOT SIZE: 1 mm	
A	B	NUMBER	TYPE					DESCRIPTION	COMMENTS		
						0		Soft, dark brown, silty SAND with rootlets (TOPSOIL)	No odour or staining. Damp	0	
						0.5		Loose, black, sandy, fine to coarse GRAVEL comprising ash, brick and clinker with occasional cobble sized brick fragments (MADE GROUND)	Dry. No odour or staining	0.5	
		*87.4				0.5		Grades into fine to medium gravel	Free product on gravel. Moderate hydrocarbon odour	0.5	
		*61.4				1.0		Dense, brown-grey, gravelly, clayey SILT	Dry. Moderate hydrocarbon odour	1.0	
		*103				1.0		Grades into firm, brown-green, gravelly, sandy SILT		1.0	
						1.5		Cobble at base of unit		1.5	
		*4022				1.5		Soft, brown to dark brown, sandy SILT with some rootlets	Damp from 1.6m. Moderate hydrocarbon odour and staining.	1.5	
						2.0		Becomes light brown		2.0	
		*3172				2.0		Soft, grey, sandy SILT with occasional sub-rounded gravel with some rootlets	Wet from 1.9m. Moderate hydrocarbon odour	2.0	
		*3301				2.0		Becomes very gravelly and cobbly from 1.9m		2.0	
						2.5		Dense, yellow-brown, gravelly, very sandy SILT with occasional cobbles	Damp. Moderate hydrocarbon odour. Becoming wet from 2.3-2.5m	2.5	
		*2524				2.5				2.5	
						3.0		Dense, yellow-grey, sandy, cobbly SILT	Dry to damp. Moderate hydrocarbon odour	3.0	
		*4359				3.0				3.0	
						3.5				3.5	
						4.0				4.0	
						4.5				4.5	
						5.0		Borehole terminated at 3.0 mbgl		5.0	

LOCATION / NOTES:		LEGEND		BOREHOLE LOG		
1. All measurements in m below ground level (mbgl)		Disturbed Sample Undisturbed Sample * Headspace Analysis + Down Borehole Analysis ▽ Groundwater Table ▽ Perched Water Table	WESTERN MARGIN INVESTIGATION BP LLANDARCY REFINERY BP LLANDARCY LTD		URS Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun	
		Job Title Location Client		DRAFT Ref. SG/CR/BRS Date MAR 2001 Job No. 39991-016-402		

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW019A		PAGE 1 of 1
	NUMBER	TYPE					START DATE: 13/12/00	DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 13/12/00	BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical	SCREEN TYPE & DIAMETER: HDPE 1 mm	
							LOGGED BY: SG/SC APPR'D BY:		SCREEN SLOT SIZE: 1 mm
							DESCRIPTION		COMMENTS
					0		Loose, black, coarse SAND with some medium to coarse gravel comprising ash, and occasional clay lenses (MADE GROUND)		Damp (surface water). No odour or staining
					0.5				
			*3.1				Firm, dark grey, very silty CLAY (MADE GROUND)		Slight hydrocarbon odour. Dry. No staining
			*2.5		1.0		Loose, black, slightly sandy, fine GRAVEL with some medium to coarse gravel comprising ash, clinker and coal fragments (MADE GROUND)		No staining. Very slight hydrocarbon odour. Slightly damp.
					1.5				
			*5.6				Coarse gravel from 1.8-2m		
					2.0		Loose, yellow and red brick COBBLES with some sand and gravel (MADE GROUND)		Wet. Some staining and free product. Very strong hydrocarbon odour
			*9.9				Re-worked, loose, black, fibrous PEAT with frequent rootlets (MADE GROUND)		Natural / organic odour. Some staining
			*63.2		2.5		Firm, orange-brown and grey, slightly gravelly CLAY with metal fragment at 2.7m (MADE GROUND)		Staining and very strong hydrocarbon odour noted. Free product from 2.7 to 2.8m
			*84.2		3.0		Firm, brown, slightly clayey SILT with occasional sub-rounded medium to coarse gravel and some dark organic mottling		Dry. Slight hydrocarbon odour
			*11.9				Soft, light brown and orange, very sandy and gravelly (sub-angular) SILT		Wet. No staining or odour
					3.5		Loose, orange-brown SAND with some sub-rounded gravel		Damp. No staining or odour
			*4.4						
			*5.8		4.0		Medium dense to dense, orange-brown, very silty, very gravelly, fine SAND with occasional sub-angular, coarse sandstone gravel and cobbles		Damp. No staining or odour
					4.5				
					5.0		Borehole terminated at 5.0 mbgl		

LOCATION / NOTES:

- All measurements in m below ground level (mbgl)

LEGEND

- Disturbed Sample
- Undisturbed Sample
- Headspace Analysis
- Down Borehole Analysis
- Groundwater Table
- Perched Water Table

BOREHOLE LOG

Job Title **WESTERN MARGIN INVESTIGATION**

Location **BP LLANDARCY REFINERY**

Client **BP LLANDARCY LTD**

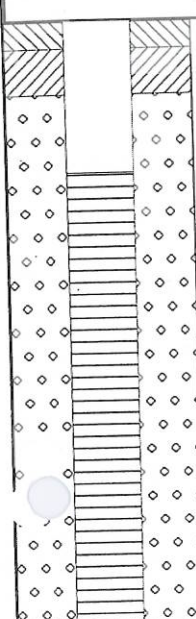
App'd _____

Ref. SG/CR/BRS

Date MAR 2001

Job No. 39991-016-402

DRAFT

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW017B		PAGE 1 of 1		
	NUMBER	TYPE					START DATE: 14/12/00		DRILLING METHOD: DYNAMIC SAMPLING		
							FINISH DATE: 14/12/00		BOREHOLE DIAMETER: 128/113/98 mm		
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm		
							LOGGED BY: sc APPR'D BY:		SCREEN SLOT SIZE: 1 mm		
						DESCRIPTION		COMMENTS			
						0		Loose, dark brown GRAVEL comprising ash and some sand with rootlets (MADE GROUND)		Damp. No odour or staining	
						0.5		Medium firm, dark grey. Silty CLAY with occasional fine gravel (MADE GROUND)		Moist. No staining. Slight hydrocarbon odour	
						1.0		Loose, black, fine to medium GRAVEL comprising ash and clinker (MADE GROUND)		Damp. No odour or staining	
						1.5		Soft, black SAND with rootlets and occasional medium sub-rounded gravel and silty lenses (MADE GROUND)		Damp. Free product and moderate light hydrocarbon odour noted	
						2.0		Stiff, dark grey (with green mottling) sandy SILT with occasional clinker gravel (MADE GROUND)		Dry. Moderate light hydrocarbon odour. Free product associated with gravel lens	
						2.5		Becomes green at 1.5m			
						3.0		Lens of medium to coarse gravel and clinker at 1.6m			
						3.5		Firm, orange-brown, silty CLAY		Slight hydrocarbon odour. No staining. Dry to moist.	
						4.0		Borehole terminated at 2.0 mbgl			
						4.5					
5.0											
LOCATION / NOTES:						LEGEND					
1. All measurements in m below ground level (mbgl)						 Disturbed Sample					
						 Undisturbed Sample					
						 Headspace Analysis					
						 Down Borehole Analysis					
						 Groundwater Table					
						 Perched Water Table					
						BOREHOLE LOG					
						Job Title WESTERN MARGIN INVESTIGATION					
						Location BP LLANDARCY REFINERY					
						Client BP LLANDARCY LTD					
						 URS					
						Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun					
						App'd DRAFT					
						Ref. SG/CR/BRS					
						Date MAR 2001					
						Job No. 39991-016-402					

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW017A		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 14/12/00		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 14/12/00		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm	
		LOGGED BY: SC APPR'D BY:		SCREEN SLOT SIZE: 1 mm						
							DESCRIPTION	COMMENTS		
							Loose, dark brown GRAVEL comprising ash and some sand with rootlets (MADE GROUND)	Damp. No odour or staining	0	
							Medium firm, dark grey. Silty CLAY with occasional fine gravel (MADE GROUND)	Moist. No staining. Slight hydrocarbon odour		
							Loose, black, fine to medium GRAVEL comprising ash and clinker (MADE GROUND)	Damp. No odour or staining	0.5	
							Soft, black SAND with rootlets and occasional medium sub-rounded gravel and silty lenses (MADE GROUND)	Damp. Free product and moderate light hydrocarbon odour noted	1.0	
							Stiff, dark grey (with green mottling) sandy SILT with occasional clinker gravel (MADE GROUND)	Dry. Moderate light hydrocarbon odour. Free product associated with gravel lens	1.5	
							Becomes green at 1.5m Lens of medium to coarse gravel and clinker at 1.6m			
							Firm, orange-brown, silty CLAY	Slight hydrocarbon odour. No staining. Dry to moist.	2.0	
							Dense, orange-brown, slightly clayey and sandy SILT with rootlets and occasional sub-rounded gravel Becomes light brown from 2.2m	Dry. No odour or staining	2.5	
							Clay content increases at 3.15m		3.0	
							Sand content increases at 3.3m Becomes very sandy from 3.5m	Damp from 3.3m No odour or staining	3.5	
Two sandstone cobbles at 3.9m Borehole terminated at 4.0 mbgl								Wet at 3.9m	4.0	
									4.5	
									5.0	

LOCATION / NOTES:		LEGEND		BOREHOLE LOG			
1. All measurements in m below ground level (mbgl)			Disturbed Sample	Job Title WESTERN MARGIN INVESTIGATION			
			Undisturbed Sample	Location BP LLANDARCY REFINERY			
			Headspace Analysis	Client BP LLANDARCY LTD			
			Down Borehole Analysis	 Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun		App'd DRAFT	
			Groundwater Table			Ref. SG/CR/BRS	
			Perched Water Table			Date MAR 2001	
						Job No. 39991-016-402	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW016		PAGE 1 of 2	
	NUMBER	TYPE					START DATE: 14/12/00		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 14/12/00		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm	
				LOGGED BY: SG/SC		APPR'D BY:		SCREEN SLOT SIZE: 1 mm		
							DESCRIPTION	COMMENTS		
							Loose, black, fine to medium sandy GRAVEL	No odour or staining Damp		
							Loose, brown, sandy, fine to medium GRAVEL	No odour or staining. Wet		
							Loose, black, fibrous PEAT becoming clayey at 1.17m	Damp. Very strong hydrocarbon odour and staining		
							Loose, black, sandy, fine to medium GRAVEL	Damp. Very strong hydrocarbon odour and staining		
							Firm to stiff, silty friable CLAY with visible laminations	Slight odour. Dry		
							Soft, black, silty SAND	Product visible and black hydrocarbon staining. Strong hydrocarbon odour		
							Very stiff, black, slightly silty CLAY			
							Firm, black, very fibrous woody PEAT with rootlets grading to soft light brown, very sandy SILT at 2.6m	Damp. Slight hydrocarbon odour and hydrocarbon staining		
							Soft to firm, light brown coarse gravelly SILT	Slight hydrocarbon odour		
							Soft, light brown, slightly sandy, clayey SILT	Dry to moist. No odour or staining		
							Medium dense, light brown, sandy, silty GRAVEL with some clay	Damp. No odour or staining.		
							Sandy lenses towards bottom	Slight hydrocarbon odour		

LOCATION / NOTES:		LEGEND		BOREHOLE LOG			
1. All measurements in m below ground level (mbgl) 2. Shallow installation (B) failed 3. Bentonite from approximately 2.5m		☒ Disturbed Sample ■ Undisturbed Sample * Headspace Analysis † Down Borehole Analysis ▽ Groundwater Table ▽ Perched Water Table		WESTERN MARGIN INVESTIGATION BP LLANDARCY REFINERY BP LLANDARCY LTD			
				URS Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun		App'd Ref. SG/CR/BRS Date MAR 2001 Job No. 39991-016-402	
				DRAFT			

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW016		PAGE 2 of 2					
	NUMBER	TYPE					START DATE: 14/12/00		DRILLING METHOD: DYNAMIC SAMPLING					
							FINISH DATE: 14/12/00		BOREHOLE DIAMETER: 128/113/98 mm					
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm					
						LOGGED BY: sg/sc APPR'D BY:		SCREEN SLOT SIZE: 1 mm						
						DESCRIPTION		COMMENTS						
						*7.8 *0.0		5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0		Medium dense, light brown, sandy, silty GRAVEL with some clay with sandy lenses Sandstone fragments from 5.4-5.5m Borehole terminated at 5.8 mbgl		Slight hydrocarbon odour Water seepage at 5.1m		5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0
LOCATION / NOTES:						LEGEND Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table		BOREHOLE LOG Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD App'd Ref. SG/CR/BRS Date MAR 2001 Job No. 39991-016-402 DRAFT						

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW015B		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 20/12/00		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 20/12/00		BOREHOLE DIAMETER: 128/113/98 mm	
				DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm				
				LOGGED BY: SG		APPR'D BY:		SCREEN SLOT SIZE: 1 mm.		
						DESCRIPTION	COMMENTS			
						0	Loose, black, gravelly medium to coarse SAND comprising ash and clinker (MADE GROUND)	Dry. No odour or staining	0	
						0.5	Gravelly and cobbly from 0.5-0.7m	Wet. Gravel product coated Hydrocarbon odour.	0.5	
						*11.1	Loose, black, fine to medium GRAVEL (MADE GROUND)	Moist. Strong hydrocarbon odour	1.0	
						*23.8	Dense, grey, gravelly, sandy SILT (MADE GROUND)	Product visible. Wet. Strong hydrocarbon odour	1.0	
						*4032	Medium dense, black, slightly gravelly, silty SAND, becoming almost lithified siltstone (MADE GROUND)	Product visible. Hydrocarbon odour	1.5	
							Brown-black, GRAVEL with cobbles comprising lightweight clinker (MADE GROUND)	Wet. Product visible Strong hydrocarbon odour	1.5	
						1.5	Loose, black, coarse SAND comprising ash with occasional gravel (MADE GROUND)		1.5	
						2.0	Borehole terminated at 1.8 mbgl		2.0	
						2.5			2.5	
						3.0			3.0	
						3.5			3.5	
						4.0			4.0	
						4.5			4.5	
						5.0			5.0	

LOCATION / NOTES:		LEGEND		BOREHOLE LOG	
1. All measurements in m below ground level (mbgl)		Disturbed Sample	Undisturbed Sample	Job Title WESTERN MARGIN INVESTIGATION	
		Headspace Analysis	Down Borehole Analysis	Location BP LLANDARCY REFINERY	
		Groundwater Table	Perched Water Table	Client BP LLANDARCY LTD	
				 Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun	App'd DRAFT
					Ref. SG/CR/BR5
					Date MAR 2001
					Job No. 39991-016-402

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW015A		PAGE 1 of 1		
	NUMBER	TYPE					START DATE: 18/12/00		DRILLING METHOD: DYNAMIC SAMPLING		
							FINISH DATE: 18/12/00		BOREHOLE DIAMETER: 128/113/98 mm		
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm		
				LOGGED BY: SG APPR'D BY:		SCREEN SLOT SIZE: 1 mm					
						DESCRIPTION		COMMENTS			
						0	Loose, black, gravelly and silty, medium to coarse SAND comprising ash and clinker (MADE GROUND) Some rootlets near surface	Slight hydrocarbon odour.	0		
						0.5	Clinker cobble from 0.55-0.7m		0.5		
						1.0	Loose, black, fine to medium GRAVEL with some sand (MADE GROUND)	Oily, with strong hydrocarbon odour. Wet	1.0		
						1.5	Firm to stiff dark brown and black, gravelly CLAY with ash and clinker (MADE GROUND)	Free product between 1.2m and 1.9m. Wet	1.5		
						2.0	Loose, black, fine to medium GRAVEL with some sand (MADE GROUND)		2.0		
						2.5	Stiff to very stiff, dark brown, slightly gravelly CLAY (MADE GROUND)	Slight hydrocarbon odour. Dry	2.5		
						3.0	Soft to firm, yellow-orange-brown (with black mottling), slightly clayey and sandy SILT with rare gravel (MADE GROUND)	Slight hydrocarbon odour. Damp	3.0		
						3.5	Loose, black, fine to medium GRAVEL with some sand comprising clinker and ash (MADE GROUND)	Strong hydrocarbon odour and product visible. Wet	3.5		
						4.0	Medium dense to dense, light brown, sandy and silty, sub-angular GRAVEL	Strong hydrocarbon odour	4.0		
						4.5	Borehole terminated at 4.2 mbgl on refusal		4.5		
5.0			5.0								

LOCATION / NOTES:		LEGEND		BOREHOLE LOG			
1. All measurements in m below ground level (mbgl) 2. Shallow installation (B) failed 3. Bentonite from approximately 2.5m		☒ Disturbed Sample ■ Undisturbed Sample * Headspace Analysis † Down Borehole Analysis ≡ Groundwater Table ≡ Perched Water Table		Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD URS Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun			
				App'd Ref. SG/CR/BR5 Date MAR 2001 Job No. 39991-016-402		DRAFT	

BOREHOLE CONSTRUCTION		SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW014A/B		PAGE 1 of 1	
		NUMBER	TYPE					START DATE: 18/12/00	DRILLING METHOD: DYNAMIC SAMPLING		
								FINISH DATE: 18/12/00	BOREHOLE DIAMETER: 128/113/98 mm		
								DRILLER: Geotechnical	SCREEN TYPE & DIAMETER: HDPE 1 mm		
								LOGGED BY: SG	APPR'D BY:	SCREEN SLOT SIZE: 1 mm	
A	B							DESCRIPTION	COMMENTS		
				*0.8		0		Loose, black, slightly silty and slightly gravelly SAND with frequent rootlets and some ash, clinker and coals fragments (MADE GROUND)	No odour or staining	0	
				*0.0		0.5		Loose, orange-brown, sandy GRAVEL with some large coal fragments at 0.75m (MADE GROUND)	No odour or staining	0.5	
				*9.9		1.0		Firm, black, slightly silty CLAY with coal fragments (MADE GROUND)	Slight hydrocarbon odour	1.0	
				*35.5				Loose, black, sandy GRAVEL comprising coal fragments (MADE GROUND)	Very strong hydrocarbon odour		
				*298		1.5		Soft, black, clayey SILT with some sand (MADE GROUND)	Very strong hydrocarbon odour. Some product. Abundant product from 1.5-2.0m	1.5	
				*318							
				*224		2.0		Firm, black sandy, silty CLAY (MADE GROUND)	Strong hydrocarbon odour	2.0	
				*230				Loose, black, fine to coarse, angular gravel comprising coals fragments (MADE GROUND)	Strong hydrocarbon odour		
				*686		2.5		Soft, black fibrous woody PEAT	Strong hydrocarbon odour	2.5	
				*4101				Loose, light brown, very sandy, clayey SILT	Strong hydrocarbon odour		
				*2070		3.0		Loose, light grey-brown, fine sandy SILT	Strong odour		
								Soft, orange-brown, slightly sandy, clayey SILT	Strong light hydrocarbon odour		
						3.5		Medium dense to dense slightly sandy GRAVEL with occasional sandstone cobbles	Poor returns from 3-4m	3.5	
				*281		4.0				4.0	
				*74.3		4.5		Medium dense to dense, very clayey, sub-rounded to rounded, coarse GRAVEL with some sand	Slight hydrocarbon odour	4.5	
				*37.1		5.0		Borehole terminated at 5.0 mbgl	Slight hydrocarbon odour	5.0	

LOCATION / NOTES:

- All measurements in m below ground level (mbgl)
- Water rose from 1.25m-0.1m

LEGEND

- Disturbed Sample
- Undisturbed Sample
- Headspace Analysis
- Down Borehole Analysis
- Groundwater Table
- Perched Water Table

BOREHOLE LOG

Job Title: **WESTERN MARGIN INVESTIGATION**

Location: **BP LLANDARCY REFINERY**

Client: **BP LLANDARCY LTD**

App'd: **DRAFT**

Ref: **SG/CR/BRS**

Date: **MAR 2001**

Job No. **39991-016-402**

Dames & Moore
O'Brien Kreitzberg
Thorburn Colquhoun

BOREHOLE CONSTRUCTION		SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW013A/B		PAGE 1 of 1	
		NUMBER	TYPE					START DATE: 18/12/00	DRILLING METHOD: DYNAMIC SAMPLING	FINISH DATE: 18/12/00	BOREHOLE DIAMETER: 128/113/98 mm
A	B							DESCRIPTION	COMMENTS		
						0		Loose, brown and black, slightly silty and slightly gravelly coarse SAND comprising ash and clinker (MADE GROUND)	Slight hydrocarbon odour	0	
				*294				Firm black, sandy and gravelly CLAY with ash and clinker fragments (MADE GROUND)			
				*109		0.5		Loose, brown and black, slightly silty and slightly gravelly coarse SAND comprising ash and clinker (MADE GROUND)	Slight hydrocarbon odour	0.5	
				*718				Firm to stiff, dark orange-brown, slightly (MADE GROUND)	Medium hydrocarbon odour		
				*647		1.0		Loose, black, silty, coarse SAND with fine to medium gravel (MADE GROUND)	Strong hydrocarbon odour	1.0	
								Firm to stiff, black, slightly gravelly CLAY with coarse sand to cobble sized coal fragments (MADE GROUND)	Some product visible Slight hydrocarbon odour		
				*474		1.5				1.5	
								Loose, black, sandy, and slightly silty, fine to medium GRAVEL comprising ash and clinker (MADE GROUND)	Strong hydrocarbon odour		
				*1380		2.0				2.0	
								Soft to firm, brown, slightly sandy SILT with occasional black mottling	Medium to strong hydrocarbon odour		
				*334		2.5				2.5	
								Soft, black, slightly sandy SILT	Strong light hydrocarbon odour. Wet		
				*1602		3.0				3.0	
				*>10,000		3.5		Medium dense to dense, silty and sandy, medium to coarse, sub-angular to sub-rounded GRAVEL with occasional cobbles	Strong light hydrocarbon odour	3.5	
				*>10,000		4.0				4.0	
						4.5		Borehole terminated at 4.3mbgl		4.5	
						5.0				5.0	

LOCATION / NOTES:		LEGEND		BOREHOLE LOG	
1. All measurements in m below ground level (mbgl)		Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table		Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD	
2. Water rose from 1.25m-0.1m		URS Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun		App'd DRAFT Ref. SG/CR/BR5 Date MAR 2001 Job No. 39991-016-402	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW012		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 15/12/00		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 15/12/00		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm	
				LOGGED BY: SG		APPR'D BY:		SCREEN SLOT SIZE: 1 mm		
							DESCRIPTION		COMMENTS	
							0		No staining or odour.	
							0.5			
							1.0		No staining or odour	
							1.5		Slight hydrocarbon odour.	
							2.0		Wet. Slight hydrocarbon odour	
							2.5		Strong hydrocarbon odour	
							3.0		Very strong hydrocarbon odour with product visible	
							3.5		Very strong hydrocarbon odour and product visible	
							4.0		Strong hydrocarbon odour.	
							4.5		Damp	
							5.0			

LOCATION / NOTES:		LEGEND		BOREHOLE LOG	
1. All measurements in m below ground level (mbgl)		Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table		WESTERN MARGIN INVESTIGATION BP LLANDARCY REFINERY BP LLANDARCY LTD	
		URS Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun		App'd DRAFT Ref. SG/CR/BR5 Date MAR 2001 Job No. 39991-016-402	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW011		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 15/12/00		DRILLING METHOD: DYNAMIC SAMPLING	
							FINISH DATE: 15/12/00		BOREHOLE DIAMETER: 128/113/98 mm	
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm	
				LOGGED BY: SG		APPR'D BY:		SCREEN SLOT SIZE: 1 mm		
						DESCRIPTION		COMMENTS		
						0	Loose, black, silty and gravelly, fine SAND with ash and clinker (MADE GROUND)	Damp. Strong hydrocarbon odour	0	
						0.5	Leaves and root debris at 0.45m		0.5	
						0.5	Loose, brown, silty, fine SAND with some rootlets and occasional fine to medium gravel (MADE GROUND) Brick at 0.75-0.85m	Damp. Slight hydrocarbon odour		
						1.0	Loose, dark-brown to black, slightly gravelly and silty SAND with some ash and clinker (MADE GROUND) Cobbles at 1.05m and 1.15m	Product visible Damp. Strong hydrocarbon odour	1.0	
						1.5	Soft to firm, light brown, silty CLAY with some sand and occasional angular coarse gravel	Very strong hydrocarbon odour. Damp Water ingress at 1.7m	1.5	
						2.0	Firm, grey to black, (occasionally orange-brown), very gravelly (coarse, sub-angular to sub-rounded), silty CLAY Some gravelly and sandy lenses throughout.	Very strong hydrocarbon odour throughout with product visible from 1.5-2.7m	2.0	
						2.5	Medium dense, dark grey to black, silty and clayey, firm to medium GRAVEL with some sand		2.5	
						2.7	Dense black, sandstone COBBLE			
						3.0	Borehole terminated at 2.7 mbgl on refusal		3.0	
						3.5			3.5	
						4.0			4.0	
						4.5			4.5	
						5.0			5.0	

LOCATION / NOTES:		LEGEND		BOREHOLE LOG	
1. All measurements in m below ground level (mbgl)		Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table		Job Title: WESTERN MARGIN INVESTIGATION Location: BP LLANDARCY REFINERY Client: BP LLANDARCY LTD	
2. Odours very "light" (petrol-like)		URS Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun		App'd: DRAFT Ref: SG/CR/BR5 Date: MAR 2001 Job No. 39991-016-402	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW010		PAGE 1 of 1		
	NUMBER	TYPE					START DATE: 19/12/00		DRILLING METHOD: DYNAMIC SAMPLING		
							FINISH DATE: 19/12/00		BOREHOLE DIAMETER: 128/113/98 mm		
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm		
						LOGGED BY: sg		APPR'D BY:		SCREEN SLOT SIZE: 1 mm	
							DESCRIPTION	COMMENTS			
							Loose, black, (occasionally dark brown), slightly gravelly medium to coarse SAND comprising ash and clinker (MADE GROUND)	Slight hydrocarbon odour.	0	0	
								Slight hydrocarbon odour.	0.5	0.5	
								Wet at 1.0m with associated hydrocarbon staining and odour	1.0	1.0	
							Firm, brown, slightly silty CLAY (MADE GROUND)				
							Loose, black, (occasionally dark brown), slightly gravelly medium to coarse SAND comprising ash and clinker (MADE GROUND)	Slight hydrocarbon odour.			
							Stiff to very stiff, dark brown, slightly gravelly CLAY with some ash and coal fragments (MADE GROUND)	Moderate to strong hydrocarbon odour	1.5	1.5	
	Loose, black, (occasionally dark brown), slightly gravelly medium to coarse SAND comprising ash and clinker (MADE GROUND)	Damp. Som product visible. Strong hydrocarbon odour	2.0	2.0							
	Soft, light brown, very gravelly, sandy SILT	Wet at 2.2m. Some oil on gravel and smeared on clay. Moderate hydrocarbon odour	2.5	2.5							
							Borehole terminated at 3.0 mbgl on refusal		3.0	3.0	
									3.5	3.5	
									4.0	4.0	
									4.5	4.5	
									5.0	5.0	

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
1. All measurements in m below ground level (mbgl)	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title	WESTERN MARGIN INVESTIGATION
		Location	BP LLANDARCY REFINERY
		Client	BP LLANDARCY LTD
			App'd
		Dames & Moore O'Brien Kreitzberg Thorburn Colquhoun	DRAFT
		Ref.	SG/CR/BRs
		Date	MAR 2001
		Job No.	39991-016-402

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RHRW009		PAGE 1 of 1		
	NUMBER	TYPE					START DATE: 18/12/00		DRILLING METHOD: DYNAMIC SAMPLING		
							FINISH DATE: 18/12/00		BOREHOLE DIAMETER: 128/113/98 mm		
							DRILLER: Geotechnical		SCREEN TYPE & DIAMETER: HDPE 1 mm		
						LOGGED BY: SG		APPR'D BY:		SCREEN SLOT SIZE: 1 mm	
						DESCRIPTION		COMMENTS			
						0		0			
						0.5		0.5			
						1.0		1.0			
						1.5		1.5			
						2.0		2.0			
						2.5		2.5			
						3.0		3.0			
						3.5		3.5			
						4.0		4.0			
						4.5		4.5			
5.0		5.0									
						Loose, black and brown, slightly gravelly medium to coarse SAND comprising ash and clinker (MADE GROUND)		Slight hydrocarbon odour. Damp			
						Loose, black, slightly gravelly, fine to medium SAND comprising ash and clinker (MADE GROUND)		Slight hydrocarbon odour			
						Loose, dark brown, medium GRAVEL		Wet			
						Soft, dark brown, fibrous PEAT with some silt		Slight hydrocarbon odour. H ₂ S odour			
						Soft to firm, brown to black, slightly clayey SILT with occasional root fragments		Moderate hydrocarbon odour			
						Soft to very soft, black, slightly clayey SILT with occasional sub-rounded gravel and cobbles		Black hydrocarbon staining, odour and product visible. Damp			
						Medium dense, dark grey-brown to black, very silty and very sandy, medium GRAVEL with frequent cobbles		Strong hydrocarbon odour. Product and staining visible			
						Dense, black to blue-grey sandstone COBBLES with coarse gravel		Strong light hydrocarbon odour			
						Borehole terminated at 2.9 mbgl on refusal					

LOCATION / NOTES:		LEGEND		BOREHOLE LOG			
1. All measurements in m below ground level (mbgl)		Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title WESTERN MARGIN INVESTIGATION Location BP LLANDARCY REFINERY Client BP LLANDARCY LTD				
				App'd DRAFT Ref. SG/CR/BR5 Date MAR 2001 Job No. 39991-016-402			