

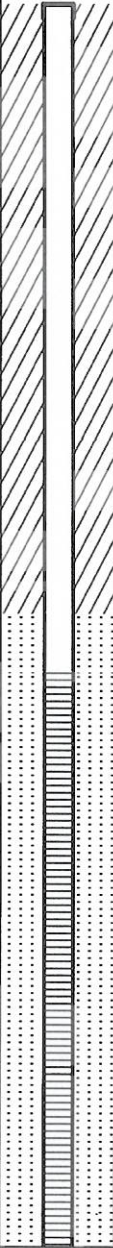
BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW116		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 30/3/99		DRILLING METHOD: ROTARY AIR FLUSH	
							FINISH DATE: 30/3/99		BOREHOLE DIAMETER: 165 mm	
							DRILLER: R2		SCREEN TYPE & DIAMETER: 50 mm ID UPVC	
		LOGGED BY: PW APPR'D BY:		SCREEN SLOT SIZE: 0.5 mm						
							DESCRIPTION	COMMENTS		
						0	Loose light brown-grey sandy and clayey GRAVEL	No hydrocarbon odour	0	
						1.0				1.0
						2.0	ROCKHEAD - Light blue-grey crystalline SANDSTONE	No hydrocarbon odour	2.0	
						3.0				3.0
						4.0				4.0
						5.0				5.0
						6.0	COAL			6.0
							Light blue-grey crystalline SANDSTONE			
						7.0				7.0
						8.0				8.0
						9.0				9.0
						10				10

LOCATION / NOTES: 1. 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 SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401		 DAMES & MOORE GROUP	
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW151		PAGE 1 of 2	
	NUMBER	TYPE					START DATE: 26/3/99		DRILLING METHOD: CABLE PERCUSSION	
							FINISH DATE: 26/3/99		BOREHOLE DIAMETER: 200mm	
				DRILLER: CP2		SCREEN TYPE & DIAMETER: N/A				
				LOGGED BY: DB APPR'D BY:		SCREEN SLOT SIZE: N/A				
						DESCRIPTION		COMMENTS		
						0		0		
						Sandy clayey SILT (TOPSOIL)				
						Loose black ASH with some fine to coarse gravel with occasional cobbles, clay and brick fragments (MADE GROUND)		Slight hydrocarbon odour in places		
						*0.7		1.0		
						*0.7		2.0		
						*49.5		3.0		
						*65.2		Slight odour		
						*75.7		4.0		
						*148		5.0		
						*0.0		7.0		
						8.0		8.0		
						*1.1		9.0		
						*0.0		10		
LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Borehole backfilled and location abandoned due to obstruction at 11.5m						LEGEND Disturbed Sample Undisturbed Sample * Headspace Analysis † Down Borehole Analysis Groundwater Table Perched Water Table		BOREHOLE LOG Job Title SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401		
						DAMES & MOORE GROUP				

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW151		PAGE 2 of 2	
	NUMBER	TYPE					START DATE: 26/3/99		DRILLING METHOD: CABLE PERCUSSION	
							FINISH DATE: 26/3/99		BOREHOLE DIAMETER: 200mm	
							DRILLER: CP2		SCREEN TYPE & DIAMETER: N/A	
				LOGGED BY: DB APPR'D BY:		SCREEN SLOT SIZE: N/A				
							DESCRIPTION		COMMENTS	
					10		Loose black ASH with some fine to coarse gravel with occasional cobbles, clay and brick fragments (MADE GROUND)			
	MSMW151 11.2m	X	*415		11		Borehole terminated at 11.5 mbgl		Suspected railway sleeper caused	
					12					
					13					
					14					
					15					
					16					
					17					
					18					
					19					
					20					

LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Borehole backfilled and location abandoned due to obstruction at 11.5m		LEGEND ☒ Disturbed Sample ■ Undisturbed Sample * Headspace Analysis † Down Borehole Analysis ▼ Groundwater Table ▽ Perched Water Table		BOREHOLE LOG Job Title SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRs Date MAY 99 Job No. 39991-004-401		 DAMES & MOORE GROUP	
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW151c		PAGE 1 of 2	
	NUMBER	TYPE					DRILLING DATES: 12/04/01		DRILLING METHODS : Air Rotary	
							DRILLER : Tectonics		BOREHOLE DIAMETER : 150mm	
							LOGGED BY : SG		SCREEN TYPE & DIAM: HDPE 50mm	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
DESCRIPTION							COMMENTS			
							Loose to very loose medium sand-sized black ash, with some clinker and brick fragments. MADE GROUND.	0.0		
								0.5		
								1.0		
								1.5		
								2.0		
								2.5		
								3.0		
								3.5		
								4.0		
								4.5		
Slightly damp - no obvious indication of oil								5.0		
5.5										
6.0										
6.5										
7.0										
7.5										
8.0										
8.5										
Becoming wet at 8.5m								8.5		
9.0										
9.5										
10.0										

LOCATION / NOTES: NVO = No visual or olfactory evidence	LEGEND  Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table	BOREHOLE LOG Job Title: Containment Area Investigation Location: Llandarcy Refinery Client: BP Llandarcy Refinery	
			App'd: _____ Date: 04/09/2002 Drawn : SS Ref: _____ Scale: As scale Job No: 39991-016 Drg. Size: A4 BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW151c		PAGE 2 of 2	
	NUMBER	TYPE					DRILLING DATES: 12/04/01		DRILLING METHODS : Air Rotary	
							DRILLER : Tectonics		BOREHOLE DIAMETER : 150mm	
							LOGGED BY : SG		SCREEN TYPE & DIAM: HDPE 50mm	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
									COMMENTS	
					10.5					10.5
					11.0					11.0
					11.5					11.5
					12.0					12.0
					12.5					12.5
					13.0			No obvious water/product returns		13.0
					13.5			Soft, reddish-brown silty, fibrous PEAT.		13.5
					14.0					14.0
					14.5			Soft brownish/orange/grey very silty CLAY with some peat fragments.		14.5
					15.0			End of Borehole		15.0
					15.5					15.5
					16.0					16.0
					16.5					16.5
					17.0					17.0
					17.5					17.5
					18.0					18.0
					18.5					18.5
					19.0					19.0
					19.5					19.5
					20.0					20.0

LOCATION / NOTES:	LEGEND	BOREHOLE LOG		
NVO = No visual or olfactory evidence	Disturbed Sample ■ Undisturbed Sample * Headspace Analysis + Down Borehole Analysis — Groundwater Table ~ Perched Water Table	Job Title: Containment Area Investigation Location: Llandarcy Refinery Client: BP Llandarcy Refinery		
		URS	App'd: Drawn : SS Scale: As scale Drg. Size: A4	Date: 04/09/2002 Ref: Job No: 39991-016 BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW172A		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 17/3/99		DRILLING METHOD: CABLE PERCUSSION	
							FINISH DATE: 17/3/99		BOREHOLE DIAMETER: 150 mm	
							DRILLER: CP2		SCREEN TYPE & DIAMETER: N/A	
						LOGGED BY: RF APPR'D BY:		SCREEN SLOT SIZE: N/A		
							DESCRIPTION	COMMENTS		
					0		Soft brown-dark brown CLAY (MADE GROUND)	Slight odour		0
					1.0		Coarse angular GRAVEL with brown clay (MADE GROUND)			1.0
					2.0					2.0
					3.0					3.0
					4.0					4.0
					5.0					5.0
					6.0					6.0
					7.0					7.0
					8.0					8.0
					9.0					9.0
					10					10

LOCATION / NOTES: 1. 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 SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401		DAMES & MOORE GROUP	
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW172D		PAGE 1 of 2				
	NUMBER	TYPE					START DATE: 18/3/99		DRILLING METHOD: ROTARY AIR FLUSH				
							FINISH DATE: 18/3/99		BOREHOLE DIAMETER: 165/115 mm				
							DRILLER: R1		SCREEN TYPE & DIAMETER: 35 mm ID UPVC				
				LOGGED BY: DB APPR'D BY:		SCREEN SLOT SIZE: 0.5 mm							
						DESCRIPTION		COMMENTS					
						0		Lose dark brown-black sandy SILT with gravel and brick fragments (MADE GROUND)		No odour		0	
						1.0						1.0	
						2.0						2.0	
						3.0						3.0	
						4.0						4.0	
						4.0		Very soft CLAY (MADE GROUND)		Poor returns		4.0	
						5.0						5.0	
						6.0						6.0	
						7.0						7.0	
						8.0						8.0	
						6.0		BRICKS (MADE GROUND)				6.0	
						7.0		Loose black ASH with clinker and some clay (MADE GROUND)				7.0	
						8.0		Dark brown gravelly CLAY		No odour 'Turpentine-like' odour		8.0	
						9.0						9.0	
						10.0						10.0	
						10.0		Soft dark grey-brown CLAY with some gravel (BOULDER CLAY)				10.0	

LOCATION / NOTES:

- All measurements in m below ground level (mbgl)
- ODEX to 14m, Rotary to 19m

LEGEND

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

BOREHOLE LOG

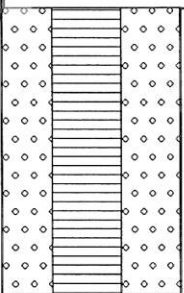
Job Title		SOIL & GROUNDWATER INVESTIGATION	
Location		LLANDARCY REFINERY	
Client		BP LLANDARCY LTD	
App'd	DRAFT	DAMES & MOORE	
Ref.	CR/MC/BR5		
Date	MAY 99		
Job No. 39991-004-401			

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW172D		PAGE 2 of 2	
	NUMBER	TYPE					START DATE: 18/3/99		DRILLING METHOD: ROTARY AIR FLUSH	
							FINISH DATE: 19/3/99		BOREHOLE DIAMETER: 165/115 mm	
							DRILLER: R1		SCREEN TYPE & DIAMETER: 35 mm ID UPVC	
						LOGGED BY: DB APPR'D BY:		SCREEN SLOT SIZE: 0.5 mm		
							DESCRIPTION	COMMENTS		
			*0.0		10		Soft dark grey-brown CLAY with some gravel (BOULDER CLAY)	'Turpentine-like' odour		10
					11					11
					12					12
			*0.0		13					13
					14		Soft dark brown silty CLAY with frequent gravel			14
					15					15
					16		ROCKHEAD: Hard dark grey crystalline SANDSTONE with some silt (BEDROCK)			16
			*0.0		17			Borehole collapsed to 17m		17
					18					18
					19		Borehole terminated at 19.0 mbgl on refusal			19
					20					20

LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. ODEX to 14m, Rotary to 19m		LEGEND Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	BOREHOLE LOG Job Title SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401	DAMES & MOORE GROUP
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW172S		PAGE 1 of 2	
	NUMBER	TYPE					START DATE: 18/3/99		DRILLING METHOD: CABLE PERCUSSION	
							FINISH DATE: 18/3/99		BOREHOLE DIAMETER: 150 mm	
							DRILLER: CP2		SCREEN TYPE & DIAMETER: 50 mm ID UPVC	
						LOGGED BY: RF APPR'D BY:		SCREEN SLOT SIZE: 0.5 mm		
							DESCRIPTION	COMMENTS		
			*0.0		0		Soft brown CLAY with ash (MADE GROUND)	No odour		0
							Loose coarse angular CONCRETE fragments with brick fragments and some brown clay (MADE GROUND)			
					1.0		VOID	No returns from 1.0-3.2m		1.0
					2.0					2.0
					3.0					3.0
					4.0		CONCRETE fragments with angular gravel (MADE GROUND)	No odour or staining		4.0
			*4.3		5.0		VOID	No returns from 5.1-6.3m		5.0
					6.0					6.0
					7.0		CONCRETE fragments (MADE GROUND)			7.0
			*0.0				Soft black to dark grey CLAY with medium sub-rounded gravel and concrete dust, concrete rubble, brick and coal fragments (MADE GROUND)	No odour or staining		
					8.0		Plastic brown to green-brown CLAY with occasional fine sandstone and coal gravel (MADE GROUND)	Slight hydrocarbon odour		8.0
					9.0		Plastic brown CLAY with occasional coarse sandstone gravel becoming sandy at 8.6m	becoming damp		9.0
					10		occasional sandstone gravel at 9.0m			10

LOCATION / NOTES: 1. 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 SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401		DAMES & MOORE	
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW172S		PAGE 2 of 2	
	NUMBER	TYPE					START DATE: 18/3/99		DRILLING METHOD: CABLE PERCUSSION	
							FINISH DATE: 18/3/99		BOREHOLE DIAMETER: 150 mm	
							DRILLER: CP2		SCREEN TYPE & DIAMETER: 50 mm ID UPVC	
				LOGGED BY: RF APPR'D BY:		SCREEN SLOT SIZE: 1 mm				
						DESCRIPTION	COMMENTS			
						10	Firm sandy CLAY with sub-rounded sandstone cobbles and angular fine to medium sandstone gravel	Water ingress at 10.3m	10	
						11	Soft dark brown CLAY	No odour or staining Damp	11	
						12	Loose angular fine to medium GRAVEL with brown clay	Water ingress at 11.4m Wet	12	
						12	Borehole terminated at 12.0 mbgl on refusal	No odour or	12	
						13			13	
						14			14	
						15			15	
						16			16	
						17			17	
						18			18	
						19			19	
						20			20	

LOCATION / NOTES: 1. 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 SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401		 DAMES & MOORE GROUP	
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW180D		PAGE 1 of 2	
	NUMBER	TYPE					START DATE: 22/3/99		DRILLING METHOD: ROTARY AIR FLUSH	
							FINISH DATE: 22/3/99		BOREHOLE DIAMETER: 165/115 mm	
							DRILLER: R1		SCREEN TYPE & DIAMETER: 50 mm ID UPVC	
				LOGGED BY: DB APPR'D BY:		SCREEN SLOT SIZE: 0.5 mm				
						DESCRIPTION	COMMENTS			
						Loose dark brown fine to medium sandy GRAVEL (MADE GROUND)	Poor returns	0		
							No odour	1.0		
							Odour moving quickly through made ground	2.0		
								3.0		
								4.0		
						Soft dark grey (mottled orange-brown in places) sandy SILT with frequent gravel	Slight hydrocarbon odour	4.0		
							Damp	5.0		
							Moderate hydrocarbon odour	6.0		
								7.0		
								8.0		
						Soft grey-brown silty CLAY with some gravel (BOULDER CLAY)	Slight hydrocarbon odour	8.0		
								9.0		
						Soft grey-brown gravelly SILT	Slight hydrocarbon odour	9.0		
							Damp	10.0		
						Soft grey-brown silty CLAY with some gravel (BOULDER CLAY)	Slight hydrocarbon odour	10.0		

LOCATION / NOTES: 1. 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 SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401				 DAMES & MOORE	
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW180D		PAGE 2 of 2	
	NUMBER	TYPE					START DATE: 22/3/99		DRILLING METHOD: ROTARY AIR FLUSH	
							FINISH DATE: 22/3/99		BOREHOLE DIAMETER: 165/115 mm	
							DRILLER: R1		SCREEN TYPE & DIAMETER: 50 mm ID UPVC	
						LOGGED BY: DB APPR'D BY:		SCREEN SLOT SIZE: 0.5 mm		
						DESCRIPTION		COMMENTS		
						Soft grey-brown silty CLAY with some gravel (BOULDER CLAY)				10
						ROCKHEAD: Soft dark brown to grey silty SANDSTONE (BEDROCK)		No odour Wet at 11.2m		11
								Slight hydrocarbon odour		12
								Very productive		13
						Borehole terminated at 14.5 mbgl				14
										15
										16
										17
										18
										19
										20

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
1. All measurements in m below ground level (mbgl)	☒ Disturbed Sample	Job Title SOIL & GROUNDWATER INVESTIGATION	
	☐ Undisturbed Sample	Location LLANDARCY REFINERY	
	* Headspace Analysis	Client BP LLANDARCY LTD	
	† Down Borehole Analysis	App'd DRAFT	
	▽ Groundwater Table	Ref. CR/MC/BRS	
▽ Perched Water Table		Date MAY 99	
		Job No. 39991-004-401	
		DAMES & MOORE	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW180S		PAGE 1 of 1					
	NUMBER	TYPE					START DATE: 18/3/99		DRILLING METHOD: CABLE PERCUSSION					
							FINISH DATE: 18/3/99		BOREHOLE DIAMETER: 150 mm					
				DRILLER: CP1		SCREEN TYPE & DIAMETER: 50 mm ID UPVC								
				LOGGED BY: JC		APPR'D BY:		SCREEN SLOT SIZE: 0.5 mm						
						DESCRIPTION	COMMENTS							
						Loose black fine-medium GRAVEL with occasional medium-coarse gravel (MADE GROUND)	Dry							
												No hydrocarbon odour		
						Soft dark grey sandy SILT with frequent fine to medium gravel								
							Damp							
							Water ingress at 4.3m							
						Soft grey-brown silty CLAY with occasional medium gravel								
						Soft mottled orange-brown and grey silty CLAY with occasional medium gravel		Slight hydrocarbon odour						
						Soft orange-brown silty CLAY with frequent medium to coarse gravel								
							Water ingress to 6.6m							
						Coarse GRAVEL with silt and clay								
						Borehole terminated at 9.2 mbgl								

LOCATION / NOTES: 1. 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 SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401	
				DAMES & MOORE	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW34		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 11/06/98		DRILLING METHOD: Cable Percussion	
							FINISH DATE: 11/06/98		BOREHOLE DIAMETER: 200mm	
							DRILLER: CP1		SCREEN TYPE & DIAMETER: UPVC 50mm	
							LOGGED BY: SG APPRD BY:		SCREEN SLOT SIZE: 0.5mm	
						DESCRIPTION		COMMENTS		
						Loose blue medium GRAVEL (MADE GROUND)		No odour		
						Loose brown slightly silty SAND with blue sandstone fragments and gravel and occasional coarse gravel, wood fragments and lenses of grey clay (MADE GROUND)		Slight hydrocarbon odour at 0.5m		
						Moderately dense coarse GRAVEL with brick fragments, clinker, wood fragments, and shale cobbles (MADE GROUND)		Moderate to strong hydrocarbon odour at 1.0m		
						occasional lumps of clay at 3m		Slight hydrocarbon odour at 1.1m		
						Borehole terminated at 3.5 mbgl		Moderate hydrocarbon odour		
LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Water strike at 0.9m (seep) Water strike at 1.3m - cased out at 2.m Water strike at 3.0m						LEGEND Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table		BOREHOLE LOG Job Title SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY Appd DRAFT Ref. MC/CR/BRS Date JUL 98 Job No. 39991-001-401 DAMES & MOORE GROUP		

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW37		PAGE 1 of 1			
	NUMBER	TYPE					START DATE: 19/06/98	DRILLING METHOD: Rotary odex	FINISH DATE: 19/06/98	BOREHOLE DIAMETER: 165mm	DRILLER: R2	SCREEN TYPE & DIAMETER: UPVC 50mm
							DESCRIPTION	COMMENTS				
							Coarse limestone GRAVEL (BALLAST)					
							GRAVEL with brick, concrete and rubble (MADE GROUND)					
							VOIDS - NO RETURNS					
							Coarse dark brown to black sandy GRAVEL with some silt	Static level at 7.7m prior to installation				
								Wet Strong hydrocarbon odour				
							Borehole terminated at 10.0 mbgl					
LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Hydrocarbon odours similar to those in Containment area wells 33 & 30.							LEGEND ☒ Disturbed Sample ■ Undisturbed Sample * Headspace Analysis † Down Borehole Analysis ▼ Groundwater Table ▽ Perched Water Table		BOREHOLE LOG Job Title SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY App'd DRAFT Ref. MC/CR/BRs Date JUL 98 Job No. 39991-001-401			



DAMES & MOORE

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW37A		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 11/06/98	DRILLING METHOD: Cable Percussion	FINISH DATE: 11/06/98	BOREHOLE DIAMETER: 200mm
							DESCRIPTION		COMMENTS	
			*0		0		Loose blue medium sub-angular GRAVEL (MADE GROUND)		No odour	
			*0				Firm dark brown sandy SILT with some medium gravel gravel content increasing from 0.3m		No odour	
			*0		1.0		Dense brown very sandy SILT with frequent cobble sized fragments of brick and slag (MADE GROUND)			
			*0				large cobbles at 1.5m		No odour	
							Concrete at 1.7m		No odour	
					2.0				Chasing boulder from 1.7m - no returns	
					3.0					
					4.0					
					5.0		Borehole terminated at 4.5 mbgl on refusal		obstruction at 4.5,	
					6.0					
					7.0					
					8.0					
					9.0					
					10					

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
1. All measurements in m below ground level (mbgl)	☒ Disturbed Sample	Job Title SOIL & GROUNDWATER INVESTIGATION	
2. Borehole backfilled on completion and location moved to MSMW37B	☐ Undisturbed Sample	Location LLANDARCY REFINERY	
	* Headspace Analysis	Client BP LLANDARCY	
	† Down Borehole Analysis	App'd DRAFT	
	▽ Groundwater Table	Ref. MC/CR/BRS	
	▽ Perched Water Table	Date JUL 98	
		Job No. 39991-001-401	
		 DAMES & MOORE	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW37B		PAGE 1 of 1		
	NUMBER	TYPE					START DATE: 11/06/98		DRILLING METHOD: Cable Percussion		
							FINISH DATE: 11/06/98		BOREHOLE DIAMETER: 200mm		
							DRILLER: CP1		SCREEN TYPE & DIAMETER: NA		
						LOGGED BY: SG		APPR'D BY:		SCREEN SLOT SIZE: NA	
							DESCRIPTION		COMMENTS		
			*0		0		Loose blue medium sub-angular GRAVEL (MADE GROUND)		No odour		0
			*0				Firm dark brown sandy SILT with some medium gravel		No odour		
			*2.4				gravel content increasing from 0.3m				
					1.0		Dense brown very sandy SILT with frequent cobble sized fragments of brick and slag (MADE GROUND)				1.0
							large cobbles at 1.5m		No returns from 1.0m		
							Concrete at 1.7m				
					2.0		Borehole terminated at 1.7 mbgl on refusal				2.0
					3.0						3.0
					4.0						4.0
					5.0						5.0
					6.0						6.0
					7.0						7.0
					8.0						8.0
					9.0						9.0
					10						10

LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Borehole backfilled on completion		LEGEND Disturbed Sample Undisturbed Sample * Headspace Analysis † Down Borehole Analysis ▽ Groundwater Table ▽ Perched Water Table	BOREHOLE LOG Job Title SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY App'd DRAFT Ref. MC/CR/BRS Date JUL 98 Job No. 39991-001-401 DAMES & MOORE GROUP
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: CARW002		PAGE 1 of 1		
	NUMBER	TYPE					DRILLING DATES: 18/01/01		DRILLING METHODS : Percussive		
							DRILLER : Geotechnical		BOREHOLE DIAMETER : ~100mm		
							LOGGED BY : URS		SCREEN TYPE & DIAM: UPVC 50mm		
							CHECKED BY :		SCREEN SLOT SIZE: 1mm		
							DESCRIPTION		COMMENTS		
					0.0		MADE GROUND. Loose, black, sandy GRAVEL (Ash).		Dry. NVO	0.0	
					0.5				Damp, with HC odour from 0.5m	0.5	
					1.0				Wet w/ odour from 0.7m	1.0	
					1.5					1.5	
					2.0		Soft, orange/brown, sandy, clayey SILT.		Damp with mod solvent odour. Some staining.	2.0	
			2.5				Firm, grey sandy SILT with occasional gravels and orange veins.		Dry-moist. Mod-strong odour of HC and solvent.	2.5	
			3.0				Loose, brown, silty, sandy, gravelly COBBLES.		Damp with mod-strong solvent odour. NVC	3.0	
			3.5				Layer of dry sandstone cobbles between 3.4-3.7m.			3.5	
			4.0				End of Borehole			4.0	
			4.5							4.5	
			5.0							5.0	
LOCATION / NOTES: NVO = No visual or olfactory evidence						LEGEND Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table			BOREHOLE LOG Job Title: Containment Area Investigation Location: Llandarcy Refinery Client: BP Llandarcy Refinery 		
						App'd:		Date: 04/09/2002			
						Drawn : SS		Ref:			
						Scale: As scale		Job No: 39991-016			
						Drg. Size: A4		BOREHOLE LOG			

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: CARW003		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 18/01/01		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : ~100mm	
							LOGGED BY : URS		SCREEN TYPE & DIAM: UPVC 50mm	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
DESCRIPTION							COMMENTS			
					0.0	Loose, black, sandy, fine-medium GRAVEL. (Ash) MADE GROUND.	Dry. NVO	0.0		
			*58.2		0.5		Damp			
			*2.8		1.0	Firm, light grey, sandy SILT	Wet with product. Mod odour	0.5		
			*1.1		1.5	Soft-firm, mottled grey/orange clayey SILT with occasional gravels.	Damp. NVC. Slight odour	1.0		
					2.0	Softer and more sandy between 1.5 and 1.7m	Damp. NVO	1.5		
			*0.5		2.5	Loose, light grey/pale yellow, sub-rounded, gravelly silty SAND.	Damp	2.0		
					3.0	Colour becomes more orange/brown from 2.3m	Damp, NVC, slight odour	2.5		
		*0.0		3.5	Firm, grey-brown, fine-medium gravelly SILT.	Water in hole	3.0			
				4.0		Dry. NVO	3.5			
				4.5	Sandstone COBBLES	Wet. NVO	4.0			
				5.0	End of Borehole		4.5			

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or olfactory evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Containment Area Investigation Location: Llandarcy Refinery Client: BP Llandarcy Refinery App'd: _____ Date: 04/09/2002 Drawn : SS Ref: _____ Scale: As scale Job No: 39991-016 Drg. Size: A4 BOREHOLE LOG	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: CARW004		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 18/01/01		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : ~100mm	
							LOGGED BY : URS		SCREEN TYPE & DIAM: UPVC 50mm	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
					0.0		DESCRIPTION		COMMENTS	0.0
							Loose, brown, gravelly sandy TOPSOIL (ash).		DRY, NVO	
							Loose, brown/grey, gravelly sandy clayey SILT. MADE GROUND.		Damp rootlets, slight odour	
							Soft, grey, silty CLAY with some wet ash. MADE GROUND			
							Firm, mottled grey/orange, slightly gravelly, silty CLAY with sandy patches. Generally getting sandier with depth.		Some staining, damp, slight odour	
									Moist. NVO	
							Firm, grey, slightly gravelly, very sandy SILT.		Dry, NVO	
							Loose, light orange/brown silty, sandy, sub-rounded to sub-angular, medium-coarse GRAVEL.		Damp, v. slight odour. (Wet patches)	
							Colour becomes more pale brown from 2.5m, with some staining from 2.7m.			
									Wetter with depth	
							Soft, light grey, sandy SILT with sub-angular cobbles.		Dry, NVO	
							End of Borehole			

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or olfactory evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Containment Area Investigation Location: Llandarcy Refinery Client: BP Llandarcy Refinery	
		App'd:	Date: 05/09/2002
		Drawn : SS	Ref:
		Scale: As scale	Job No: 39991-016
		Drg. Size: A4	BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: CARW006		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 17/01/01		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : ~100mm	
							LOGGED BY : URS		SCREEN TYPE & DIAM: UPVC 50mm	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
					0.0		DESCRIPTION	COMMENTS	0.0	
					0.5		Loose, black, sandy, fine GRAVEL (MADE GROUND)	Dry. NVO Damp	0.5	
			*21.8		1.0		Loose, black, sandy, fine-medium GRAVEL. (MADE GROUND)	Wet (product). Mod odour	1.0	
			*52.9		1.5		Soft, grey, silty CLAY	Moist. Mod odour	1.5	
			*147		2.0		Med-firm, mottled grey/brown, silty CLAY	Some staining. Slight odour	2.0	
			*8.0		2.5		Stiff, mottled grey/orangy brown, gravelly, sub-angular-subrounded, sandy, clayey SILT with sandy patches. More gravelly from 2.2m Collapsed to 1.5m	Moist. NVC. Slight odour.	2.5	
		*5.2		3.0		End of Borehole		3.0		
				3.5				3.5		
				4.0				4.0		
				4.5				4.5		
				5.0				5.0		

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or olfactory evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Containment Area Investigation Location: Llandarcy Refinery Client: BP Llandarcy Refinery URS App'd: Drawn : SS Scale: As scale Drg. Size: A4 Date: 05/09/2002 Ref: Job No: 39991-016 BOREHOLE LOG	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: CARW007		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 17/01/01		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : ~100mm	
							LOGGED BY : URS		SCREEN TYPE & DIAM: UPVC 50mm	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
					0.0		DESCRIPTION	COMMENTS	0.0	
							Loose, black, sandy fine-med GRAVEL comprising Ash. MADE GROUND.	Dry, NVO		
			*1.9		0.5			Damp from 0.7m, slight odour	0.5	
					1.0			Wet (product) from 0.8m mod-odour	1.0	
			*28.5		1.5				1.5	
					2.0		Soft, dark and light grey, slightly sandy, very clayey SILT.	Damp, stained, slight odour	2.0	
			*33.1				Soft, light grey, silty CLAY	Damp, NVO		
			*10.1		2.5		Med-firm, pale yellow/orange/grey, slightly silty CLAY with occasional sub-rounded gravels and cobbles.	Dry, NVO	2.5	
			*0.2		3.0		Med-firm grey, very sandy SILT	Dry, NVO	3.0	
					3.0		End of Borehole			
				3.5				3.5		
				4.0				4.0		
				4.5				4.5		
				5.0				5.0		

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or olfactory evidence	Disturbed Sample ■ Undisturbed Sample * Headspace Analysis † Down Borehole Analysis ▽ Groundwater Table △ Perched Water Table	Job Title: Containment Area Investigation Location: Llandarcy Refinery Client: BP Llandarcy Refinery	
		URS	App'd: _____ Date: 05/09/2002 Drawn: SS Ref: _____ Scale: As scale Job No: 39991-016 Drg. Size: A4 BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: CARW008		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 17/01/01		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : ~100mm	
							LOGGED BY : URS		SCREEN TYPE & DIAM: UPVC 50mm	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
					0.0		DESCRIPTION	COMMENTS	0.0	
					0.5		Loose, black, sandy, fine GRAVEL comprising Ash. MADE GROUND	Dry, NVO		
			*47.6		0.5		Sticky, black sandy GRAVEL, some grease. (MADE GROUND)	Sticky product. Mod odour	0.5	
			*37.4		1.0		As above but fine-medium GRAVEL. (MADE GROUND)	Damp from 0.85m, wet from 1.0m. Mod odour	1.0	
					1.5				1.5	
			*237		2.0				2.0	
					2.5		Soft, brown, silty CLAY	Dry, NVC, slight odour	2.5	
			*3.5		3.0		Soft, very light brown CLAY. Drilled to 3.0m, collapsed to 2.0m	Dry-moist. NVO	3.0	
					3.5		End of Borehole		3.5	
					4.0				4.0	
						4.5			4.5	
						5.0			5.0	

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or olfactory evidence		Job Title: Containment Area Investigation Location: Llandarcy Refinery Client: BP Llandarcy Refinery	
			App'd: _____ Date: 05/09/2002 Drawn : SS Ref: _____ Scale: As scale Job No: 39991-016 Drg. Size: A4 BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: CARW009		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 09/01/01 - 10/01/01		DRILLING METHODS :	
							DRILLER : Geotechnical		BOREHOLE DIAMETER :	
							LOGGED BY : SC		SCREEN TYPE & DIAM:	
							CHECKED BY :		SCREEN SLOT SIZE:	
					0.0		DESCRIPTION	COMMENTS	0.0	
			*4.2		0.5		Soft-loose, black, fine-coarse GRAVEL with patches of sandy silt. Grades into gravelly, silty SAND from 0.6m. Lump of sticky grease at 0.65m MADE GROUND	Wet, slight odour	0.5	
			*3.4		1.0		Soft, med brown, slightly clayey, slightly sandy SILT with occasional gravels and cobbles. (MADE GROUND)	Wet. Manure-like odour	1.0	
			*3.5		1.5		Med-soft grey/black clayey SILT.	Damp. Manure odour, some staining	1.5	
			*14.5		2.0		Very soft, brown/grey/black, slightly gravelly, clayey, sandy SILT. More clayey at 2.0m, but remains soft. Becomes sandier and firmer (compressed) from 2.3m	Very damp, slight odour, some staining. Odour decreases with depth	2.0	
			*2.2		2.5				2.5	
			*1.5		3.0				3.0	
			*1.3		3.5		Firm, grey (with some orange streaks), clayey, very sandy SILT. Becoming more clayey from 3.2m	Moist. NVO. Some chicken wire	3.5	
			*0.5		4.0		Loose, med brown, gravelly SAND. Very gravelly from 3.5m		4.0	
					4.5		Med-dense, med brown, gravelly, very sandy SILT		4.5	
				5.0		End of Borehole		5.0		

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or olfactory evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Containment Area Investigation Location: Llandarcy Refinery Client: BP Llandarcy Refinery	
			App'd: _____ Date: 05/09/2002 Drawn: SS Ref: _____ Scale: As scale Job No: 39991-016 Drg. Size: A4 BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: WSTP138 - Hand Auger		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 03/12/2003		DRILLING METHODS : Hand Auger	
							DRILLER : JW		BOREHOLE DIAMETER : -	
							LOGGED BY : SS		SCREEN TYPE & DIAM: -	
							CHECKED BY : SG		SCREEN SLOT SIZE: -	
	WSTP138 - surface sample (S,L)				0.0		DESCRIPTION		COMMENTS	S,V
					0.0		Loose, dark brown, slightly sandy SILT. Hand auger terminated at 0.1m due to refusal.		Steep slope covered in loose, bedrock gravel and cobbles	
					0.5					
					1.0					
					1.5					
					2.0					
					2.5					
					3.0					
					3.5					
					4.0					
					4.5					
					5.0					

LOCATION / NOTES: NVO = No visual or olfactory evidence of contamination S,V = Contamination Observations S - Odour score (0-5) V - Visual score (0-5)		LEGEND Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table		BOREHOLE LOG Job Title: BP Llandarcy Whole Site Investigation Location: BP Llandarcy Refinery Client: BP/WDA 			
				App'd: _____ Date: December 2003 Drawn: SS _____ Ref: _____ Scale: As scale _____ Job No: 39991-044-785 Drg. Size: A4 _____ BOREHOLE LOG			

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: WSTP125		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 13/11/2003		DRILLING METHODS : JCB	
							DRILLER : JCB		BOREHOLE DIAMETER : -	
							LOGGED BY : OG/JG		SCREEN TYPE & DIAM: -	
							CHECKED BY : SG		SCREEN SLOT SIZE: -	
DESCRIPTION		COMMENTS	S,V							
	WSTP125 - 0.2m (2xP)			0.0	Loose black fine to coarse sand with frequent angular gravel with occasional brick fragments. (MADE GROUND)	Damp	0,0			
	WSTP125 - 0.6m (S,L)		*8.8	0.5	Soft light brown grey mottled fine to coarse sandy clay with abundant angular gravel and cobbles and occasional gravel size clinker and angular boulders. (MADE GROUND)	Damp	2,2			
			*5.7	1.0	Soft grey brown silty CLAY with abundant subangular cobbles and boulders and occasional orange staining.	Damp	0,0			
				1.5		Damp				
			*1.7	2.0	Becoming mottled grey and light brown and slightly silty .	Damp, with occasional black staining	1,3			
			*0.8	2.5			1,3			
			*0.8	3.0	With angular boulders from 3.0m.	Damp	1,3			
	WSTP125 - 3.3m (S,L)		*16							
			*7	3.5	Trial pit terminated at 3.5m due to refusal.	Damp				
				4.0						
			4.5							
			5.0							

LOCATION / NOTES:		LEGEND		BOREHOLE LOG	
NVO = No visual or olfactory evidence of contamination S,V = Contamination Observations S - Odour score (0-5) V - Visual score (0-5)		 Disturbed Sample	 Undisturbed Sample	Job Title: BP Llandarcy Whole Site Investigation	
		 Headspace Analysis	 Down Borehole Analysis	Location: BP Llandarcy Refinery	
		 Groundwater Table	 Perched Water Table	Client: BP/WDA	
				App'd:	Date: February 2004
				Drawn : CM	Ref:
				Scale: As scale	Job No: 39991-044-785
				Drg. Size: A4	BOREHOLE LOG